BODHI

International Journal of Research in Humanities, Arts and Science

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The journal welcomes publications of quality papers on research in humanities, arts, science. agriculture, anthropology, education, geography, advertising, botany, business studies, chemistry, commerce, computer science, communication studies, criminology, cross cultural studies, demography, development studies, geography, library science, methodology, management studies, earth sciences, economics, bioscience, entrepreneurship, fisheries, history, information science & technology, law, life sciences, logistics and performing arts (music, theatre & dance), religious studies, visual arts, women studies, physics, fine art, microbiology, physical education, public administration, philosophy, political sciences, psychology, population studies, social science, sociology, social welfare, linguistics, literature and so on.

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"Research" is the key word that should be normalized among students entering Engineering studies invariable of their major or branch of study. Students who aim at a brighter career prospect should involve themselves in exploring possibilities of finding something new or upgrading features in the existing technologies. Firstly, they should be exposed to various theories that underlay inventions and discoveries and should gain comprehensive acquaintance with these engineering marvels. The knowledge gained from theoretical perspectives will lay a strong foundation for their empirical studies, help them to shape and develop new technologies that will serve the need of the common people.

With an objective to expose students towards theoretical research in recent technologies, the following topics were suggested and the each student was allowed to choose any one topic from the suggested topics.

- Artificial Intelligence at health care Industry
- Drone Technology for life saving activities
- Embedded technologies for Hospitals
- Energy Efficient Technology for day-to-day life
- Business Intelligence

The students collected the resources from authentic open access journals related to their chosen topic. The gathered information was tailor made in the form of a research paper with standard straplines. The whole process was guided systematically during the classes and fine-tuned by the editors soon after the plagiarism check. This initiation will not only add value to the student's resumes but also it will trigger interest in research and innovation.

The success behind this special issue of the journal is purely because of the student's interest in exposing themselves to research and their commitment to accomplish the same. My sincere thanks and gratefulness to the international editors for their tireless work and investing their personal time in grooming this research work. This project is made feasible only because of VIT's vision "Transforming life through excellence in education and research" and it's a blessing for teachers and students to be a part of this great institution.

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CONTENTS

ROLE OF EMBEDDED TECHNOLOGIES IN HEALTH CARE INDUSTRIES

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Introduction

Embedded technologies are nothing but computer hardware which consists of a software designed to perform certain functions, mainly real-time operations. They perform either independently or as part of a large system. Embedded technologies are of great help to hospitals especially those who use HIS (hospital information system), this has helped the hospital reach certain level of informatization. Embedded technologies are not alone used in medical field but also in home appliances, industrial and automotive. Most people interact with these technologies, even if they don't realize it.

Yu, Lei.,et.al., Embedded technologies are deeply branched into: IOT- Internet of things, RFID-Radio frequency identification, SNT-Standardized nursing technologies and WCT- Wireless communication technologies. Each of these technologies have a different function. For example: to communicate with any person or object at any point of time and one of its significant advantage is mobile medical treatment which is flexible and extensible and an effective way to implement access of interconnection of multi-source information.(**IOT**); for non-contact identification of objects or articles i.e in case of RFID it is a small object which consists of an antenna connected to an electronic chip for sending and receiving information its main function is to keep track of the functioning of the person or object on which it is tagged in. It also has other uses like the features in RFID can be used in tracking of animals and selling products at retail stores and at libraries(**RFID**);to track the quality, safety and the patient's outcome etc(**SNT**); for automatic transformation of information and WCTs are further branched into ZigBee, Wibree and WiFi which play an important role in many different researches(**WCT**),respectively.

Liberati .,et.al., Embedded technologies are just all about IOTs and RFIDs but are also the backbone for various equipment like scanners, accelerators etc. There are also technologies to support the emerging demands of hospital automation like: Glucose's Continuous Monitoring system, Patients Tracking System and monitoring patients using wireless LAN's Oriented Infrastructure. These technologies play a vital role in advancing hospitals and helping them achieve various goals. The above said four technologies/systems aren't the only ones in embedded technologies but there are other technologies like standardized NNN technologies, wireless sensor technologies etc:- but the ones above mentioned are the one who really contributed in the expanding and growth of healthcare industry.

Zhou.,et.al., My personal opinion on this topic is that technologies do play a vital role in hospitals and in saving lives. There has been a lot of equipment upgrade in hospitals like: LINAC accelerator, Digitalized X-Ray, USG, CT-Scan, MRI, C-ARM Scan, PET, SPECT, pacemakers, CPAP machines etc., the thing that I'm trying to highlight here is that technologies develop hospitals and has cured various diseases/injuries that once was impossible to overcome. It also has not only cured but found things like cancer and tumour that people wouldn't have even imagined back in the day. I personally have seen a lot of technologies like **smart cards** which is an important process for employees and patients in the hospital. Another such thing was proposed by RFID by the **RFID tags** which ensure the correct link between blood samples and the patients. They are all used in monitoring vital signs and also in all kind of imaging systems, for tracking treatment

progress. Then there are **EHRs**(electronic health records) which is one of the most frequently discussed health information technology aimed at improving clinical care. I'm not just constraining to embedded technologies but there are also other technologies like EMR (electronic medical records), telehealth services and mobile technologies like tablets and smartphones.

Literary Survey

Tracking the Social Dimensions of RFID Systems in Hospitals

Fisher .,at.al., There has been a talk about RFID for tracking inventory and identifying patients using tags and other devices, they also have a valence towards surveillance, there has been an enormous amount of revenue earned due to RFID in healthcare. These systems are shown as a key ethical concern regarding privacy due to the surveillance potential of the technology. This paper also adds that a conceptual framework has been developed for identifying the factors that contribute to the success/failure of this system in hospitals. The findings suggests that a range of sociotechnical needs are required for implementing /evaluating the RFID system in hospitals, but the other side to be highlighted it that the clinical nurses feel scrutinized and intensified with labour because the task of keeping in control of these technologies fall upon them and they fell overburdened, in several hospitals strong nurses have even blocked the implementation of these technologies and the hospital also experience constrains like maladaptation and organizational challenges and most hospitals are unprepared. **These two constrains are one of the main findings in this paper**. Certain methods have also been taken to keep these problems in control like appointing technology vendors so that they could resolve problems as part of their sale rather than an organization planning to overcome it.

Building a Smart Hospital using RFID Technologies

Guinard., et.al., A ubiquitous echograph system and a networked digital camera has been developed, echograph system is nothing but an ultrasound system for capturing pictures in motion and one of the very successful ones in echograph system is echocardiography and the networked digital camera was warmly welcomed by the clinical staffs and introduced into real clinical procedures. It also talks about the features provided by the system which is pretty inexpensive and it also takes care of features like theft control and power conservation. There has also been a reference to the loss of lives due to ignorance in hospitals using that as a point to express that such surgical errors can been avoided using RFID tags which is basically like a wristband which identifies the person thus prevent confusion and performing the wrong surgery in the wrong body.Even though there are a lot of pros there also come open problems to be solved regarding the using of technologies in hospitals. For example in case of RFID we have to make sure the radiations emitted does not mess with the pacemakers and heart monitors in the hospital and also these radiations can be pretty harmful to the patients. Results also prove that there has been less consumption of energy and object tracking time due to this system.

Data Mining in Healthcare–a Review

Jothi., et.al., After the release of information regarding data mining there has been a lot of changes in how the hospital works and how various test and practices take place, because its main aim is to perform practices efficiently using data and analytics. Data mining came into role when there was a need of extraction of hidden knowledge from this wide spread information rich competitive world and human medical data are the most rewarding and difficult of all biological data to analyse. Data mining has played an important role in healthcare industries by working with human health and life, physical interpretation, constant maintenance, security issues, predicting various diseases and medically diagnosing it and its one of the main reasons for the evolving of healthcare industries in this rapid pace. The main problem which is faced by data mining mention in the paper is that there are a lot of information mining and the accuracy of these

data mining methods vary so it is important to characterize which data to be taken and which to be not. It also mentions about a hybrid model which resolves the problem and that is preferred for predictions of various problems or confusions in the future. Another problem due to these new technologies are that due to its development new ways of education are required for people in medical field. It has also noted the importance of ethical and legal aspects of data mining(medical), which are actually fluid instead of the national and international bodies addressing it.

From Cloud to Fog and IoT-based Real-Time U-Healthcare Monitoring for Smart Homes and Hospitals

Nandyala .,et.al., Cloud computing is a part and parcel of IOT, this paper talks about Fog computing and how it adds and extends Cloud computing and in promoting U-healthcare monitoring in smart houses and hospitals in doing so highlights the description of different tier necessary to achieve C2F vision key characteristics in U-healthcare monitoring.C2F is nothing but cloud computing to Fog computing which all comes under the IOT system and Fog computing is the ideal place to analyse most IOT data. The main task of the tier is to host applications and to manage the IOT system, it also consists of data centres for data management and applications. There has also been a reference regarding the abundant opportunities for business provided by cloud computing through a wide length of computing services. IOT devices generate data constantly, and often analysis must be very rapid, but on the other hand it does not meet all of our requirements. The main issue is latency its due to a large amount of files moving from the network edge to the data centre, then there is the outstripping of the bandwidth due to the traffic from thousands of devices. This is where the whole concept of Fog computing comes into place where it forms a link between IOT devices and far off data centres. It provides flexibility and scalability by providing network resources and preventing latency.

Interference of Wireless Technologies on BLE based WBANs in Hospital Scenarios

Karvonen .,et.al., This work mostly talks about a mathematical model to evacuate the interference of wireless technologies on BLE enabled devices in a hospital environment. BLE is nothing but Bluetooth low energy which formerly marketed as Bluetooth which is a wireless PAN technology. The mathematical model concept is a very practical topic which can be understood better by imaging. The use of wireless devices is continuously increasing worldwide and it is common to find it in hospitals for tracking doctors, patients and other medical equipment. The medical model above mentioned is further classified to geometric model-Fig1.0, path loss model-Fig1.1 and temporal model each having its own significance. These models have a BLE and a ZigBee as nodes in each patient's room which helps in controlling the whole room. Even though they sound pretty successful these communications need carful radio frequency planning at the beginning and it is always a subject to interference as shown in Fig1.2 and It needs a lot of security algorithms and modulation techniques during its long time setup, and these nodes mentioned above can cause interference in case of multi-storage hospitals because the nodes in the adjacent patient's room are considered to be identical. The location of the ZigBee nodes inside the target room also need to be properly managed if the range of the affected BLE links need to be longer.
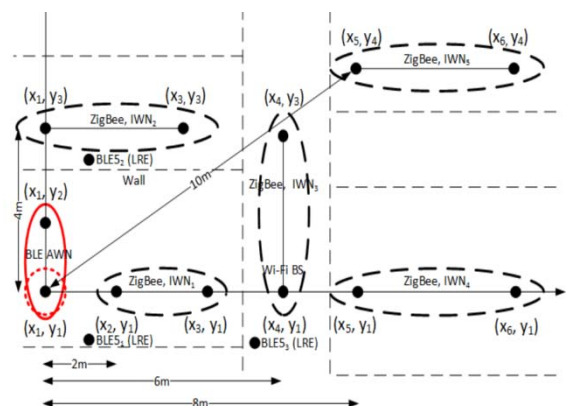

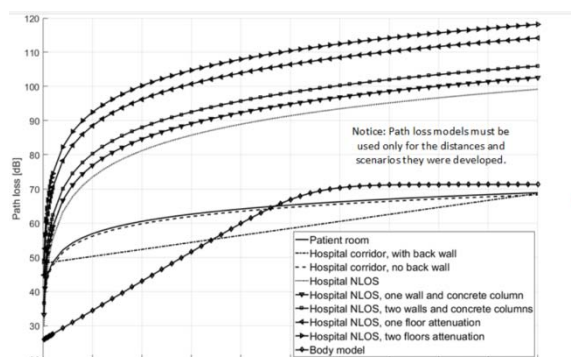**Fig 1.0 Karvonen (2017) Geometric Model**

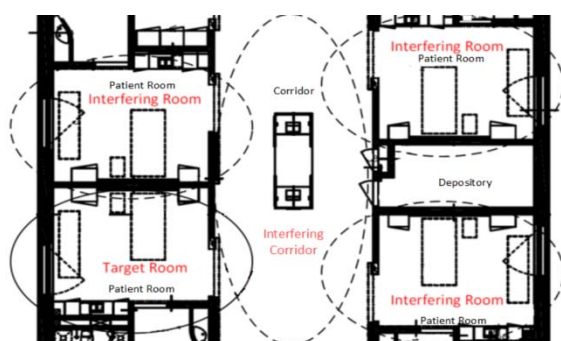**Fig 1.1 Karvonen (2017) Path loss values as a function of distance**

Fig 1.2 Karvonen (2017) Illustration of hospital room scenario

Cross Mapping of Nursing Care Terms Recorded in Italian Hospitals into the Standardized NNN Terminology

D' Agostino .,et.al., This study talks about standardized nursing technology/NNN technology which reviews the nursing documents, their activities and phenomena and gives an open opinion about it and helping in development of nursing science. This system was highly practised in Italy, that is because in Italy the nursing documents are still paper-based and recorded in free text style, without the use of a SNT. This paper found out a sample of 137 nursing documents and in which 80% the nursing diagnoses interventions and outcomes were cross-mapped into NNN terminology. The above said cross-mapping is actually a study using a multicentre design for collecting the above said terms using a D-Catch instrument and mapping them with the NNN terminology. One of the major problems were that the nurses weren't showing any consideration towards the patients. An adequate example is that when the paper found about the 137 nursing documents only a mean of 2.2 nursing diagnostic terms per patient were present. This was also the main reason which SNP was strictly recommended in Italy. Different educational and organizational strategies are required in order to obtain complete, standardized and reliable nursing documents. A lot of academic and continuing education programs are conducted to educate both students and nurses. Moreover, nursing leaders have to use strategies to improve working conditions of nurses in order to enhance nursing autonomy.

Advantages

1. The operating conditions in a hospital are pretty rugged and hard, but these industrially graded embedded systems have become very useful in tackling such difficulties.
2. Embedded technologies give the doctors and patients what they are actually dealing with and always gives them a heads up.
3. It helps them in pre-practising surgeries, tracking vital signs and treatment progresses and also saving a large number of lives.
4. Embedded technologies are also helpful in the data storage process involved in health care industries
5. Embedded technology devices like defibrillators and pacemakers helps in monitoring the patients 24/7, thus reducing the burden.
6. Apart from pacemakers and defibrillators there are also other nano-devices like remote patient monitoring, tracked ingestible sensors and mHealth or mobile health, which makes managing patients an easy job.
7. IOT or Internet of things helps in creating a single framework through which data can be generated and exchanged.
8. These technologies help in increasing the convenience, efficiency and even budget-saving options of modern hospitals.
9. Another important advantage is that the cost involved in managing and running the system is very low.

10. Embedded systems have even developed up to android so that doctors can monitor their patients through their personal mobile.

Conclusion

Even though embedded technologies have its own flaws like reduction of manual labour, thus people facing un-employment; it mainly concentrates on one particular goal, saving lives and making that easy. The application of embedded technologies in the medical field appears to have endless possibilities. They provide the patients a better understanding about their health and provide ways in which they could lead a healthy life. The embedded technologies have gone to such extent that they provide healthcare services to remote areas, where doctors are not easily available. They help in identifying various unknown diseases, and also helps in decreasing the time to diagnose and treat patients. Embedded technologies aren't all about medical fields, it varies in all ranges from the alarm clock we use to the cars we drive, its all technology these days. It's of great help to both men and women. Focusing on the big picture, these technologies have made India get connections all over the globe personally as well as professionals. Another important fact is that the medical field would always be new methods of treatment and tools, so just there is a lot of market for software and thus employment.

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BUSINESS INTELLIGENCE - A MUST OF MODERN BUSINESSES ?

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Introduction

(Craig Stedman and Ed Burns) Business intelligence is a subset of a Decision support system which helps both private and public companies to ensure quick and quality decisions by the huge sets of data they take in. BI basically collects data from internal IT systems and external sources, prepare it for analysis, run queries against it and build data visualizations, dashboards and reports which are then used by the executives of the company for operational decision making and strategic planning. Ranjan, J. (2009), Intelligence of Business is a new field of the investigation of the application of human cognitive faculties and artificial intelligence technologies to the management and decision support in different business problems. Azma, F., & Mostafapour, M. A. (2012). There is a lot of incomplete and scattered data which a company encounters, this information can be made useful using an intelligence organization. The useful data can be targeted to improve the performance of the company, predict future changes and get meaningful solutions. All this helps the company to increase their sales which is in turn their main moto.

The rise in management decisions shows the quality of the organization. They require intelligence support to facilitate the functional organizations and companies such as processing offline analysis, Business analysis, organization and knowledge management, data mining and other activities in the organization.

Literary Review

Components of Business Intelligence

There are several components of BI such as:

Ranjan, J. (2009), OLAP (On-line analytical processing): In this way the users can mend the data as they wish using designed tools that allow for the navigation of dimensions such as time or hierarchies. Data warehouses and data marts are worked on by OLAP techniques and tools. These system first processes the data then discovers various trends and analyze crucial factors. These BI tools are used to store and analyze data such as data mining and data warehouses, mapping, information visualization, and dash boarding.

Data warehouses and data marts: This is the most important component of BI as it supports the physical propagation of data by handling the numerous enterprise records for integration, aggregation, query tasks and cleansing. It contains live data and has a minimal history.

Business Intelligence and Data Warehousing

Geetha, Keval, Param(2020), Business intelligence focus on product pricing and product positioning, sales performance, forecasting, profitability whereas data warehousing as the name suggests simply means storing the company's data in a single place. Business intelligence and data warehousing goes hand in hand as all the decisions for making a company rise is dependent on the quality of processed data and other information from the data stored in the data warehouses. The entire process is carried out as heterogenous data ->ETL process -> Data warehouse -> Quality reports. ETL refers to the extraction, transformation, and loading of data from one data source to another. ETL process helps businesses to have a combine view of data and help improve business judgements. ETL eliminates the duplicates and ensures quality of data. The modern day ETL-tool performs better and faster. Using ETL

and data integration, enterprises can obtain the best data view across multiple sources.

Data Warehouse Architecture

Ahmet Uçaktürka (et.al) (2015),For structured stacks and product design a quality architecture is required. Architecture is developed in order to answer the changing demands of the corporation. Data warehouse architecture is used by companies to create a data warehouse architecture. Data warehouse, provides some important advantages to its users with its effective decision support solution, in struggling with concept and organization problems. Companies can comprehend and analyze the relationship between various trade functions deeply such as account and customer services by first joining data in data warehouse. The main advantages are that the companies and organization can access data stored in their data warehouses any time of the data and can use them for various decision making. Data warehouse, is the best way to provide the continuity between Data Marts and accessing the source. This analysis is realized in general by data mining in re-organizing the data and researching the trends. Data warehouses help the organizations in understanding individual markets better, in examining them and revealing widespread trends (Microsoft, 1998).

Business Intelligence Applications

Celina M. Olszak and Ewa Ziemba(2006), Most of the company that uses BI systems are in trading, insurance, banking, telecommunications and manufacturing line.

Insurance

- Claims and premium analysis
- Customer analysis. Analyze client needs and product usage patterns.
- Risk analysis

Banking, finance and securities:

- Credit management. Find credit problem progression by customer type.
- Branch sales.
- Customer profitability analysis.

Telecommunications:

- Customer profiling and segmentation. Calculate high profile product profiles, integrated customer profiles and determine future customer needs.
- Customer demand forecasting. Forecast future product needs, improving customer retention.

The Edge of having this Software Implemented in Companies

- Quick identification of market trends from huge lump of data available
- Generation of fast and accurate report
- Increased operational efficiency
- Valuable and effective business insights
- Qualitative and improved decisions
- Better customer satisfaction
- Increment of company revenue
- Provide competitive analysis
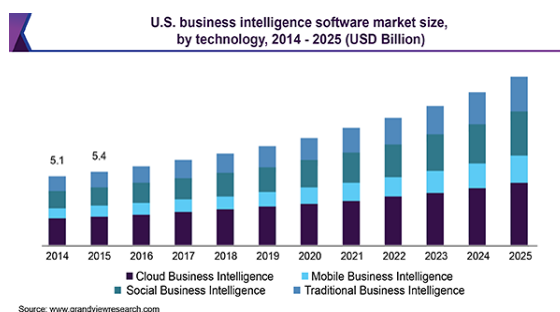
Fig. 1source- www.grandviewresearch.com

Problems Faced by Companies to Install this Department

Elizabeth Waringa, Cost – It has proved that it is costly for small and medium sized enterprises, this is due to its sophisticated technology which is still relatively new. Thus, might create a potential loss to the business because its statistics is different from bigger firms

Complexity – The use of data ware in its implementation has made it rigid in its techniques. Thus, making companies not to take risks which would have been beneficial to them

Limited use – the creation of business Intelligence was for rich enterprises that could adapt

with the shifting phases of its design. Due to its complexities Business Intelligence is quite expensive as it was created for a small demographic which could afford

Time consumption – the process needed to achieve optimum efficiency take a long duration of one and a half years to be implemented. This can create small loop holes that can make a company lose data because they do not have the substantial data that they need.

Conclusion

Data intelligence is vague concept and is in trend because of the growth of industries who have to make big decisions based on the trends they observe and from the data they take in from the consumers and other competitors. Data intelligence is a subset of DSS(Decision support system) which is one of the major reasons behind the rise of any company. All the data which is taken in by the company and then stored in data warehouses. Data warehouse is an expensive installment but is worth the benefits it provides. Big companies which lacked this technology have installed it and observed blooming results. ETL process is the core of this technology. In a long run data intelligence is going to bloom and an expected market growth of 10% will be observed. The industrial sector of India has not yet realized its full potential but once they recognize it then the quality of their decisions and competitiveness will increase. Despite the complexity and time consumption, the technology has its benefits and are wide ranged as industries from banking to telecommunications are benefitted.

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Fig1: source- www.grandviewresearch.com

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USER FRIENDLY AI TECHNOLOGY IN HOSPITALS

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Introduction

AI is one of the most fast-pacing industry with regular developments. Artificial intelligence came into existence in 1956.The various fields which use AI are healthcare, agriculture, education, Flying., Retail, Shopping and Fashion, Security and Surveillance., sports Analytics and Activities Related to Manufacturing and Production.. However, in this paper our major focus will be healthcare. We will focus on the applications of AI in healthcare, uses of robots, failures of AI and future scope

Researchers in the 1960s and 1970s discovered the first problem-solving program, known as Dendral. It was designed for use in organic chemistry. It is as considered one of the most significant early uses of artificial intelligence in medicine. Later in 1980s and 90s microcomputers and supercomputers were discovered which boosted the use of AI in healthcare. Guoguang Rong et.al. AI is defined as intelligence of machines as compared to intelligence of human beings and other species. It has brought a shift in healthcare industry by increasing the availability of healthcare data and analytics techniques. AI plays a significant role in fields like cancer, neurology, cardiology, stroke etc. AI makes use of robots and other technologies to analyze thepatient. What makes AI different from the traditional technology is that it processes the input data and gives a well-defined output.

AI is also used in development of drugs and vaccines such asDSP-1181.Varun H Buch et.al preaching AI can replace humans is a baselessstatement.AI can assist physicians but cannot replace them. AI can help them in taking important clinical decisions by providing required data but cannot take decisions independently. However major problem associated with AI is lack of updated data and wrong medication. It fails to deal with new cases and therefore gives wrong treatment. Robots are a major part of AI in healthcare industry, they are used as assisting nurses, virtual chat boxes etc. They are used in various medical institutions like British national health service, **Sig Tuple Technologies Private Limited,** and other major institutions.IBM and google have also developed AI algorithms and are using in their workplaces.

Literary Survey

Challen.et.al (2019). Machine learning or AI is use to solve complex problems, and make predictions on patient's data. According to reports, there will be a 14 percent effect of AI on the Global domestic product by 2030 which can be achieved by increasing productivity. They have an impressive accuracy rate. Clinical decision support system (DSS) provides rules for secure prescription of medicines but has its own Sid effects. They are precisely marked for general trials but they fail to deal with the breadth and variety of information which involves typical diagnostic process, as a result AI is better because it deals with a specific Diagnosis .AI performs actions based on the training data and previous records. They are used in determining risk predictions based on patient's records.

Problem: the main problem of AI is the failure to deal with Operational data which varies from the general trend and requires unique treatment and medications. This is known as distributional shift.

Solution: This problem can be solved by updating the Systems and software regularly and bringing into action different cases and situations.

Types of AI

fe jiang et.al(2017) The AI devices fall into two categories, one which use structured data such as imaging, genetic and EP data and the other category which uses unstructured data such as clinical reports, etc. .AI is further grouped as supervising and unsupervising learning. Unsupervised learning focuses on feature extraction whereas supervised learning focuses on predictive analysis.

Wahal et.al (2018). Supervised learning focuses on patient's data such as height, weight, blood pressure etc. and stored in EMRs Unsupervised learning pays attention on physical reports. Artificial intelligence is also classified as general and narrow artificial intelligence. Artificial general intelligence which pays attention on large no of general diseases and creates a general remedy for them and artificial Narrow intelligence which focuses on disease.

AI also makes use of vector machine and neural network technology to make predictions on patient's data and Suggest required diagnosis. AI has A special feature called NLP (natural language processing) to translate medical reports and identify the disease related terms and words, keywords and enhance the clarity of the information. Wahal et.al (2018).NLP is another field of AI that tries to bridge and reduce the differences between low level and high level languages .AI also extracts large amount of data from images signals sent to them via wireless technology. It also tries to categorize and prioritize Different steps and predict the outcome In recent times, AI plays a significant role in stroke analysis, it uses patient's previous Records and determines whether he is prone to stroke, it also tells about the medication and steps required for treatment .AI consists of various Components which have expert systems and has expert level knowledge in solving problems, machine learning is also used for automating data analysis by taking into account algorithms that separate the different patterns in data and arrange them accordingly to incorporate changes.

Applications of AI in Heath Care

AI ensures smooth flow and automation of primary care, allowing doctors to focus more on critical and serious cases. There are AI chat boxes which is AI-powered service and has small algorithms that Provides patient's with answers related to all his general queries, it reduces patient's cost of travelling and consultation. They are available 24*7 and talk to multiple patients at one time.

Assistance of Robots

Mallika Rangaiah (2020), Robots play an important role in healthcare industry. AI and other robots have revolutionized surgeries in terms of their speed, and depth while making delicate incisions. Since robots don't get tired as humans, the problem of fatigue in the middle of lengthy and important procedures is terminated. Robots reduce the percentage of mistakes and accidental problems during surgeries. Some examples are I-robots, humanoid robots etc. There are also virtually nursing assistants that perform a wide range of tasks such as assisting the patient, providing the best care. They are designed to respond to the queries of patients and provide correct diagnosis. Just like robots they are also available 24*7.in the recent pandemic their role and use has increased rapidly. They interact with patients through chatboxes and respond to their worries. This ensures social distancing and no direct contact. The world's first virtual nurse assistant was Care Angel, which can facilitate wellness checks through voice and AI.

Problems

One of the biggest risks and problems of robots and AI in healthcare is that the AI system might at times be wrong, for example, it may give a wrong drug to a patient or make an error in locating a tumor in a radiology scan, which could result in the patient's injury or dire health-related consequences. It fails to deal with new symptoms and data and therefore suggests wrong remedy

Scope of AI in Future

AI has a bright future in the health care industry. Simon Marshall, AI will play a huge role in hybrid models where clinicians will be supported in

diagnosis, treatment planning and determine the risk factors, but keeping patient's health to ultimate priority. This will result in faster improvements and ensure low stress levels. They will reduce the risks rate and may even perform minor surgeries in near future.

Advantages

1. One of the major advantages of AI in health care is its ability to analyze big data reports and give future predictions

2. AI has a much higher accuracy rates as compared to humans and can make highly accurate predictions based on the data.

3. AI has revolutionized the surgical procedures in terms of speed and depth by making use of robots. Unlike humans' robots do not get tired.

4. Another advancement of AI in healthcare are the smart algorithms that help physicians or patient to read the data. They are able to notice patterns which cannot be easily recognized by human eye and determine the general trend.

5. Another development of AI in healthcare came with the use of chat bots or voice bots which are robots which listen to the queries of patients and provide the proper guidance.

6. Humanoid robots or I-robots are also used as virtually assisting nurses which assist the patient and provide the best care.

7. They are available 24*7 and can perform repetitive jobs with the same intensity and same accuracy unlike humans who sometimes get bored or are not available after certain slots.

8. AI also creates room for several innovations and developments as compared to other aspects of healthcare.

Conclusion

AI is one of the best gifts given to the healthcare Industry. Even though AI has minor setbacks but it's important for us to use the positive sides of the invention to create a world a better place. We have seen the impact AI has on the healthcare industry. The key role played by robots in assisting physicians in taking important decisions, reducing their stress and workload. The useful algorithms which help in decoding the data, their benefits to the patient which include proper care, availability 24*7 and giving the proper guidelines to them. However, AI has several potential benefits which need to be worked upon in future.

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THE CONVERGENCE OF AUTONOMOUS INTELLIGENT SYSTEMS WITH THE HEALTHCARE INDUSTRY

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Introduction

Lu, H. et.al. (2018) Fiction and movies have always shown Artificial Intelligence (AI) to be a powerful system capable of extraordinary feats, like JARVIS in the iron man franchise. However, in the real world, AI is a lot more subdued, whose growth however is accelerating at an exponential pace. Be it Apple's SIRI which can do anything from telling you a joke to placing a call to whomever you want it to, or IBM's Deep Blue, which learnt chess rapidly and gained enough knowledge to beat World Champion Gary Kasparov, AI is slowly beginning to become quite useful in today's world and shows no sign of slowing. But AI as of now still has a long way to go. Today's AI is what can be referred to as "Weak AI", where the intelligence in question excels only in specific tasks which it is designed for. Take AlphaGo, the AI system which learned the game GO and managed to beat world champions who had decades of practice in just a few years. Now if we were to take this AI and try to use it as a facial recognition software to unlock your smartphone, it would fail because it does not support execution of multiple tasks yet. Still, due to extensive research done on AI by the top companies like IBM, Microsoft, Apple and Tesla, the potential of AI has skyrocketed manifold and so have the areas of use like healthcare, driving, space exploration, security among many others. Emanuele, J., & Koetter, L. (2007)In today's day and age, many hospitals are at the end of a multi-pronged chokepoint. They have to find ways to make healthcare better and more efficient, while at the same time providing top quality care to all patients no matter what the situation may be as this is the thing that is most

expected regardless of the current scenario. Hospitals are constantly striving to be as efficient as possible while not giving up on their clinical excellence. The problems lie mainly in the obvious fact that while population is on the rise every day at an unimaginable magnitude, hospital real estate grows at a very measly comparative pace. Thus, hospitals must deal with patient overcrowding many a times, especially during serious health crises. Emergency wards or rooms are almost never empty, and it takes a few hours of waiting sometimes just to deal with something that should be dealt with rather quickly due to the seriousness of the issue at hand, however this is just not possible with the at capacity or sometimes, over capacity wards. Serving a steadily increasing number of patients with the same care as if there were much less is proving to be a major challenge. Omitting any previous steps to speed up the process usually leads to unnecessary testing, delayed medication, and assignment errors, all which increase the chance of the patient becoming worse rather than better. One more shortcoming is the lack of sufficient healthcare professionals in the industry, be it nurses, doctors or pharmacists, leading to extreme pressure on the existing professionals to deal with the increasing array of patients, longer stays in hospitals, overfilled beds and patient contentment. Panesar, A. (2019) Although the myth that AI will one day replace us humans in industry still runs rampant, it is highly unlikely (especially based on the current growth) that this will actually happen and in healthcare for one, it looks like AI and ML technologies will be highly effective more so as an assistant and as a tool rather than replace your doctor itself. AI and ML, if integrated into healthcare as

ideally imagined would be a very competitive tool and would take the efficiency of many branches of healthcare up manifold. AI has the capacity of almost infinite data storage and retrieval, so it could store the data for millions and millions of patients through a common database along with their health and sickness history, thus any doctor finding out symptoms from a patient could just type them into the system and instantly would get a hit on the most common disease associated with those symptoms, not by reading theoretical journals, however by accessing a database of real recorded cases, which would make diagnosing and categorizing a multitude of times easier than it would have otherwise been. This technology also has applications in rare surgical cases where it could have a record of previous surgeries done on that same part, and however rare, even if one or two were to be present, that would be a huge help to the surgeons working the case. Another underrated application would be integration into the devices we carry daily, our smartphones and our fitness smartwatches. Once a common framework is built, it would be tremendously helpful for patients to be able to present a doctor with a history of heart rate, sleep data, blood O2 saturation levels as these numbers could provide a more comprehensive idea of what ails or could ail that patient in the future.

Literary Review Overview of AI, ML and Deep Learningin Healthcare

Davenport, T., & Kalakota, R. (2019). AI is a collection of multiple technologies, all which come under the collective umbrella name of AI. Out of the numerous constituents, the most common branch is what is known as Machine Learning (ML) and its further complex counterpart, Neural Networks. Many technologies of AI have immediate applications to medicine and although this technology is still developing for all fields, it has immense usage in the industry even as of today. ML is used far more even in medicine as it is the one that has the most capability at this moment. ML as a technology has its multitude of uses, most important of which lie in predictive analysis, that is predicting both current

and future sicknesses and ailments as per given data, the dataset which will always keep increasing and will become more and more accurate as it is fed more real time data. This can also be applied to further recommending treatments for that patient which will be focused on efficiency and patient wellbeing. The next levels of this technology itself involve Neural Networks and eventually Deep Learning, which is essentially the closest technology has ever come to resemble a human brain, that is it is a framework which can essentially "think" and furthermore predict outcomes. One other field of AI that is quite "primitive" in terms of other branches is the one of robotic process automation, which is basically a program or an algorithm implemented into physical or digital bots, mainly used for clerk work and administrative purposes, which follow a pre-loaded set of instructions and are thus not built for "thinking" or performing any other actions. However, these are built to act as semi-intelligent system user and are now mainly used for simple, repetitive tasks such as billing, data uploading as well as security and authorization of protocols.

Patient Opinions on Remote Health Tracking

Tran, V. T. et.al. (2019) No matter the advancements in AI and its applications in healthcare in particular, and however powerful our own devices may become in tracking our health data for better treatment and diagnosis, all these will fail if the patients itself lose trust in either the technology, the system or the data tracking in which these technologies are involved. This is because usage of data without consumer consent is illegal and could lead to multiple court cases and lawsuits. In France, recruiting chronic patients and asking them a set of broad questions regarding this topic came up with some interesting results. Out of the 1183 that were questioned, a fifth of them considered that the positives of the technology far outweighed the negatives. On the far opposite end, those who believed the negatives were far more than the positives, the percentage reduced to about 3%. However, a 35% of patients denied integration of one of these technologies into their healthcare process. Almost half of all the patients all

but said that usage of the technologies was a wonderful opportunity for them and independently but as a whole came up with about 47 potential benefits of this move, mainly identifying them as better follow up of care, reducing the stress and the load that came with excessive treatments as well as reducing the workload of the healthcare professionals and better data collection and analysis for both the systems and the doctors involved as well. On the contrary, also asking independently and assessing as a whole, patients also identified 31 potential threats regarding this move which mainly constituted of fears like the likelihood of hacking of these systems leading to information leakage and misuse of the aforementioned, and the replacement of human intelligence with these systems.

Problems Regarding Implementation of these Technologies

Panch, T. et.al. (2019) In 1858, the UK government spent about 300 million pounds (in today's figures) in order to build a sewer system due to the unbearable stink coming from the river Thames as it had become a sort of a public toilet. However, this decision came about only after intense debate and scrutiny, and in the end, they decided to do it and it turned out for the better. Right now, the ethical debate over the introduction of AI into the healthcare system resembles this, as people try to look at the advantages and compare them to the disadvantages.As of this moment, the healthcare institutions that do adopt some form of this technology have their own individual infrastructure and this poses a problem, there being no common framework such that the sharing of this data becomes feasible and viable seamlessly. Thus, the continuity of care across different organizations becomes nearly impossible at that high level. Another real-world issue that must be addressed is that most AI systems at this point that would help in healthcare immensely have all but one big problem, they only exist in theory, that is in research papers. We, at this point simply lack the systems in order to train these algorithms to fit each region differently as it will initially be a common framework and we must also

be able to provide enough data from all walks of people equally to ensure that the system does not develop a patient bias. What this means is that if most of the patients are of an ethnic majority, we cannot and should not expect the same level of accuracy for ethnic minorities which human doctors are usually able to accommodate. Electronic medical records (EMR's) are also the way of the future but are limited by local cloud storage and lack of integration as well as the lack of satisfaction among healthcare professionals.

The Current State and Probable Future for these Technologies

Bali, J. et.al. (2019) Right now, based on the limited use cases of AI we have seen, some technologies have come out superior and shown us the true future potential that these systems might have as they become more technologically superior. A use case of IBM Watson, one of the most famous AI systems in the world termed IBM Watson-Oncology, has proven time and time again that its proficiency at picking the adequate drugs for cancer patients is as good as and, in some cases, even better than the same done by its human counterparts. Stanford University developed an AI system that had a radiological algorithm, and this ended up detecting pneumonia better than its human counterparts (radiology doctors). As this technology becomes more and more advanced, it sometimes ends up posing a problem for future development as we do not want it to go "rogue" and end up disrupting the systems it initially was developed for. This means that the machine, no matter how powerful, will still be under an individual or a group, such that they are able to monitor everything the system does and are able to shut it down if ever necessary. Like anything, advanced technologies are a double-edged sword, they can be exceptionally good or exceptionally bad based whose hands they fall into. Coming to a specific country in which this technology could have an interesting scenario, India, as of now there are no laws in the country that cover data transfer of this sort specifically. This means that any middle parties between the individual and the medical institution

that are told to handle the data have a limitless scope on what they could do with it, which could pose quite a few challenges as people might not be comfortable with this development.

Issues Raised in the Collection of data for these Frameworks

Kaur, J., & Mann, K. S. (2017) Part of the biggest challenges in incorporating systems into the current healthcare system, is data, or more so the lack of it. What this means is that while each patient needs personalized care, because every patient is different, the lack of a common data framework makes the collection and storage of previous patient data fickle in usage. Right now, around $8/10^{th}$ of all patient data is in this raw, incomplete form. Statistics show that chronic diseases like heart disease, strokes and cancer are among the most common and treatable health problems but are also among the most expensive to treat and due to a lacking in the healthcare system, especially in countries like India, patients are not able to get better as quickly and effectively as they should. Diagnosis of patients becomes a lot more efficient when data collection is no single pronged tool and is multi-pronged rather, meaning that the data should be collected and collated from multiple sources. This means collecting the general present data of the patient along with their history of problems, hereditary data, population and future developments, which allows for a comprehensive profile and better healthcare as a result. Thus, we can see that a technology like Big Data has an excellent scope in this field, which is the collection of multiple diverse datasets to form a collective data bank, also including easy transfer of this information. An application of this big data healthcare system was proposed in another paper, wherein the authors wrote about coming up with a framework that could spread information among the masses about alternative medicine to a current prescribed treatment and provide a system to avail this alternative treatment.

Start-ups in the AI-Healthcare Revolution

Iliashenko, O. et.al. (2019) Right now, spearheading the integration of involvement of advanced technologies into the healthcare system are many start-ups, mainly in countries like US(49), Israel(7), UK(6) and one in India which are considered to be the top in healthcare start-ups. These start-ups focus on helping both the ones who work for the patients and the patients themselves, be it an intelligent smartphone bot that could collect your answers to general questions and pool it into a centralized database and tell you what could possibly be ailing you, and if you need a doctor, then a similar system, albeit of a higher calibre at the hospital itself would tell you how serious as to your condition was. This could help save a lot of time and unnecessary hospital trips only if people were told with clarity what their problems were exactly and how to deal with them. Benevolent AI is a UK based company now considered among the top in the world in this field and founded with a focus on medicine development among others. It uses a minefield of data, drawing on both structured and raw data to create a comprehensive total framework termed as a "Bioscience Knowledge Graph", where this collected data is taken in, computed and results are generated along with proof backed hypotheses. Another USA start-up, called Qventus is used in hospitals itself and is used as a sort of "think-tank" which makes decisions to simplify the process from start to finish, that reduce time and costs, along with making the provided healthcare a better experience to the patient in question as well. Other companies work on the betterment sector, like Gymfitty which has branded itself as an AI trainer, which tracks user health and fitness data during workouts and during other times of the day in order to provide and optimize workouts using that data. As the data collected from past sessions keeps getting fed into the system, it becomes better and better at optimizing future workouts.

Findings

1. In current years, due to the efforts of people and corporations alike, including but not limited to Elon Musk, IBM, Apple, Tempus, Kite, AI and further applications in fields like ML has become a more sophisticated technology and is becoming more adaptive and useful to us in our lives by the day.

2. The applications of AI and ML is present in numerous fields, including medical, virtual smart assistants, autonomous vehicles, financial risk predictors, just a few among the multitude, and the focus of this paper is on the medical side of these applications, and more accurately how AI can be adapted in the hospital industry to better benefit all parties involved.

3. Remote Health Tracking is one of the areas in which AI has potential to be useful, and just as the name implies, it is the usage of wearable devices and remote systems to keep track of patient conditions, like heart rate, blood O2, steps, etc. and this method comes to fruition when connected to a centralized database, such that doctors can use this data in their diagnoses more accurately as they can access data over extended periods of time and chart it.

4. One of the upcoming advanced applications are those involving the direct link between the brain and systems, eliminating the need for middle interactive systems like mice, keyboards and this sort of a technology, although in early stages is being spearheaded by programs like Neuralink, and hopefuls of this technology aim to be able to solve problems like complex neurological and brain related issues that aren't currently curable.

5. Information storage and revival is another use for AI and ML, especially enhancing the current EHR (electronic health records) to involve video records, natural language processing and dictation tools to better improve information indexing and future comparison and retrieval.

6. Radiology and Cancer departments are where AI already has a presence, and further developments are working towards making these systems further optimized to detect cancerous strains as early as possible to improve diagnosis and be able to surgically remove the tumours before they become a major problem.

7. Although these are tremendous advantages in this sphere, each technology, these developments come along with their own set of disadvantages and shortcomings.

8. Healthcare collected data as such could help not only the person being treated, but the collected and condensed data in the form of test results, helps for further diagnoses and treatment of future patients, especially in the case of rare patient conditions, as this helps to diagnose such cases better and treat them more efficiently.

9. One of the major disadvantages and this is one not unique to the medical sphere, but one that is associated with the expansion of data and integrated systems all over, is the privacy of data. Health data is very sensitive and highly personal, and because these AI integrations involve the uploading and the sharing of data across large centralized database that help the ease of access, the leakage of this data, from leaks either internal or external, could cause massive problems regarding doctor patient confidentiality and the selling and exploiting of this data by nefarious third parties.

10. Another problem that could come up and probably will in the treatment of multitudes of patients in the common framework system would be the development of a bias within the system itself. We know that systems like AI grow the more the data fed to them, and with a large sample space are able to make decisions a lot faster. Now although a national or global framework will eventually exist, hospital frameworks should tend to be localised for treatments, because the people going to different hospitals around the world widely differ in demographic. This is evident by observing that the average person going to a hospital in the US is very different to the average patient in India. However, even in localized frameworks, problems may arise due to the sheer probability that the number of people constituting a majority

in a particular region will be treated a lot more than the number of people constituting a minority, and thus systems need to be taught not to develop a majority bias in decision making.

Conclusion

The integration of technologies in the domain of AI and ML in healthcare are a double-edged sword. Like the introduction of anything radical and new, they come with their own set of benefits, as well as caveats. We, especially in this digital age must be extremely conscious of such implementations, more so in a field that values the data collected and analysed of supreme importance. Confidentiality of data in this space is one that is legally regulated, and mass data leaks could wreak havoc in the system as a whole. This movement of making healthcare more machine reliant is such that it affects people at all levels, be it personal (wearable fitness devices to remotely track health) to patient-system links at hospitals, to detection of operable conditions via radiology and all the way to a connected, rigorous framework to influence treatments, decision making and decision enhancement. As such, looking at the opportunities in this space, going all the way from data collection both in and outside the hospital and clinical environment to surgical detection, assistance and rehab, eventually moving into more "human" spaces like consulting, successful intersections of these fields would bring about a massive change and would make the healthcare industry, especially one that is struggling nowadays under huge patient intakes, the time taken per patient and not being able to accommodate the growing patient base quickly enough, and the shortage of hospital infrastructure and staff shortages, a more streamlined and efficient place for problems both major and minor, for people from both the receiving end (patients) and the providing end (consultants, surgeons, doctors, nurses, therapists).In a country like India, technologies like this usually take a long time to implement and, in this case, would be no different, but the gradual integration into our society would be a major help to the already overwhelmed industry due to our population and standards of living, which are lower owing to us being a developing country. A common framework would help treat those ailments that are commonly found within large communities, and with remote health tracking, crisis response during disease outbreaks would be a lot better and a rather smooth process compared to the scenario in which these sorts of implementations didn't exist, due to the lack of such infrastructure to contact trace, remote diagnose and remotely test, among others to monitor medicine intake, treatment and rehabilitation.

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AI AND ITS EFFECTIVENESS IN HEALTHCARE

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Introduction

Gunning, D. (2017).: Artificial intelligence in medicine is the next step that must be taken to make healthcare widespread and more affordable. While AI is not meant to replace caregivers, caregivers that will use AI would probably replace those who would not. If a balanced perspective of the limitations and benefits of AI are considered, then we can see that AI can be incorporated in healthcare to make a meaningful impact.

As described by Nick Bostrom in his book, *Superintelligence*, AI is classified into three types:

Artificial Narrow Intelligence (ANI) performs a single task, such as playing a game, facial or speech recognition. ANI implements a limited part of a mind. Artificial General Intelligence (AGI) is also known as human level AI. It is known as such as it can recognize environments, understand, and reason the way humans would. Artificial Super Intelligence (ASI) can perceive and discern better than the best humans. It is smarter and better at everything ranging from scientific study to general creativity.

There are more components that must be stated. These are supercomputers, capable of high-level computations, machine learning, which consists of basic algorithms and deep learning, which consist of brain-like neural networks. Alan Turing stated, "For a machine to be deemed intelligent it must have to show characteristics like that of a human being". As we undergo more and more technological advances in the field of development of artificial intelligence, it is said that AI is getting closer to passing the Turing test and in the fourth industrial, the primary component will be AI.

Meskó, B et.al. (2018).: Medical administrators and clinicians are facing unparalleled pressure because of the everchanging requirements- administrative and medical. The first and foremost problem faced in the healthcare industry is its human resource crisis. The reasons for this crisis are a worldwide shortage of doctors, aging and burnout of practitioners, a higher demand for chronic care for long term illnesses. In the next 20 years, one third of the doctors are expected to retire. The newer generation of physicians look for a limited number of working hours. This would lead to a further decrease in available medical professionals at late night hours. To quote the authors, an effective healthcare system depends on the *availability, accessibility, acceptability,* and *quality* of its workers. With this decrease in available doctors and surgeons, there is the increase in life expectancy of the older population, which in turn would lead to more demand for full time care and treatment. Not to mention, the lack of access to basic, safe, and quality medical care varies across the world.

Reddy, S. et.al(2019) Services with AI as the basis could help make more accurate diagnosis, make small decisions, perform analysis of huge amounts of data necessary for operations, perform lesser important tasks such as those related to HR and general transactions which do not require the touch of a doctor. AI is considered to take over some of the tasks currently being performed by healthcare workers and administrators. There are four areas where AI is likely to show the progress: healthcare administration, clinical decision support, patient monitoring and healthcare interventions. In healthcare administration, AI has a far-reaching desideratum. We can utilize AI for many processes. To name a few, clinic scheduling and patient prioritization that would hence reduce waiting time and implement efficient use of the doctors' time. AI can predict the length of stay of patient and

efficiently use stretched hospital supplies. AI can be used to reduce administrative burdens. Routine and monotonous tasks such as data entry and maintenance of large databases can be managed through AI. Under clinical decision support, the AI will go through the vast amounts of patient and clinical data, as well as draw upon large scale data about similar previous cases to support decisions made by healthcare professionals. This can help reduce medical errors and personalize treatment unlike ever before. With electronic health records and smartphone and fitness monitoring devices, AI now has details on sleep patterns, heartbeat, pulse rate, etc. that it can exploit to monitor health of the patient and identify the onset of various diseases.AI can help health interventions be made for individuals or similar groups of populations. The need for the unification of AI and medicine is extremely crucial, especially in unprecedented times as such, with the spread of coronavirus around the world. It can help in the research and implementation of vaccines as well as help with treatment. The large amounts of data required to be collected regarding the testing and reporting of COVID 19 cases around the world, and especially in India considering the large population of our country.

Literature Review

Ross J., et.al. (2019)Artificial intelligence is a tool used by many people in various industries, to help with different tasks specific to those industries. They perform many tasks better, faster, and more efficiently then humans. There are three types, machine learning, AI, and robotics. AI learns the same way that humans do- through trial and error. It will take a decision which depends on the need of the situation and depending on the many variables. AI handles routine tasks, which are considered boring tasks, giving the physicians the time and space to work on the 'human touch' which cannot be replicated by the AI. The top 5 healthcare applications of AI, which are administrative functioning, virtual nursing assistants, surgery assistants, dosage error detection and fraud detection. They are helpful in preliminary diagnosis, image diagnosis, clinical trials, and cybersecurity. AI is also very efficient in connecting different machines and integrating data across several platforms, the author goes on to write about different examples. A plague commonly affecting the people of the world, diabetes. One of its symptoms is diabetic retinopathy which leads to blindness. This has a visible symptom and can be diagnosed with the help of AI. It involves the reviewing of remote images, in which case AI would be helpful as they would increase speed and free up eye surgeons time to focus on the actual treatment. Healthcare workers must keep in mind that it is especially important to form bonds to increase trust with the patients, to make sure that they feel comfortable, to provide the best care. It is important to embrace change and to focus on abilities that cannot be replicated by the AI, such as emotional, communicational, empathetic and judgement skills.

Mesko, B. (2017). Until now, physicians have had to rely on skill, rudimentary tools, and their discernment to perform diagnosis and provide optimum healthcare to the patient. Although, the percentage of accuracy when it comes to just human diagnosis is not that high. However, now, with the incorporation of AI and digital health in the medical industry, we see the field aiming for three major goals, which are, first, the patient is now priority, second, to be able to analyze larger sets of data that will in turn make healthcare more precise, which is the third goal. For the last hundred centuries, medicine has been made to cater to the general public and hence, the minorities with problems get left out. With the incorporation of AI, we can now bring individuality into the field,i.e., solutions can be found for each individual in a way that best suits them, based on their lifestyle, community, past health records, etc. The industry has now been revolutionized by health care trackers, affordable genomics, and advanced biotechnology. It had become impossible for physicians to keep up with these large amounts of data. This vast data, however, can be interpreted with the help of supercomputers, AI, and deep learning. The author has highlighted the importance of the combination of the physician's

knowledge and reasoning ability should be combined with the advanced analytical power of the AI. This leads to greater accuracy when it comes to making predictions and diagnosis. There have been many examples of the incorporation of AI in medicine. With the vast amounts of anonymous eye scans and images that are available to the software, it can analyze all of it and help with eye treatment. It can be a 'cognitive assistant.'. Recently, a Dutch company has taken the help of AI to go through hospital invoices and records, to identify where the practitioners where making errors, to help them improve.

Fogel, A. L., et.al (2018) AI can help with the human-to-human bonding and relations, make more accurate decisions, help with diagnosis, analyze large amounts of data all in short amounts of time that are beyond the capabilities of the human mind. It can perform all the tasks that do not necessarily require the physician, thereby freeing up valuable time, that can be spent in providing the best quality care to the patient. Hence, they can form better bonds with the patients, leading to a trustworthy relationship. We have been using machine language, which follows a predefined set of rules and performs a single task. However, with AI, when data is given to it, it almost thinks, reasons, analyses, and defines its next move after careful deliberation and analyzation. It is because it provides this diagnosis inexplicably that there exists a distrust between the patient and doctor and the machine. They do not understand how the machine has arrived at the conclusion that it has. In fact, if the doctor cannot provide a satisfactory explanation as well, this could potentially deteriorate the relationship between the doctor and the patient and add to the fear against them. Regardless, repetitive, and rote tasks, which are not enjoyable for the physician, can be given to the AI, who can do it better and faster. The author goes on to talk about a few examples. The first example is that of skin cancer in humans. Skin cancer is the most common cancer, and it is imperative that signs of the cancer are spotted early, which they can be because it is comparatively easy to spot the visible malignancies. A study was performed, in which a deep neural network was able to differentiate between the malignant and benign lesions, based on the vast amounts of images and information it possesses, with around the same accuracy as that of expert dermatologists. Another example is of a problem that plagues many people, which is medication adherence. Since people do not fill up and complete prescriptions, an AI integrated smartphone app can identify the person, the pill taken and keep count of the pills taken.

Panch, T., et.al, (2019) In today's world, every hospital or organization, has built their own data infrastructure to help and support its own needs. The data is organized and constrained to provide services to people across care continuums. With increasing costs and newer policies to maintain patients across several hospitals, there is a pressing need to combine this data. In these places, AI would improve the accuracy and efficiency of all these data laborious tasks. It has the potential to make medicine more precise by pertaining it to individuals rather than the general public. However, there changes must be made in other areas of medicine, so that this advance in technology is effective. There are economic and political factors that play in here, hospitals need to have data infrastructure to store this data so as to tailor it to the local population and to remove the aspect of a bias. This requires rigorous amounts of data entry. There is a clear need for AI as this kind of high computing work hat is impossible to do manually. One of the major problems is regarding the ownership of data. People have a problem with their data being vulnerably shared across these many organizations, especially those with interests outside healthcare where this information could be beneficial for them. People need to know that their data is protected by various policies and protection acts, that do not cater only to larger infrastructures but also to smaller healthcare organizations. This would open the doors to innovation and prosperity across the healthcare industry.

Sparrow, R., et.al, (2020) In *Deep Medicine,* Erik Topol states that AI in medicine would help increasing the time that the doctor would get with their patient, as it would analyze data from different

records, integrate personal records, and avoid errors in diagnosis. He says that AI will not replace physicians but be incorporated into medicine to work with them. However, the authors of the paper disagree with Topol. They say that instead of helping, AI would worsen the already present disparities in the medical industry, if used in the same economical and political background in which it is practiced today. If AI does increase the time that a doctor has, then because of the need to provide healthcare to all people and to increase cost effectiveness, instead of using this time to care for the patient, more patients will be seen by the doctors. The doctors, after the implementation of AI, would feel disempowered, demoralized, and fragmented, due to the threat to their jobs, and the sudden change in the industry. AI would negate the need for the redundant skills that physicians have spent time to learn. AI would disrupt the environment and it would be difficult for physicians to practice in such an environment. A weary workforce would worsen the healthcare access and quality of healthcare that is given to people. It is not necessary that incorporation of AI would increase decrease the time they spend doing data entry as the lifeblood of AI is data , this would increase the demand for data, and physicians may end up working on this instead. It would be exceedingly difficult for AI to understand the body language, accents, and mannerisms that humans can perceive easily.

Kabir, M. (2019). Machine learning or deep learning takes place in a 'black box' of deep neural networks, where the algorithms are ever changing based on the analysis done by the AI, based on pattern recognition and trial and error. AI can therefore approach tasks the way a human would, with the advantage of being able to analyze large amounts of data in noticeably short amounts of time. Science fiction aside, the use of AI in medicine, brings up troubling concerns such as privacy, data protection and doctor to patient contact. Doctors are expected to be compassionate and understanding, which is feared to be lost with the incorporation of AI. AI helps in reducing administrative burdens and performing clerical tasks, thereby clearing time for the physician to do other things. AI can enhance the diagnosis made by the doctor. AI can interpret large amountsof data in a fraction of a second. This diagnosis could also help in the cases of first aid, where a professional is not present. This can increase the accuracy of clinicians. It can manage chronic diseases such as asthma and monitor mental health. There are still many obstacles in the path of successful incorporation of AI into the industry. It would be difficult for both the doctors and the patients to understand the decision of the AI. Any error made by the AI, could lead to a catastrophic problem. Transparent communication should be key. Therefore, if AI is interpreted and incorporated into the field properly, with changes in other sectors too AI could be more of an opportunity than a threat.

Advantages
1. First advantage of AI is the most obvious one. As healthcare moves into the digital world, more and more data will be generated and accumulated over thousands of platforms. There would be so much raw data to process, it would be almost impossible for most doctors to use the data efficiently. However, an advancement in AI would benefit the clinicians in this situation as AI has the ability to read and manage this large amount of data, so that the physicians can use it easily.
2. AI can make decisions based on the large amounts of data they can process. These decisions can help diagnose patients, plan treatments and manage the health of the general population. Essentially, AI can streamline the data available.
3. AI can share, access and accumulate a patients data records from large number of platforms. It can combine all this data to provide accurate and personalized reports that help the individual patient.
4. The fourth benefit of AI is that it can make healthcare more accessible, especially in developing countries where healthcare services are still lacking in many areas. AI can help to

make healthcare both more accessible and more efficient.

5. Due to a lack of qualified physicians, usually due to a lack of resources and skilled training, in many rural areas, misdiagnosis is a huge problem. In these areas, AI would be incredibly useful as it can give the doctor advice, to avoid a wrong diagnosis and improve the accuracy.

6. AI can also identify and reveal diseases that a person may be at risk for, early enough to provide efficient treatment, depending on their current health problems, where they live, their past experiences and compare it with previous similar cases to make an accurate estimation. This is beneficial especially in the case of hereditary and genetic diseases.

7. AI can help save time and cost. They save time due to their benefits with data processing and managements and that in the technical domain. Also, after the high initial cost, hospitals using AI would be more cost efficient as compared to ones who do not.

8. Another advantage of AI is that it has an incredibly large benefit when it comes to surgery. They are unrivalled as an assistant during surgery because, aside from data processing and decision making, normally surgery, especially that of the heart and the brain, requires tiny, precise, and accurate movements and complex operations that need minimal errors can be performed with simplicity using AI. The development of nanorobots would just accelerate this.

9. It can improve the patient to doctor communication. Using technology such as virtual nursing assistants, healthcare providers can improve communication between them and the patient. They can decrease the number of visits to the hospital and can transfer important data to them. By using AI, a doctor can manage their time and patients to help spread their time efficiently to the people who would require it more.

10. AI can help with administrative works of a hospital. They can help with fraud detection, reduce errors caused in financial or administrative domains, and they can increase cyber security.

Conclusions

AI has a long way to go before it can be efficiently incorporated into healthcare. However, it clearly will do more good than harm in this domain. Especially in developing countries such as India, where access to good quality and efficient healthcare is a primary concern, especially in rural areas, incorporation of AI might be the much-needed solution. For the common people, AI can help efficiently keep track of health, monitor the risk levels of the person, and make sure that they get the treatment is the best suited to them at proper times when the risk level is low. It can help with the treatment and cure of life-threatening diseases such as cancer, Parkinson's etc. Once the disadvantages to AI, that is to say issues related to patient information confidentiality and such are taken care of, AI would be the next step in healthcare, that would take it to newer and better heights.

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THE VARIOUS ASPECTS OF IMPLEMENTING ARTIFICIAL INTELLIGENCE IN THE HEALTHCARE INDUSTRY

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Introduction

Stanfill et. al.(2019) AI or artificial intelligence are algorithms which are being applied in various field to make effective choices after analyzing data and trends. AI helps to record and find minute details in scans and tests, helps to detect medical conditions and diseases and also helps clinicians in making proper judgements. In healthcare, one of the main factors which decides its success rate is, health information management, which takes care of collecting, storing and using the data in times of need. Agencies are trying their best to develop algorithms with heavy funding inputs from the government and the industries and institutions. The pressure is to save lives and money as well. The healthcare industry generates huge volumes of data which have to be recorded and analyzed which is becoming immensely hard for physicians to interpret. Key information remains hidden in the massive quantity of data which might would have proved to be lifesaving, on the other hand predictions cannot be made on time if the data recorded is not efficiently scrutinized. But looking at the level at which AI is currently, it's hard to have complete trust on AI laden equipment to be put to use with complete trust.

Davenport et. al.(2019) AI does not indicate a language or a process by itself but contains a set of technologies. They include machine learning, natural language processing, using AI laden robots, in diagnosis, treatment and administration. Machine learning and its subparts like deep learning help in identifying cancerous cells from scans like radiology. Deep leaning in combination to studies of radiology help in identifying diseases with greater accuracy with much more clarity. This process is termed as computer aided detection, but on the other hand they present little significant value to a human observer as they are hard to comprehend.Natural language processing (NLP) is used to understand human behavior and input, like speech recognition, making reports by analyzing notes which were made roughly. To implement these techniques, NLP algorithms first need to be taught about the language, it has to analyse and use the knowledge to apply for translating and recognizing.Stanfill et. al. (2019) Assuming that AI in healthcare would improve to an extent that its reliability would not have to be questioned, there are other challenges. These challenges can be legal, in the workforce, changes in governance.

In the health care department automated medical coding or in other words computer assisted coding has been used to assist in writing algorithms for self-decision making, using natural language processing. Studies claimed that when coders did the same work, when faced with repeated scrutiny, their productivity rates dropped whereas for computer assisted coding the productivity rate remained the same. Medical professionals should contribute in recognizing data to help in the automation process.

AI systems are getting involved in faster detection of health conditions like neural network algorithms have been effective in identifying strokes by taking activity in legs, arms and other body parts as input. AI can help to trigger alerts when a person is set to suffer an septic shock, appropriate steps can be taken beforehand to prevent it, but when they are not reported or reported staggeredly by physicians, the life of the patient is put to risk. Despite all the drawbacks or unavailability of the

know how or infrastructure, there have been significant developments as well. AI is extending its roots to devices, as IOT(internet of things) connects more and more vital machinery with the internet. Devices measuring glucose levels, taking ECGs and measuring stress level have been available for long now. Data is collected and safely transmitted within organisations to be analysed, but the main challenge is to maintain the quality of such data, so that it can be trusted and put to good use. There are legal drawbacks on the path to apply AI too. Physicians and medical coders are solely responsible for the handling of vital information about patients. They must be trusted upon with security and specials steps have to be taken to prevent leakage of data. Adding to this another legal issue is, with whom does the liability lie with, after an AI service takes a decision, irrespective of whether it's an error or an accurate judgement. Every algorithm should have reasons for giving an output which have to be discussed before applying it on a large scale.

Davenport et. al.(2019)As robots are becoming widely popular in various sectors, even in healthcare sector it has made its mark. Robots are being implemented in factories to help in the manufacturing of instruments. AI is getting embedded in the brains of patients and helping perform surgeries with precision. They are also used in the administration department to automate the process by mimicking a human. They do not need robots, they are simple sets of transparent codes which help in calculation and auto generation of files, bills, etc.

Throughout the years, rather than developing AI to be as accurate as humans, the harder job has always been to integrate AI in the existing environment. The healthcare sector tries to be more attracted to the rule based system though they are hard to maintain and follow. AI though is coming in the scene but is mostly used in the research labs and not majorly in actual clinical practices. Big companies and industries like Google, IBM constantly keep revealing their findings in AI which are more accurate in finding results, but reasons like economic, political, prevent them from being implemented in the same speed.

If AI helps in automation process, then will it generate unemployment? Studies conducted by Oxford, Deloitte confirm that this can indeed happen as they automate the work process, limit jobs by affecting the cost of production and also prohibit labour market growth.

Literary survey

Reddy, et. al. (2019) AI falls in the list of newest fields of engineering. Great mathematicians and scientists gave the standard, that the capability of an AI system/machine should be on how hard it is to distinguish between decisions taken by men and machines. Through history AI has faced many setbacks due to limitations in computing power, but as exclusive funding pours in, AI gets an even better future. AI is delivered in the health care industry at various levels. Starting with the administrative level, AI has allowed clinicians spend more time with the patients while AI takes care of documentation, retrieving data from the systems and keeping track of the hospital resources. In critical times, AI can take accurate measures by predicting the outcomes of medical conditions like sudden shocks, also reducing the chances of committing an error and fill the gaps in the current healthcare industry. It has helped to monitor patients and to keep them in touch with their medications and regular checkups. It also intervenes in healthcare industry to have assistants help patients to guide through unknown and unfamiliar situations, especially elderly people. They are also helping in analyzing the medical data of patients like scans and test. There are many challenges in the way which prohibit AI to be put to its full capabilities. Every new development has to be assessed by everyone involved in using or providing the facility related to the development. Clinicians have to be more open to new facilities to improve in their profession and keep up with the advancements AI with deep learning and machine learning is bringing with itself.

Human Resource Crisis

Meskó et. al. (2018) As more and more time passes we like to imagine the future generations would be lucky enough to work with robots powered by the fuel of Artificial Intelligence, but we tend to ignore the healthcare crisis that exists worldwide. First, due to doctor shortages across the world, second, physicians in practice are aging and thus retiring which is not in pace with the increasing demand of healthcare around the globe. Third, factors like their availability, quality, etc. The demand for healthcare is increasing exponentially due to increasing population together with increasing life expectancy. 400 million people do not receive medical care in any form and approximately 5 billion people lack safe medical facilities like anaesthesia or are such facilities are not affordable for them.

There has been an increase in the number of chronic patients around the world and this along with the problem of reducing number of physicians per patients is aggravating the situation even further. Physicians are being overloaded and hence they are facing sleeplessness and an uncontrollable lifestyle. These gaps can be filled up with the involvement of AI in the healthcare industry.

In Poor Countries

Hossain et. al.(2019)In poor and emerging countries, where healthcare is scarcely available, digital health technologies have to be applied so that they are developed quickly. But again, the cost of developing and installing such devices are hard to bear for developing countries which makes the barrier hard to break. Many clinical practises are different in different countries which makes the process of application very hard to get adapted to, they have to be developed according to the need of regions and physicians practising in the region. Thus, development should be in such a way that it can be acceptable by the varied public. Which can be achieved only by a global vision by integrating physicians from across the globe.

Subcategories in AI

Jiang et. al. (2017) Though AI cannot replace physicians completely but AI can be used to assist them, help them in their decision making process by reducing errors and suggesting the best step to be taken. Achievements in data analysis and availability of data have been key to its development. To deploy AI in the field of healthcare, it first needs to be made aware of the data, like imaging, testing, electro diagnosis etc. AI devices are categorized in two categories, machine learning (ML) and natural language processing (NPL). ML is used to analyse the patient and detect their outcomes whereas NPL mainly analyses and extracts information from unstructured data to convert them to machine readable format which can then be analysed with ML. AI is being used in three main categories: cancer, neurology, cardiology as they can help in quick detections by analysing the scan results.

ML is used to organize the data and find related information of interest. Machine learning is categorized into supervised and unsupervised learning. The first one is to extract the information only but the second one is to connect the data and between the patient's behaviour. Neural network techniques have been used to diagnose cancer, scanning mammary glands and predicting tumour outcomes.

Deep learning is used for more complex analysis and of high volumes of data, which are far more complex to analyze. Machine learning techniques are not capable of analysing images as they are usually in dimensions higher than two and are in big volumes. Another technique is to lower the dimensions to still use ML techniques to analyse images. Natural language processing is used to help in the decision-making process. It is mainly used to identify keywords in disease related terms and classify them accordingly. Such measures help in easy identification of diseases and data has shown that they do it high rates of accuracy.

Application in Stroke

Jiang et. al. (2017) Stroke is a condition in which very few patients can get treatment in time. With the

use of AI we can identify and analyse the risk of stroke for any given person, thus helping in early detection and diagnosis. Under AI, ML is used in the field of strokes. MRI, CT scans are performed for such patients for applying the neuro imaging techniques. SVM and neural network are the two major categories of ML that are used for these processes. IBM Watson, based CC-cruiser are the major systems from whom there are major expectations for contributing in development in these fields as for example IBM Watson have shown excellent results in their work in the field of oncology, where results have shown that steps recommended by AI are 99% coherent with the ones suggested by a physician. But all the findings, research and development can only be put to use when there are proper guidelines given by the government on how to conduct the tests, to have a regulated system which will ensure that there are lesser risks in the process of implementing AI and the final step is to integrate the flow of data and familiarity of the resources among the physicians, the AI systems have to be trained with data from the past, present and continuously updated and configured to keep it efficient.

Drug Development Process

Mak et. al.(2019) The drug development process is started using inputs from already existing results and they are developed by compounds which are developed many times using trial and error methods, but if AI's help is taken then options can be eliminated and more promising trials can be conducted first. For analyzing a drug we need to first identify its behaviour on encounter with other enzymes, the compound which hits the target first is called hit which is analysed using computer techniques and are termed as lead. This brute force technique and other similar methods are used for R&D, which not only demands a lot of monetary input, but is also hard to solve, as problem gets more and more complex, with no surety of success in the results. In these cases, AI can help in analysing the factors in the test cases and giving faster results with more efficiency, as it gives quicker results with

lesser investment. It will also reduce human intervention in the process of finding the potent drugs. Deep learning has achieved massive success in this arena by approximately saving time of over a decade and saving money of over US$2.5 billion. AI assists in helping to identify new drugs and restructure the process of drug designing. IBM Watson, AI platform have identified five new RNA proteins. AI reduces the number of compounds synthesised thus reducing the cost. AI also helps majorly in the most important step, i.e. to synthesise the chosen drug in the optimal route. The analysis of data as it is done by AI and ML, it has led to many partnerships between AI and healthcare companies. They have collaborated to work towards specific diseases and health conditions. These partnerships have helped develop monitoring technologies, with wearable tracking devices.

Though currently there haven't been any drugs developed with the help of AI but the future is bright, AI and healthcare workers have to work hand in hand to create and train AI to be used in daily practices. Though tests haven't been conducted with AI developed drugs, but they can help in developing pharmacological techniques which aren't available still.

The Actual Scenario

Panch et. al. (2019) Almost all healthcare facilities have their own infrastructure for storing huge bulks of data but as time is passing the cost of maintain such high amount of storage is no more feasible and AI is expected to contribute here by helping in managing the huge piles of data and keeping them in much more organized way, but this is where the truth comes in.

AI and all its methods and ideas of implementing are still found only in research papers. They are not applied heavily in the industry due to two main reasons. First the existing system has to be reengineered to fit them in the system where they can be actually useful. Second for AI to be useful they have to be trained with data related to the topic which it can analyse. But most of the healthcare organisations lack the infrastructure to collect the

data. Once they are collected, they should be updated and abide by the medical standards. Now to store such huge amounts of data, infrastructures like cloud have not only helped in development but also brought down operating costs and investments significantly. With these comes the next problem, of ownership of data and how to make people trust on institutions and companies who provide such infrastructure and would store their data. The entire processing of integrating AI would need intervention of even the patients. The European Union's General Data Protection Regulation which controls data privacy are needed to keep check on patient's data, as patients argue that they should be the sole owner of their medical records. Thus we realise there is an urgent need to develop both secure and highly capable data managing infrastructure to be of any help to AI.

After this there are two ways we could go to build data infrastructure and help the AI in the coming days, one is to build on existing data and successful research domains recent Science and Technology Research Infrastructure for Discovery. The other route is to make it compulsory for healthcare institutions to store their data in commercially available clouds by making sure that there is no compromise on the security and integrity of the data. Ultimately the success of AI comes down to these factors where we either work towards the goal to develop measures and trust among the supplier and handlers of data or keep waiting until the plans and ideas of AI in healthcare get diluted and forgotten.

Advantages

1. The entire aspect of humans committing errors and losing focus while doing repetitive tasks over and over again is completely eliminated as it can repeat a task over and over and still be error free.
2. Reduces the time taken to analyse scans, images, compare them with previously obtained scans and results, by analysing the minute details of the tests and finally take decisions, as its ability to learn and take decisions in seconds gives it an edge over physicians.
3. Especially in the healthcare systems, where sometimes the emotion of people sometimes tends to get the better of them. In such cases AI helps as it does not have any feeling or sense of fear, and thus enabling them to take risks, to do what is right, without second thoughts.
4. AI helps to bring precision in medicines, which would not have been possible without them. Deep learning algorithms have helped to narrow down areas of research to help algorithms reach to solutions faster and in a more efficient manner.
5. In the US alone the spending on the healthcare sector has raised from 5.2% in 1960 to 16.0% in 2007, this indicates the rising expenditures in the healthcare sector. Though the initial costs of setting up AI environment can be expensive, but in the long run, especially in developing countries, these can act as major boosters of the economy.
6. With increasing number of patients each year, the number of healthcare professionals are not increasing at that rate. AI can be act as a helping hand in such cases to reduce the stress of physicians and even take their place in their absence temporarily.
7. AI is making keeping track of patient's data, more and more simple. AI in wearable devices is helping track of the basic things like sugar levels, oxygen levels in the blood daily activity and so much for, which are especially essential for the elders who are incapable of travelling to the doctors regularly.
8. AI can help in the integration of data not only in the specific hospital or lab, but can help in integration of data throughout the world, where everyone would follow a standard data storing and analysing models to maintain uniformity.
9. AI can help create a framework which can store the medical history of an individual which can be accessible from any part of the world, and can be updated after the patient undergoes an operation or surgery in any part of the world,

and can show even the daily medications that the patient takes.

10. If AI works to automate the processes in healthcare, corruption in the healthcare industry can be curbed immensely, where every action taken would be recorded and will have proper justification after every step.

Conclusion

Mahajan et. al. (2019) Developing countries like our country India, find major scope to implement AI in almost every sector, especially healthcare. Our country has an abundant supply of manpower, talent which can be and is being diverted to contribute more and more towards developing AI. In our country, al lot of foreigners visit everywhere from our neighbouring countries to get treatment which is not usually available in their countries. This generates huge amount of data, similar to other developing countries, which needs integrity. Our country still lags behind superpowers who have developed ecosystems connected through AI, and in that aspect, we need what our country lacks. Even though we have such a high population and the talent, what we lack is the number of trained professionals. A simple indicator is the digital divide that is being extended year by year. It is quite clearly visible that the number of people connected to the internet per 100 people is very low in the Asia Pacific region than Europe or North America. Lamy et. al.(2019) Especially for women usage of improved algorithms are of utmost importance as they can help in determining accurate results of scans which can help in identifying breast cancers efficiently. Using Case-Based-Reasoning (CBR), which is based on memory-centered cognitive model, instead of black box algorithms are helpful. Black box algorithms include deep learning, but the results obtained from CBR are easier to justify. From what we can analyse, implementation of AI in healthcare can save many lives from the thousands that are lost to cancer very year, by early detection before it advances to the later stages. Both men and women can find benefits as AI is helping detect urological cancers with very high efficiency. Thus, to generate the requirements to improvise AI we need to educate the young engineers to extend what they learn further to help take the advancements forward, and hopefully one day we won't have to worry when a physician takes a day off at work or not have to worry when we leave the elders alone at home.

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ENERGY EFFICIENT WORLD

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Introduction

Peter, (2019) ex.al; We are moving towards a world in which everything is automated. We are working to achieve the human robot ratio of 1:10.We have numerous technologies which make our day to day task easy. For example: Smartphone which is enough to understand the modern world that makes our daily task so simple i.e. Paying electricity bill, Booking tickets, etc and Computers , Software ,and so on. The important source that is essential for this modern machines to work is electricity. Initially, these machines tend to consume more energy to perform their respective task. Now, as a result of many research and development the energy consumption of these machines were drastically reduced.

Mbohwa, C. (2019) So, the term "ENERGY EFFICIENCY" describes the energy consuming capability of the machine. Still many research and development programs are in progress to improve the energy efficiency of the machines. In the task of developing the modern society, a major concentration is given to the energy sector. Energy conservation plays a major role in the sustainable development. Energy efficient technologies also contributes to the sustainability of future generation.

The primary task of this energy efficient technologies is to "FULLFILL THE NEED OF PRESENT GENERATION AND ALSO CONSERVE ENERGY FOR FUTURE GENERATION". At present, We have many energy efficient technologies in our day to day life. For example: LED bulbs , LED tube lights, Inverter AC, Smart fridge, Energy efficient washing machine and so on. Many governments insisting the manufacturing companies to follow some strict protocols, that are manufacturing the products with less negative impact on environment, to use sustainable amount of energy and natural resources. We are moving towards the "Industrial revolution 4.0" and this revolution going to make a huge impact on automotive sector and energy sector.

Manju.S (2017) et.al; In India, consumption of energy is increasing as a straight line graph. Initially, India depends on the plant waste, Animal residue, Fuel wood for energy as they are energy sources. But now all of those are got replaced by Solar, Wind, Nuclear, Water and other sources for energy. As per government, the energy consumption of India has been doubled. Renewable energy source plays a major role in the development of modern India.

Sagar, N. (2017) As per some reports, on average an Indian citizen consume one fourth of energy consume by a china citizen. India stands fourth in top energy consuming countries in the world. India consumes about one third of energy consumed in the world.

Literary Survey

Energy Efficiency in Manufacturing Sector

Worrell et al. (2001) Manufacturing sector consumes major part of energy produced in the country. The industries like Iron, Steel, Paper, Pulp and Petro-chemical which convert the raw materials into usable products to exchange with money. This consumption is because of the wide variety of activities, Energy demand and GHG emission vary widely. In 1995, industrial energy usage recorded as 41% of global energy usage with 43% of global CO_2 emission. Still, the energy consumption of industries is increasing by 2.1% per year which is less than the energy demand rate of 2.5% per year. Industries in OECD countries use 44% of total industrial usage energy. Energy

efficient in manufacturing sector results in implementation of modern technologies, concentrating on the sound and environmental benign investment policies. In the developing nations, the adoption of energy and resource efficient technologies are in progress. Efficient use of raw materials may increase the potential to reduce the energy usage and greenhouse gas emission. May be the technology transfer can be done by a private sector or collaboration between two companies but some policies and the institutional barriers may interfere in the transaction process and the efficiency of the process.

The Energy Efficiency of China

Li, M. J et.al .(2017) China was become one of the better country in energy efficiency. China achieved this through various energy conservation policies and through the innovation. Initially, The country suffered from energy shortage in some sectors and rise in cost of the energy. Due to pressure on environmental conservation, Energy conservation and increasing energy demand. The government took more attention towards these problems. They took new methodology to solve these problems.

He, Y. L et al. (2017) The country was divided into three parts on the basis of energy consumption that are *High energy efficiency areas *Moderate energy conservation areas *Low energy efficiency areas. Various models are used to evaluate and derive the this problem that are GARCH model, RFBN model, SFA model and so on. In 2006, Chinese government made an report that the intensity of energy has been reduced by 20% in 2010 compared to intensity in 2005. The Achievement was made through various energy saving policies and regulations. These energy efficiency policies were approved by the government during "Twelfth Five – year plan".

The Energy efficiency in Communication sector

Buzzi, S et al. (2016) ; The Communication industry enrolled as a part everyone's life. As a result of new innovations, The communication sector brings the new updates daily. Initially, the communication

industries concentrated on quality of interaction, Rate of data transfer so on . But from the last decade, The industries included 'Energy efficiency' as an important parameter to improve in the communication sector. This revolution in communication due to some economic reasons, Environmental concerns and so on. So, the next generation communication called '5G' will be improved with one of the important parameter as "Energy efficiency". In order to achieve the energy efficiency in communication sector four major techniques are used. They are 1)Resource allocation 2)Network planning and deployment 3)Energy harvesting and Transfer 4)Hardware solutions. Firstly Resource allocation, This method empower energy efficiency through allocating system radio resource. Secondly, Network planning and deployment, This method increase the energy efficiency through increasing the infrastructure to cover maximum area. Thirdly, Energy harvesting and transfer, This method encourage maximum usage renewable resource like solar, Wind energy and so on.

Finally, Hardware solutions, According to this method the hardware components are designed in such a way to contribute for maximum energy efficiency.

The Rebound Effect

Wei, T et al.(2017) Rebound effect refers to the phenomenon of actual reduction in usage of energy and emission is less than the expected reduction caused by the energy efficient improvements due to induced behaviour adjustment of relevant economic agents. According to Economics, the energy efficiency can be defined as the amount of energy generated per unit of energy usage.

The Energy Efficiency of United States

Thomas, B. L. et al.(2016) In the current time, the cyber-physical systems are replacing some manual devices as well as humans. According to some report, In 2015 USA used 97.651 quadrillion BTU of energy which is 300% greater than the consumption in 1949. This high pitch of energy consumption is

not only cause of the Manufacturing sector but also cause of the residential and commercial buildings. In United states, 40% of the total energy is consumed by the Residential and commercial structures. To solve these problems smart buildings play a major role to increase energy efficiency. One of the way to improve energy efficiency is to acknowledging the citizens about their daily activity related with the energy consumption and then about the smart building technology. Sensors play major role in this smart building to increase the energy efficiency. The smart home technology is being promoted because of its various aspects like Smart health monitoring, Energy efficiency and Home automation.

Energy Efficiency in Robotics

Carabin. G et al.(2017) We are moving towards a world where robots are going to replace humans in majority of the jobs. So, the Robots should be designed in such as way to contribute more energy efficiency. To produce robots with more energy efficiency the manufacturing is divided into three parts. That are 1) Choose the right mechatronic or robotic system. 2) Replacing the certain hardware components which provide better energy efficiency 3)Adding the additional hardware components which enhance better energy efficiency through storing and recovering the energy. Energy sharing devices also play a major role in enhancing the energy efficiency.

Advantages

1. Cost efficient that is money spent for energy can be reduced.
2. Reduction of pollution that is pollutants released during energy production can be decreased drastically.
3. Usage of natural resource for energy production can be reduced.
4. It will also helps in the reduction of carbon footprint which means amount of carbon in its different forms emitted can be reduced since production was reduced.
5. Efficient use of energy will be promoted.

6. Usage of charcoal can be minimized which is used as raw material in thermal power plant for energy production.
7. We can avoid the energy and work done straight line where more energy is needed to do work. Through this energy efficient technologies we can more work with limited energy.
8. Wastage of energy can be reduced or avoided.
9. It is Eco-friendly since human disturbances towards environment is reduced.
10. It reduces the manpower involved in the energy production sector and also helps energy production industries to reduce expenditure on man power.

Conclusion

The energy efficient technologies plays. An important role in the development of the country. Energy efficient devices will help the people to reduce their expenditure on electricity or energy. They ensured their major role in the modern world. They also ensure the quality of the environment. It reduces the usage of fossil fuels for energy generation. Energy efficient devices reduces the wastage of energy .These devices ensures a new way of life and advanced lifestyle. Energy efficient devices have become mandatory at current time. These devices are become mandatory not only by its efficiency but also for the sack of environment. These energy efficient technologies are one of the important contributor of automation technologies. The energy efficient technology will play a key role in the modern automation society. These technologies will also help the developing countries like India, Sri Lanka, Bangladesh and etc. This technology help those countries by reducing their annual expenditure for energy production or development. Thus, the energy efficient technologies will contribute to the development of modern human society.

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DRONE TECHNOLOGY FOR LIFE SAVING ACTIVITIES

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Introduction

Mark Lafay (2012) A drone refers to an unpiloted aircraft or space craft, it is also known as UAV (unnamed vehicle). Currently the usage of drones is very vast in now a day Drones can be used in finding height of crops by using technology named as lidar which measures height by illuminating an object with a laser. They are also used by farmers to check livestock on large amount of land. Fire departments use drone to track and find wildfires. Now a day's drones are used in film industries which is helping them to reduce cost of helicopters or any manned vehicle. Drones can be used to detect minerals, oil, natural gas by using electromagnetic sensors. Drones are extremely used to locate people trapped in disaster.

Irizarry. et.al (2012) Drones are unpiloted flying objects that would operate under remote or smart phone without any pilot on board. Some of the useful applications of this device are in borders where army can see what is happening in the enemies barracks without any solider getting injured, investigations during/after disaster such as earthquakes, hurricane etc., for locating forest fires in farm lands, monitor criminal activities ,mining advertising scientific surveys and secure pipelines and offshore oil platforms.

Measure.com (2017) aerial unnamed flying objects i.e. drones are very much promising and powerful new technologies to improve disaster management and relief operations. They are safer, faster, and importantly more efficient. When any disaster occurs, drones are used to locate victims, perform structural analysis of damaged infrastructure, and to deliver needs to the victims until they are rescued. Drones are also used to perform the "3-D" missions that are often dirty, dull

and dangerous. Drone technology can reduce disaster worker and stop engineer's exposure to unnecessary danger. It enhances the effectiveness of responders. Drones technology is highly deployable and cost efficient.

Literary Survey
Drone Technology in Life Saving Activities

Balasingham (2017) As we know that drones are pilotless air crafts which were first handling only military works but as of now, they are in every field. Health care industries are taking ample of advantage of this drone technology such as delivering aid packages, medicines, vaccines, blood samples and other medical supplies to remote areas, providing safe transport of disease test samples and test kits in areas with high contagion, and providing rapid access to automated external defibrillators for patients in cardiac arrest.

Now a days apart from aerial drones, ground drones are also being developed. The usage is going on increasing. They are now used for sketching maps, helping in rescue operations, in farming activities, in traffic surveillance and yes saving lives in medicines.

Drones have been used to deliver small aid packages to community where disaster has hit such as earthquake or some tsunami etc. Drones have been used in the fight of human immunodeficiency virus (HIV) which has posted challenges to the third world nations.

The use of drones has potential to decrease response time and increase survival chances, especially for patients in cardiac arrest. They are used to deliver treatment to disaster hit zone before the emergency teams arrive on the scene. With many new advancement's drones may expand further to

include diagnostic capabilities. Drones are also used as tele medicines i.e. delivery of health care and sharing of medical knowledge over a distance using a telecommunication system. As everything has cons drones too have some such as they should travel only in line of sight, while carrying disease samples or any medical appliances temperature is also a factor which is unfortunately not available in drones.

Precision hawk (2019) Drones are established as tool of combat, army men used to spy and even to assassinate. Going on drones are now becoming consumer items. When environment disaster strikes, responders work to minimize damage and saving of lives, scan for victims and relay their location. Drones also find hotspots and help firefighters to access to the fire as fast as possible.

Drones are used to search and rescue, gather imagery, 3d maps of affected areas, then fly over identify worse hit zone and send information to rescue workers on ground directly where they needed. In past years 17 firefighters died every year during activities related to fighting wildfires. Manned aircrafts should fly at low altitudes so there is much risk of violent winds, low visibilities and high temperatures. Drones are now used to fight against wildfires and help firefighters by sending them hotspots. Disasters are inevitable and can affect anyone, anytime. Drones helps us to gather emergency response quickly and access the extent of damage as efficiently as possible.

Agoston restas (2015) Drones in now a day have n number of appliances apart from military and commercial purposes. In disaster management drones have a tremendous role in helping rescue workers. In case of any nuclear failure or hazardous materials exposed the drones are only one's which can detect them and send message to rescue team.

At accidents involving hazardous materials, the primary task is solved by drones, they precisely identify the direction of flow of hazardous liquid or gas and send 3d maps to the rescue teams. In case of nuclear accidents, we can send drones into it and check the activity of radioactive sample and when it comes below the hazardous level we can go in and check.

When earthquake occurs then a quick mapping is very necessary that drones does it for us and identify people who are stuck. It also shows the damaged buildings, the worst hit zones etc. To the rescue workers. In case of forest fires drones are majorly used to identify hotspots and send the locations to fire fighters, helping them to navigate to the fire in a safe way that helps them to reach faster and hence put off the fire as quickly as possible before any major damage has done.

Andrew Brown (2017) Mainly in Africa we have several remote areas where even transportation is difficult because provision and health care for children. Now this problem is slowly overcoming by using unmanned vehicles (drones). UNICEF are also looking forward for delivering vaccines and improving connectivity to places which are hard to reach.

Drones are used to deliver medicines and issue treatment for children as fast as possible. They are also delivering vaccines and essentials parameters. Drones can help overcome transport challenge and delays in delivery of small, low weight supplies, through the air supplies of medical diagnostic kits and return samples.

Drones are used sprinkle mosquito medicine over stagnated water and mosquito breeding areas which can stop spreading of malaria which is taking lives in world. They are also used for health authorities for sending medicines for people who are in remote areas which doesn't have approach road too. They are also used to collect the blood samples and any samples which are used for testing of patients and patients can stay in home if they are unable to come to hospital.

Gemma Alcock (2018) Drones are capable of doing many things apart from searching, they can do much more. Drones are now saving many lives that wouldn't be saved before the invention of it. It is quicker, safer and importantly more efficient in doing things. Drones can do work we cannot imagine if and only if we design it to do so\.

The emergency and rescue teams should not see it narrowly as a flying camera or a sensor. They should realize that its capacity is much broader than

which is seen right now. Emergency situations one of the first requirements is to gain up to date situation awareness information at the highest quality available and as quickly as possible, to mitigate the risks and hazards that rescue personnel are subjected to.

Without a doubt drone can perform works more efficiently and can help in lot of activities in coming years and now in time of pandemic too it is quite helpful and helping to save life by delivering items and ensuring social distancing and making the virus spread down a little bit. Drones are treated as invaluable situation awareness tool which ultimately ensures better outcomes for those in need or help and importantly it enhances the safety of the emergency response teams.

Naveen Joshi (2017). Drones are having 10 astonishing advantages. They are used for aerial photography such as cinematography. These are also used in real estate in sports for capturing images. A lot of companies are using it as shipping and delivering items as this doesn't depend on traffic and it is faster

It can also draw 3d maps of mountains, plateaus, etc. helping geographical workers. If any disaster occurs then these are a most helpful in locating victims, supplying medical treatment before medical teams arrive and send locations to rescue workers to come and rescue the alive stuck people. They also identify worst hit zone and make a map of the place before and after disaster to identify the damage. Farmers are also using drones in checking the height and growth of plants.

They also use thermal cameras to detect missing people in seas, rivers and lakes. Drones are also used to detect weather forecast and collect data. They are also used in wildlife monitoring and if they see any disturbance such as any hunters or any animal crossing a limit of radius it can inform the forest officials. It can also be used as traffic police to ensure law enforcements.

Advantages of Drones

There are a lot of uses of drones, in which I would like to present a few here:

1. The first advantage of drones are they are safe and unmanned vehicles so if unfortunately, any accident occurs no harm will be done to the humans.
2. Now days during pandemic drones are used to deliver food items and lots more. It is a big advantage as physical contact is reduced to a far extend.
3. Drones are also being used by farmers for spraying pesticides as some of them cause ill effect on humans.
4. We can also see something which we cannot see. For example we can able to see what's behind a high hill standing on the other corner or we can see all the jungle from far away (used in forest departments usually) and many more.
5. Drones can also be used efficiently for finding the toxic level of nuclear material if any nuclear hazard occurs.
6. Now a days they are also being used in film making which is becoming more profitable for producers.
7. Drones are also used for searching people in thick forests or any lakes if they are missing
8. They are immensely used in disaster relief such as finding victims, creating maps of after and before affected area, spot hotspots.
9. In some parts of the world mainly in Africa they are useful in delivering medical needs for people living in places which don't have an approach road
10. They are also helpful for fire fighters in locating where the fire exactly is.

Conclusion

According to me drone technology will be very useful for country like India as we have a lot of population and they are a lot of needs such as film making, film making, disaster management, and in many more. Drones can be drove by anyone if they have some practice so it will also be available for common men and women if they can afford them. Technology now a days is becoming vital for survival of human. If we are using in beneficial way then it is all good and if we are damage any ecology then it will be worst case of using technology.

Overall good use of all the modern technology will always be beneficial as they are lots of people who really need them.

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DRONE TECHNOLOGIES FOR LIFE SAVING ACTIVITIES

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Introduction

John Villasenor (2012),Drones are pilotless aircrafts which are designed in a way that they fly autonomously without human involvement and are nowadays collaborated with artificial intelligence and Global Positioning System(GPS). Drones are also called as Unmanned Aerial Vehicles (UAVs). Drones are of various sizes, shapes and are capable of flying with high skill. They are also capable of carrying small weights to long distances.

Nevada Institute For Autonomous Systems (2018), Drones were initially used especially for the military purpose. The use of drones was first witnessed in mid1800's according to some historians which were in the form of pilotless balloon aircrafts. They were used by Europeans for bombing. The government of USA in 1917 included drones for the first time in military during first world war. Even after the second world war and also during the cold war the usage of drone technology continued. Both USA and USSR used drones for spying and surveillance purposes. Lateron drones were especially used for border surveillance and aerial surveillance by various other countries too. Later drones were used in mines as they were accompanied with toxic fume detectors to detect toxic fumes in air produced while mining. The development in drone technology has tremendously increased its uses in various fields. Initially drone technology was criticized for its military purposes and target killings but later received appreciation all over the world as it turned out to be more useful for life saving activities during emergency situations.

Restas, A. (2015), During natural disasters such as Floods, Tsunami, Earthquakes, forest fires, etc., drones turn out to be very much useful in life saving activities. In such cases, drones provide medical care, food supplies, and other necessary supplies to remote and rural areas where manual help is not possible and thereby saves many lives. Drones can also be used in the early detection and prevention of some kind of man-made disasters like chemical accidents and nuclear accidents. Also, at the time of accidents involving hazardous materials, Drones are used in the early and accurate identification of the direction of the spread of hazardous liquid or gaseous materials.

Literary Survey

Balasingam, M. (2017), The health care industry can benefit the most from the drone technology due to its technical capabilities and the ease of use. As mentioned before, the most important role of drones in life saving activities is the provision of necessary supplies and the assessment of the disaster effect. They are used to provide first aid kits, medicines and blood. In case of spread of a transmitted disease, drones are used to transport test kits, test samples and vaccines. In case of cardiac arrest and breathing difficulties, drones are used in the transportation of medical equipment such as defibrillators and oxygen carriers to the rural areas so that doctors present over there can quickly treat the patient. Drones accomplished with image diagnosis technology can be used to monitor the health conditions of the rural communities with the help of telemedicine technology. Because of these widespread applications drones have become significant in the field of medicine and healthcare in the 21st century. Drones can be launched in different ways. They can be launched from a launch pad or hand thrown or can even be catapulted. They can be landed on different kind of regions and they can adjust to the different kind of weather and climate. They can fly vertically

up and can drop objects from a varied range of heights based on the type of drone. Drones are also economical when compared to normal mode of transportation in difficult regions.

Konert, A.et.al.,(2019),The most important role of drones is to provide air transport for freight and nowadays even for passengers. They extensively support rescue operations. Drones can be used to save drowning people during floods. They can analyze the level of damages made. They can be used to monitor large gatherings. In an analysis Red Blood Corpuscles and certain platelets and plasma units which were frozen for 24 hours from the time of collection, were kept in a cooler and carried for a time period of 26.5 minutes through different temperatures ranging from -1 to 18 degree Celsius. This analysis showed no change in platelet count, haemolysis of Red Blood Cells and in blood pH level. From this we can infer that drones could be a better option for the purpose of transportation. The first usage of Drones in monitoring the effects of an earthquake was done in 2010 in Haiti. The Canadian Police used thermal imaging camera attached to a drone and found a man lost in a desert. In 2015 drones were used by rescue services to deliver life jackets to people who were stuck in the Little Androscoggin River. The rescue services of other countries such as China and Iraq provide video and audio tools through drones to interact with the victims of an emergency. A Drone called AtraxM was created by The Polish Air Force for supporting rescue operations which can identify the exact location of the incident, the previous scenario before the arrival of rescue services and the proper number of victims affected. The previous shown instances and technological advancements made drones worthier for its usage.

Mayer.S,et.al.(2019), In rescue operations time is considered to be the most important factor along with the exact location of a victim. Drones are used to achieve these important factors. During disasters such as floods, tsunamis and forest fires the affected regions are difficult to access or at times even impossible to access by humans. Drones have more advantages over humans. During these situations,

drones reduce or even eliminate the risk of death or injury to the rescuer. Drones can be used to scan a large region within a short time span. Drones can be installed with RGB, thermal and infrared cameras combined with machine learning can be very helpful for tracking victims. Drones not only transmit images but also conditions such as ambient temperature, radio activity and air contamination. Not only humans but other lives can also be saved. Drones can be used to monitor farming lands during emergencies and domestic animals and pets can be saved. Drones face the challenge of navigation and at times Global Positioning System fails to be precise. However, Swarm Search Strategy has been introduced for proper navigation and for the determination of the exact location. Other than disasters drones are also useful to find people when they are gone missing. In case of missing of pet animals drones can be used to trace them. At times children go missing in shopping malls, amusement parks, shows and large events which are heavily crowded. In these cases, drones which are coupled with computer vision can be used to trace them back even in large gatherings. Privacy concerns is one of the limitations of drones in the above said case.

Laksham, K. B. (2019), Initially drones were very successful in the field of Environment and Ecology. This made us believe that drones can be used for Public Health Care during emergencies. Drones can provide important medications like antidote for a snake bite or a dog or animal bite. Organ transport needs to be very fast and it can be achieved through drones. However, drones need proper infrastructure and well trained and equipped individuals for monitoring. Drones can be evaluated by observing their strengths, weaknesses, opportunities and threats. The most important strength of drones is that they are time saving. During an emergency, patients within the radius of 11.9 square kilometers can be reached by a drone in one minute which is almost ten times faster than the recue made by the conventional methods. Drones are relatively cost effective than normal road transport in difficult areas. Vaccine availability could be increased and it can decrease the costs. Drones can

fly very close to the earth and provide clear images without cloud contamination. Drones can be operated in different terrains such as mountains, deserts, oceans and also in snow covered areas. Usage of drones require well trained professionals who have to completely monitor from the ground, which is a weakness as there can be human error. Proper infrastructure like a proper runway is required. Drones cannot carry heavy payloads like planes and helicopters. In developing countries like India drones can transport blood and organs for operations in a hospital which is an opportunity. Due to drones, air traffic can increase and accidents can occur and affect the people on ground which is a threat.

Benjamin Powers, (2018), There are six golden benefits of drone technology. The first one is that drones can be used to rescue on snowy slopes. Drones use infrared imaging system and zooming lenses for tracking lost people in forests. Without the assistance of drones, it would have not been possible to track a Scottish climber, who was lost in mount Godwin-Austin which is the second largest mountain in the world. The second benefit is provided drone ambulances. Drones can carry objects weighing up to 5 pounds for a period of up to 30 minutes. In Papua New Guinea drones were used to transport TB test samples by an organization called "Doctors Without Borders" to a remote village. The third benefit is that drones aid in critical ways after the occurrence of a natural disaster. Drones can be used to assess the weather and conditions after a disaster and they can also be used for transport and other purpose as indicated earlier. Highly efficient drones can also provide cellular networks in the aftermath of a natural disaster. Fourth benefit is saving people from cardiac arrests. Only 10 out of 100 people can be saved from heart attacks because of the factor that paramedics can't reach them on time. Drones can be the solution to this problem. The fifth benefit is that drones can also be used for traffic monitoring, so that they detect an accident. A drone could provide more details of the incident and necessary measures can be taken for prevention of such incidents in future. The final benefit of drones is for fighting diseases. Mosquitoes are well known disease vectors. A

United Nations Agency approved a drone which can release sterile mosquitoes and reduce the spread of deadly diseases.

Agoston Restas, (2015), Drones have three important roles during a disaster. They are pre-disaster activity, immediate action and post disaster activity. When drones are used in Nuclear hazards their primary role is to identify the direction of spread of the hazardous substance more accurately, at the earliest time possible and also to save trapped individuals in the region. Any operations involving humans is not only difficult but also useless during a nuclear leak. Hence drones are the most used or only used tool during a nuclear hazard. Earthquake is usually an unannounced disaster which can cause severe damage. Immediate evacuation is the only source to save lives. The survival chance of people depends on the type of collapse or damage incurred. Therefore, a quick mapping of the affected region is not only important for calculation of damages but also for saving lives. This quick mapping is not done by the drones. Floods are disasters which have slow development. As a pre disaster activity drones can track the stream of rivers and the dams can be opened or closed accordingly. Their main role here is to provide wide range of images and to provide exact locations of trapped individuals who can be rescued through motor boats by the rescue team. The support of drones in forest fires is the most developed and more experienced area in the usage of drones. The main objective of drones in forest fires is to detect hot spots in a forest and to provide real time information. Only during forest fires drones are more expensive than the conventional methods as a larger region of forest is to be monitored.

Advantages

1. As the drones are accompanied with the remote control technology they can be used to monitor the locations such as oil and gas refineries, nuclear power stations, etc. for the communication of possible accidents or hazards and notifying the threatening conditions.

2. The most important application of drone technology lies in disaster management. They can be used to provide medical care, food

supplies, and other necessary supplies to remote and rural areas where manual help is not possible.

3. Drones can also be used in wildlife monitoring. They can be used to monitor the endangered species. This also helps us to prevent the hunting of animals which is the major cause for the animals becoming endangered.

4. Due to the smaller size of the drones, they can easily penetrate into the areas that would otherwise be difficult for helicopters to enter and provide close-up views and high-quality images.

5. Drone technology has also become useful in rescue operations and healthcare industry. It is used to deliver first aid kits, medicines and blood to the patients in remote areas who need immediate medication much faster.

6. Due to the regular advancement in the drone technology, it has become much easier to operate a drone. Nowadays drones are operated by the operators even with a low technical background.

7. Drones can also be used in military in detecting bombs and also for the aerial surveillance of the dangerous areas to protect the country from the enemy attack.

8. Drone technology also has its applications in the world of media. Drones can be sent to the places where it is difficult for a reporter to reach and can be used to take the aerial footage for live broadcasting.

9. Drones can also be used for weather forecasting. Drones accomplished with high-resolution cameras and effective sensors can be used to collect important information that could help in weather forecasts.

10. As the usage of drone technology is increasing rapidly, the price of the drones has also come down to an affordable level. Hence, it is more economical to buy, maintain, and fuel the drones than the airplanes.

Conclusion

As there are a vast number of applications of drones in different sectors, they are useful for the development of any country. Especially for a developing country like India, drone technology would be more useful for its rapid growth in all sectors if it is used in an efficient way because of its affordability, ease of control, effectiveness, and other military applications. For India, due to the border-disputes with Pakistan and China, drone technology would be useful for the safeguard of country. Also drone technology has various applications for the common man. It can be used for shipping and delivery purposes using GPS and sensor systems. For example, it can be used to deliver a pizza on order. As they are fast and cost-effective, it saves both money and time.

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BENEFITS OF ARTIFICIAL INTELLIGENCE IN THE HEALTHCARE SECTOR

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Introduction

Iliashenko, O., et.al., (2019) AI or Artificial intelligence can be defined as a field of science that deals with the development of computers systems to make them capable of simulating human intelligence. It is also understood as the ability of a digital device or a computer-controlled robot to imitate intelligent behaviour or perform tasks that are commonly associated with intelligent beings, such as decision making, visual perception and speech recognition. These AI systems are designed and programmed to emanate human cognitive abilities and ultimately perform tasks that can currently be performed only by humans and other intelligent beings. In the future AI is expected to take over certain roles that are now held by humans, and this development is predicted to prove useful even in the healthcare or medical industry.

Jiang, F., et.al., (2017) In recent years AI has been playing a major role in increasing the efficiency and accuracy of diagnosis, patient care and overall treatment. This in turn has fuelled several discussions on whether AI might one day completely replace human clinical professionals. Although the current belief is still strongly that AI will not replace human physicians in the near future, it is admitted that AI has the capabilities to assist and enhance the efficiency of human medical professionals and aid them in making better clinical decisions. In certain specialisations it is observed that AI systems could even replace human judgement almost completely (eg. radiology). With the rapidly increasing research and development seen in the field of AI and the increasing amount of healthcare data available, several different ways of successfully applying AI and big data analytical methods in the healthcare industry continue to surface.

Hamet, P., & Tremblay, J. (2017) AI successfully aids the healthcare industry in mainly two aspects- the virtual aspect and the physical aspect. The virtual aspect includes data analysis and interpretation. This directly helps both the end customers and the medical professionals equally. Ralph Tkatchuk, (2020), AI is used directly by the patients to understand their symptoms and overall condition better and take necessary steps and precautions during the course of the treatment supervised by the human medical professional. AI also helps the physician to understand the symptoms and data provided by the patient, compare this information to all other relevant information present in the vast medical database and ultimately reach a more accurate diagnosis in a faster and more efficient manner. Another virtual application of AI that has proven useful in the medical field is its ability to assist in making predictions regarding the time, spread and general location of possible outbreaks of infectious diseases. AI is also used in the management of healthcare systems and health records. Hamet, P., & Tremblay, J. (2017) In the more physical aspect, AI directly helps medical professional in carrying out tasks required for treatment such as performing surgeries. It is also used for performing tasks that humans aren't capable of, but with human intelligence and understanding. An example of this would be 'Nanorobots', a unique drug delivery system.

Literary Survey
Use of Artificial Intelligence in Healthcare and Medicine

Khanna, D. (2018). Artificial Intelligence is an area of computer science that finds use in the healthcare industry as a means of analysing, interpreting and

storing complex and vast amounts of medical data. The diagnostic information such as record of symptoms, physical conditions and medical images such as MRI, X-ray, ultrasound and CT scan that are provided by the medical professional are gathered and analysed by the system. The vast amount of medical information in the form of journals, research papers, textbooks and other findings along with the analysed and interpreted patient specific information makes the process of diagnosis and treatment more accurate and efficient. This paper discusses the different techniques of artificial intelligence and their potential application in healthcare. There is a vast amount of medical information and findings available and it is nearly impossible for each medical professional to access and refer to this information accurately and efficiently during diagnosis or treatment.AI systems are designed to hold large amounts of information about medical journals, clinical research papers and medical textbooks. It uses algorithms to gather large amounts of healthcare data and analyse this data to provide assistance to medical professionals to address the problems that the patient is facing. This yields in a faster and more accurate diagnosis which in turn speeds up the process of treatment.

Machine Learning procedures are used to clutter traits observed in the patient and conclude possible disease outcomes. Supervised learning is the type of machine learning that is most commonly used in a clinical setting. It compares the physical traits of the patient with information available to suggest a more accurate outcome. Modern Deep Learning is another type of machine learning that is used to narrow down multiple possible outcomes into a few.

Future of Artificial Intelligence in the Healthcare Industry

Desai, P., (2019). AI systems such as machine learning, data analysis and processing, forecasting and optimization undoubtedly have the potential to improve population health and also aid in overcoming some of the greatest challenges in healthcare. It can also be said that in the future, advanced AI systems will be capable of carrying out a wider range of tasks even without human assistance or input. But this begs the question of ethical issues. Even with the current scenario of the healthcare industry, medical ethics is a topic subjected to constant debates and discussions. Apart from this, another challenge in the face of using AI in healthcare is the risk involvement. The ethical issue and course of action in a situation where an AI algorithm is false or makes a wrong decision is something that needs to be addressed. Even an algorithm that has been researched extensively and validated before being implemented can make a wrong decision when faced with a case that hasn't been recorded before or when there are certain factors that are unique to the particular case. Doctors are indispensable in the face of such new cases that haven't been recorded by AI or addressed in previously exiting medical research. Although the question of AI completely replacing human medical professionals is still far-fetched, the role of current AI systems in aiding both doctors and patients are immense and though there are many challenges faced even in this, the benefits overweigh them. Doctors and nurses have already started adopting to working with newly introduced technologies to provide faster and more accurate services.

Opportunities and Challenges of Artificial Intelligence in Healthcare

Iliashenko, O., et.al., (2019)Although humans are capable of analysing information and detecting patterns in them, a more efficient method would be to do this with the help of an AI system, especially when there are several different variables to be considered and referenced. In this way AI systems can aid humans in the sense that they would be better suited at surfacing signals that human medical professionals might otherwise miss. Several companies and start-ups have come up with AI solutions that function in this manner. One of the examples of such an AI system is IBM Watson which is a question-answer based system that relies of evidence-based learning to help medical professionals reach a decision on the diagnosis or treatment plan. DeepMind Health, an initiative by a

British AI company is designed to not only give advice to doctors, but to possibly detect predisposition to diseases or to reveal diseases at an early stage where humans would not be able to detect them. In recent years there has been an increase in popularity of telemedicine systems that acquire data from wearables like fitness trackers or inquirers that define symptoms and identify problems in patients, they then provide recommendations on what to do or give the information directly to the doctors. One such technology is a German start up called Ada launched in 2016. It has an interactive chat interface which asks relevant questions to the user and compares the answers to other cases to find a possible solution to the problem. Another example of a start-up project is the Benevolent AI by a British artificial intelligence company founded in London. Its main application is to help navigate and provide a platform for the vast amount of biomedical data available, in turn helping advance the drug development process. These are only some of the numerous start-ups related to AI and healthcare that have surfaced in the past few years. Some of these are meant to substitute professional medical care while others are merely meant for the user to better understand symptoms and steps that need to be taken.

Artificial Intelligence in drug Development: Present Status and Future Prospects

Mak, K. K., (2019). One of the important benefits of using AI in the healthcare industry would potentially be its application in the pharmaceutical or dug development sector. The use of AI in the drug development process is a subject that has been vastly discussed and studied when it comes to AI in healthcare. Experts believe that using AI systems would increase the efficiency of the research workflow and also increase the chances of developing effective drugs with lesser number of trial and errors. Although no drug has been developed completely using only AI approaches, it is believed that with the current rate of advancements in this field, this should be possible within the next 2-3 years.

AI incorporated technologies have been designed to help in various stages of a drug development process such as finding potential drug targets, coming up with new drug solutions, repurposing other drugs, aiding in the R&D workflow to increase its efficiency, analysing biomedical information and even in the task of finding patients suitable for clinical trials. Using AI in this manner increases the efficiency and certainty in comparison to classical drug development methods while removing bias and human intervention.

Data Mining Applications in Healthcare

Koh, H. C., (2011). One of the applications of AI that serves the healthcare industry immensely is its Data Mining capabilities. There is a massive amount of healthcare related data present in various forms such as medical records, research papers, medical textbooks, and patient specific data such as medical imaging. And all this complex amount of medical information is generated at a rapidly increasing rate. They are growing too voluminous and complex to be interpreted and analysed by doctors and professionals using traditional means. Data mining is the AI technology that can be used to process all this vast information and interpret the necessary data for more efficient decision making.

Data mining is defined as the process of analysing databases to identify previously undetected patterns and trends. This method is intensively used in financial institutions and now sees potential in the healthcare industry also. Usage of data mining in the treatment process can reduce the cost and increase operating efficiency and quality of patient care and treatment. An additional aspect that motivates the use of Data Mining in healthcare is that it helps health insurance workers in detecting fraud and abuse.

High-Performance Medicine: The Convergence of Human and Artificial Intelligence

Topol, E. J. (2019). This paper clearly discusses the potential that AI has in the current medical industry in which 2 major drawbacks in workflow can be observed. The first being that with the increase in

generation of medical data at a rapidly increasing rate, medical professions lack the capacity to effectively analyse all this data. Valuable medical data in the form of high-resolution medical imaging, electronic medical records and genome sequencing etc are generated on a daily basis. Effective analysis of this information alongside previously existing medical data would prove extremely beneficial in diagnosis and treatment. However, the lack of manpower and resources to manage this has man reliant on machines to carry out this task.

The second drawback in the current functioning of the healthcare system that this paper discusses is the overwhelming number of serious diagnostic errors and medical mistakes that are being observed, the enormous waste of resources, and inadequate time between patients and doctors that ultimately mean poor treatment results for the patients.

Although AI promises aid in bettering medical workflow and reduction of the above-mentioned drawbacks, there are serious issues regarding the use of AI in the medical field that need to be discussed and addressed first. If an AI algorithm based on very limited input and insufficient research, cases studies and evidence is implemented, then the resulting treatments may be erroneous and potentially cause major harm to patients. Unlike a single doctor's mistake, the consequences of a flawed algorithm would be far more severe. Hence extensive amount of research, study and proper validation is required before an ai algorithm can be unleashed. Another issue that needs to be addressed before AI can be expected to assume an important role in the healthcare industry, is the question of privacy and security of medical data. Using AI algorithms would mean risk of hacking and data breeches hence putting important information, such a person's medical history, in a vulnerable position. There is also the risk of deliberate hacking and manipulation of the algorithm to cause large scale harm to people, such as overdosing of insulin in diabetes patients. Furthermore, it would become possible for an individual's identity to be found out using facial recognition and genomic sequences, increasing the question of privacy.

Advantages

1. AI can process large quantities of data that would otherwise be overwhelming to clinicians, notice patterns that are not obvious to the human eye and come up with actionable data faster and in a more efficient manner.

2. AI algorithms can analyse a larger data set and identify factors useful for diagnosis. This is useful as some conditions such as metastatic cancer are very hard to detect and diagnose.

3. Some countries or regions have particular challenges with being either under-resourced to experienced medical professionals or have less access to professional training. Misdiagnosis or completely missing a problem appears to be more prevalent in these countries. In such instances, AI-based systems supervised by some clinicians prove to be very useful.

4. Traditionally, drug production takes a very long time and sometimes requires a few "misses" before corporations strike a formula that works. This long time of production adds to the substantial rate of medications that we see today. AI is being used to produce medicines by helping scientists find potential candidates early on. This ensures that they can concentrate on improving only those that are most important and can save many years of trial and error.

5. An AI based surgical system enables the smallest and most precise movements to be performed. Complex procedures are therefore done with minimal pain, blood loss and low risk of side effects. In addition, patients heal much faster from such surgical procedures.

6. AI helps augment human abilities. Patients can be assisted not only by medical professionals, but also by robots. Paralyzed people can walk again and don't rely on caregivers thanks to exoskeleton robots.

7. Another breakthrough in AI application in the healthcare system is a smart prosthesis that is fitted with sensors that enable patients to have more reactive limbs than the original ones.

8. Currently many radiological diagnostic processes require a tissue sample from the

patient. This increases a risk of infection in the patients. Experts predict that soon AI supported Radiology tools will remove the need for tissue samples in some situations.

9. In the medical world, smart devices are important for patient management in the ICU and elsewhere. Using artificial intelligence to enhance the ability to predict deterioration, indicate that sepsis is taking root, or sense the emergence of complications, may dramatically boost outcomes and minimize costs associated with hospital-acquired condition penalties.

10. AI systems can be used in collecting and analysing data acquired by wearable and personalised healthcare devices such as smart watches, trackers etc.

Conclusion

As discussed above, the use of AI in for medical processes such as diagnosis, treatment and patient-care can greatly improve the general efficiency and functioning of the healthcare industry. There are currently many applications of AI in the medical industry that aids medical professionals by analysing large amounts of data for diagnosis, providing better treatment solutions by analysing a patient's medical history and other factors, increasing accuracy of drug development process, providing direct solutions to patients through smart devices and services etc. Many more such applications are being actively discussed and researched even now. The implementation of all these AI systems is a slow process in many countries due to the lack of resources and also because many of these systems aren't full proof and come with some drawbacks. In a country such as India with a patient to doctor ratio of 1,700:1, with 70% of the infrastructure being limited to major cities that account for only 30% of the country's population, and low expenditure by the government in the healthcare sector, it is important to implement all the latest available technology in order to increase the quality of patient-care and ensure that a maximum amount of people benefit from the services provided at the lowest cost possible. In addition, artificial intelligence enables hospitals to introduce patient-centric plans and reduce excessive hospital procedures, making delivery of health care quicker in India.

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ENERGY EFFICIENCY TECHNOLOGY FOR DAY-TO-DAY LIFE

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Introduction

Kodali, R. K., & Yerroju, S. (2018). Efficient techniques that offered by the home automation system is that even if you're not home you can control your house just by using your mobile phone or a web browser and you can save energy mainly electricity and do not worry even if you're away that if anything at home is turned on or if something is turned off you it's all available for you on your mobile phone or your PC. To use this feature efficiently you need to check all the time when you are outside your house you should be checking your phone to see what's happening at your house. This way you can keep check on what's happening at your house and which all appliances are turned on and how the house is functioning at the particular point of time. This energy system can be evidently seen in the working principle of the Amazon's echo dot Alexa in which we can control our homes switchboards by just giving the voice commands and works on the principle of the ioT system which is pretty much robust and can even access with the Google assistant. This system is something which every household should have in order to reduce loss of energy. Using this is not only helpful for our household but also for the society and also our environment.

Pihlatie.,et.al.,(2014). The drastic change from the fossil fuel buses to EV buses is a big change. The energy efficiency cost while changing from fossil fuels to electric buses has a huge margin. Electric buses has a very low maintenance as they have just a motor instead of an engine which can be repaired by a common man on his own with a pair of tools. Do you know the fuel required for a bus to travel a distance for a liter of petrol or any other fuel? It's ten to fifteen kilometers per liter. Whereas while changing to EV buses , a bus can travel up to four hundred kilometer 's per charge which will cost 700 which is a drastic change and energy efficient technology in our day-to-day lives. This technology not only is an energy efficient one but also helpful for the people the features provided by electric vehicles are much more than what is provided by the normal ones. All the way from home to work an all the way from work back home you can travel in a bus which is quiet and which helps the carbon cycle. This is really helpful for our atmosphere and can reduce the pollution if implemented in places like Delhi. As per my views I would like to implement this not only for buses but also for all other transportation which is going to create a big marginal change in the pollution caused and the depletion of the fossil fuels.

Byun.,et.al,. (2013). 20% of the total energy consumption of the world is by electricity. This system adjusts the light intensity today environment using light sensors and adapt to the environment without making the users eyes tiring. This has proven to reduce the electricity consumption by 21.6% which can cause a big change indeed total energy consumption. Using the system in the household People do not need to switch on or turn off lights whenever necessary rather it would even adjust the intensity of light whenever required. This system makes peoples mind stress free cause there is no other solution they can adopt to reduce the electricity consumption at their household. The problem they are facing is that this is not permitted by large scale building as this is against the norms of the construction of the building.

Literary survey

Smart Energy Efficient Home Automation System Using IoT

Vishwakarma.,et.al,.(2019). The home automation is a thing that can change everyone's lives because there is nomore worries thinking about whether the gas stove is on or the fan is running or anyother doubt regarding home can be seen through the online app or else you can use your google assistant to control the things happening at home. The main drawback of home automation is that even other people can your tamer your system and log in and control your house. Breaking into your house would be much easy for a robber cause if he is good around computers, he can easily access your automation app and easily access your house without any traces. A new robust system with which u can save power not only while u are home but also when u are away. Another finding is that, u can control it not only using web application but also using google assistant which adds to its robust features. The main features are the use of the google assistant and the use of Node Mcu(ESP8266), IFTTT, Adafruit, Arduino Software (IDE). All these methods are the main adopted ones apart from their ideation of the fully automated house. Smart Energy Efficient Home Automation System Using IoT is a really well planned and executed taking into consideration of all the present things happening in the world and the global electricity consumption and that too present in India and its steady growing graph, this seems to be such an apt solution for reducing electricity consumption not only in houses but also in shops and other places where electricity is consumed. This is more over simplified to make it easy for the common man and the older people by adding the feature of voice assistant by the common available and which most of the Indian population has, the google assistant.

Fully Electric City Buses – The Viable Option for Energy Conversation

Pihlatie M.,et.al,.(2014) The idea of the eBus system is a productive as well as an operable idea. This idea can help our environment from pollution and save fossil fuel. This changes the concept of a bus running on and engine to a system of just motors. The major drawbacks of this system is that the initial investment that the government has to make is really high but it has its own perks this will also increase the energy consumption which is electricity and which will result in higher energy output requirements for the nuclear power plants. EBus would be one of the most profitable systems that a country would have after gaining the investment, which is because we do not have to be afraid of the complaints that the vehicle could have cause it doesn't have an engine or a gear or anything of that sort, rather it has a motor in which hybrid motors are also being introduced which will regenerate energy while not inputting energy or while breaking. The eBuses are going to run in our town with the same old system and the other adopted things are the old seating arrangements and the old shape of the bus, which is already in pretty good form. The eBus system altogether is a n idea which will fetch us a great source of continuous income. This not only helps the earth but also helps the people by increasing the riding comfort. Electric vehicles can increase the riding comfort and have a silent ride. Since its electric it does not have an exhaust cause it does not have an engine which makes the whole system silent and thus reducing noise pollution.

Intelligent Household LED Lighting System Considering Energy Efficiency and User Satisfaction

Byun, J.,et.al,.(2013) The idea is to reduce and increase the intensity of the led light so that energy can be conserved and this is done in a manner such that it is not stressing your eyes. In this system the light is never off, even during the day time if u have a but of reduced natural light the LED is going to glow in an intensity that u always receive same amount of light in your eyes. The major problem faced by this system is that they are not able to install this system in households or others buildings due to the architectural limitations. They found out a new system in which you do not have to bother about the lights to turn on or off cause this light stays on

always and only the intensity varies throughout the time. The use of the light sensor is the main thing. The light sensor plays the major role in the whole system. Only after receiving the message from the sensors the led can decide the intensity to be emitted. This is a system if starts to be adopted in the building which will increase the life of sight of people and studies show that by using this system the energy consumption is reduced by 20.56percentage. In the whole amount of energy consumed the 20 percent of the energy is electricity. This can be reduced if we adopt this system and it will also reduce our thought about the electricity bill cause we do not have anything else to do to reduce the electricity consumption. Imagine the amount of electricity that can be saved if this is implemented throughout the world, it will be a really big margin.

Pollutant Emissions and Energy Efficiency under Controlled Conditions for Household Biomass Cookstoves and Implications for Metrics Useful in Setting International Test Standards

JetterJ.,et.al,.(2012) Pollution emissions and energy efficiency under controlled conditions for household biomass cook stoves and implications for metrics useful in setting international test standards is a great ideal so if there is an ideal point then u can calculate from it and find the energy efficiency of the cook stoves under several conditions like when there is difference in moisture and air and pressure and other criteria. The major problem they face is that this to come into existence they need to implement it throughout the world and the cooking conditions vary in all the different places which results as a barrier for their acceptance. They found out the difference in energy usage and the energy loss footing different types of cooking at households like with fuel types(wood, charcoal, corn cons rice bulls. etc.) which results in the pollutant emissions (carbon dioxide, carbon monoxide, methane and ultrafine particles). These standards which when given to stove developers they can improve the performance of their stove and give us better performing once in the market. If these standardizations comes into our market we will receive better efficient stoves with

the particular fuel we use. This can set the marks for every cooker with right amount to be used inside them and the amount of water to be added to conserve energy and time. To use stoves that does not produce much smoke cause which shows that energy is lost in the form of smoke. This can be understood from the law that energy can neither be created nor destroyed it can only be transformed from one form to another.

The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity

Williams, J. H.,et.al,.(2012) The electricity plays the major role in cutting down the emissions of the green house gasses. Technically feasible level of energy efficiency or decarbonized energy supply will not do what is required to save energy. This project requires a widespread change in the electrification of the transportation and other sectors. Electric equipment's that people has to change is not cheap. The cost variations are too high. From a bulb to led lights it's almost 200 percentage increase in the cost and changing to electric vehicles the initial investment is really high that it's not affordable by common man. If people one day change from the present system to this system of electrification the green house gasses emitted will be reduced by 80 percentage as per studies. This plan is currently to be in force in near future and if we keep a ban on the carbon emitting sources then people will be forced to change rather it's better we start changing before that so that we can and our children can have a better and a bright future. This is a system which they are trying to implement in California which can result in 80 percent decrease in the 1990 levels and if we can implement this system in Delhi people can also breath fresh air without pollution. The main carbon emitting ones are the industries which burn fuel in order to make things in which if they install solar panels or windmills they can have enough energy for running their machines in the industries.

Energy-Efficient Elevators and Escalators in Europe: An Analysis of Energy Efficiency Potentials and Policy Measures

De Almeida A.,et.al,. (2012) Energy efficiency elevators and escalators in Europe is which sound come into effect. The major electricity consumption of a city is from elevators compared to escalators since escalators require more space. This idea is something that no one has thought about till date. The major set back is that most of the building have the elevators by now so the new system can only be implicated once there are new buildings, so it's going to take a long while to get this system into effect. They found out that the elevators are more energy consuming than the escalators cause most of the elevators do not even use counter weight and is is a small space so they intent to get more elevators than escalators. There are certain ways which can be adopted to make it energy efficient these are installing a power saving system into the elevators which will turn off the power supply while the elevator is not in use and using a counter weight along with the motors so that the power has to be supplied only while moving it in one direction. Escalators should have pressure sensors on them so that they need not supply the same amount of energy while moving always and they even turn it off when it's not loaded with people. Using this principle in Europe reduces the electricity consumption by a huge margin like up to 20 percent of the total energy consumed.

Advantages

1. Energy efficient ideas can reduce the price of production in the market and reducing the competition with other companies and thus reduce the price of selling or any of the combination of the above.
2. The manufacturers get the supplies for a revised price thus making it available for the public at a revised price too. And thus, reducing the work for the energy producer and also for the consumer and benefits both mutually.
3. The energy efficient things can also be considered as a marketing strategy since these things are considered to be green in the market. Which increases the demand for their product indirectly and indirectly helping the society too.
4. These types of technologies help not only us but also the environment by reducing pollution like smoke or any type of energy wastage. Thus, an advantage for the society and the environment.
5. Energy efficient technologies at home makes the work load and the duties at home less hectic for the home maker and gives the people a peace of mind while they are at home.
6. If the energy efficient technologies are used on the street lights a considerable amount of electrical energy can be saved by the government. Thus using that on the other purposes like helping the poor or better transportation.
7. People would be really happy to get home rather than thinking that they have to still work at home. They instead will have a free mind so that they can have increased life expectancy and safe and healthy life.
8. Energy efficiency not only helps out the people at home but also the other several factors that prevail in our society like things on the eco system and reduce hazardous things in some of the cases.
9. Electric vehicles increase the ease of transportation for the people and also are comfortable and also quiet and also a was which is really benefiting for the authority.
10. The life expectancy of an electric bus is really better than the fuel powered vehicles thus which is an advantage for the people as well as the eco system.

Conclusion

The technology when it comes to India it becomes really helpful cause India is filled with lights and other things like vehicles and being the second largest populated country thus leading to be the busiest. Indian government will have a huge profit if this kind of an idea of energy efficiency in included into our eco system. They can profit from electricity fuel and other things. This is a really helpful

technology for women and men because they are stress free and their life becomes cost effective and also that the government doesn't want to squeeze out tax anymore because it would be already profitable for them. This is a technology that should be implemented in a county like India as per my views because India has that many opportunities where these can be implemented in every fields.

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IOTS AND THEIR ROLE IN THE MEDICAL FIELD

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Introduction

Ben Lutkevich et.al. () Embedded technology/ systems is a combination of computer software, hardware and firmware made for specific tasks within a larger system. Some possible locations were automobiles, cameras, toys and even medical equipment. They are often used for sensing and real time computing in Internet of Things. They are managed by Digital Signal processors, microcontrollers and ASIC's (application specific integrated circuits and many more. Various Embedded systems have different complexities depending on the complexity and aim of the specific task that it is going to be used in the hospitals.

Upadhyay, Aastik & Dhapola, Abhimanyu. (2015). Embedded Systems And its Application in Medical Field. 10.13140/2.1.1004.2406.

Upadhyay et.al. (2015). The intersection of technology and Health care is called health informatics. This helps the professional a wealth of data so that they provide the best patient care. Some of the many new age embedded technologies in hospitals are defibrillators, digital flow sensors, fetal monitor electronic, external and internal monitoring, fog computing. Defibrillators can help a patient's inconsistent heart rate to be back brought to normal by monitoring it and providing a gentle shock to the heart. This device can be programmed using an external device, and placed into the patient. The real effect of the device is felt only when it starts to do its job. Apart from that Blood analyzers and diagnostic imaging devices are also present so as to monitor diabetic and cholesterol patients. By these devices, doctors can remotely monitor their patients. Digital flow sensors are devices used to monitor and measure the respiratory flow in patients. They also measure liquid flow, which will be helpful in determining the drug delivery functionality.

Fog computing is another type of system that is really helpful in the medical field, especially during emergency situations when doctors have to access a patient's details. Fetal Monitoring Electronic is another device with which we are able to listen to the baby (fetus) heart rate. This is done mainly during pregnancy, labor, and delivery. This way we can determine if the baby is healthy or not. External and internal monitoring of the patient's health status is done using a variety of technology like sensors, gauges, and many more.

The intersection of technology and Health care is called health informatics. This helps the professional a wealth of data so that they provide the best patient care. These innovations have brought in a major change in the health industry. Now it is easier for the doctors and health professionals to access huge amount of necessary data at the time of an emergency. There is no need for long procedure to be done to acquire live human cells for the purpose of experimentation. It can be done by printing live cells then and there. We must be thankful to the people who contributed towards the development of such technologies which is helping save so many lives in the current world.

Literary Survey

I. Methodology

Hamdan, R (2018), conducted a literature survey to obtain and verify all the related information that we have on this topic of IoT in hospitals. The paper aims towards the investigation of related factors on physicians, and health professionals so that they can successfully utilize the IoT for health information exchange. We performed the review based off

various multiple databases to avoid any omission of any relevant and important information. Following the search criteria that; the paper must be published in English and between 2003 and 2017, the time when IoT was newly introduced to the world. We targeted clinicians and medical group as this new concept does not just focus on physicians and nurses only. We noticed that the amount of relevant studies was pretty low during the years 2003 to 2011 but increased by a huge difference from 2012 to 2016. Even country wise, USA and Canada had much more studies that Iraq, Taiwan, Indonesia. There were many countries were no study was held. There were around 6 Human Factors that had an effect on the medical professionals and IT practitioners using IoT. Intentions to use the system is one. People with high behavior of intention can easily adapt towards new technologies in the health care. User satisfaction is important as it increases the interaction between the user and machine so that they can use it more efficiently. Collaboration is necessary a physician and professional have to talk and discuss the various problems, EHR is one system that is well collaborated with physicians. They have to trust each other and all the IoT components so that they use it to its maximum limit.

Chakraborty, S. et.al (2019), First a database of various clinics, and doctors all over the nation mainly in the urban areas where health services are unrivalled. We aimed at fusing doctors, executive and various other staff members for a joint collaboration. Data about doctors and clinics were collected from various sites like Data.in and sehat.com and more. Confirmation of some of the contacts were done through a few trustworthy clinics. The examination was held on a web-based interface Practo.com which is very well known. Then we introduced a criterion to conclude the synopsis of the specialists. The examination had a condition that that each specialist must have at least 2 years of work experience in their field and subject of specialization. An email was sent to all these specialists containing an introductory letter and a poll to support the review. Many finished reactions were received on the investigation for checking the legitimacy of the

proposed attachment. The nonattendance of non-response bias was assessed by the examination through the right on time and late reaction correlation. Nothing noteworthy contrasts were found. The examination went from pre-pilot, pilot and final investigation. The investigation took broad writing look for choosing a measure. Common method bias evaluation was considered necessary since a single member for each firm was drawn closer.

II. Findings

Scarpato, N. et.al (2017), has studied various application of the IoT in the health industry. Wearable sensors acquire the medical data from patients and transfer it to mobiles or gateway using wireless technology. Different sensors take data from different parts of the body. They are small and consume very less power. Diabetic sensors are based on breath acetone monitoring and sudomotor dysfunction. Its known that breath acetone levels are elevated for type1diabetes. ECG is one of the most commonly used bio signals to check the health condition of the patient. The QRS complex in ECG signal represents the electrical activity of the heart during contractions. Now they are available as we wearable sensors attached to the surface of the skin. Insights into the huge volume of IoT data can be done through Informative analytics so that professionals make better decisions and optimize operations. The second challenge is application of real time analytics to monitor current conditions and respond. Healthcare Big Data helps in analyzing huge data sets so that healthcare providers can gain insight and help them make decisions. Some areas where these concepts of Big Data analytics are used are: Signal Processing, Genomics and Image processing. Intelligent transformation and storage of IoT data, to prepare and retrieve it for analysis is done by the Information Ingestion. The division of data and cloud is done by APIs which makes it easier to pull the data.

Carcary, M. et.al. (2018), Huge amounts of real time data or near real time granular intelligence data can be accessed using IoT devices. This continuous

sensing helps in making the data richer and more accurate as it can tell the status of the item and it surrounds and make a collection of the "trusted" data which is difficult during ongoing sensing. It is possible to connect these IoT devices to various other devices and establish an inter-organizational-integration. The various analytical enabled by these devices can provide the strengths and weaknesses and react to events promptly. They are able to do real time decision making, analyzation, querying of data and many more automatically without any human interaction. Sometimes timely reaction to critical parameter measurements can be done by organizations as IoT devices hold remote control capabilities. Sensor triggers or proximity can be used to automatically initiate an activity. Improved systems and procedures can be introduced as a result of various operating efficiencies enabled by the IoT. In this way, labor can be reduced, human interaction towards machines will be less, so that they can improve the coordination between people, products and procedures. All these imply to increase in productivity of the organization, thus improving the productivity across manufacturing, customer interaction, logistics. This also helps an employee increase his productivity, by using his skill to their full potential and finally increasing revenue and capital for the organization.

III. Problems

Hossain, M,et.al(2015), IoT devices can only accept a limited amount of input for a particular job at a particular time. Some of the issues of hardware are that, usually IoT devices are battery driven and use low power CPUs with low clock rate, therefore, conditions or algorithms that require fast computation cannot be moved to such low power devices. These devices are built with limited RAM and flash memory compared to PCs or Laptops and use RTOS (Real Time Operating System). This raises a need for memory efficient security schemes. large algorithm may take up the spacious RAM leaving no memory for the operation of security schemes. Software of IoTs do have their limitations as well. Since they use thin network protocols stacks,

lack of sufficient security modules may arise. It is usually better to install a dynamic security patch on IoT devices. Since the operating system or protocol stack does not have enough ability to receive and integrate new code or library, remote programming of these devices is not possible. Network based limitations also arise in IoT devices, since most of the IoT devices are always moving, these devices join a proximal network without any configuration, this rises the need for mobility resilient security algorithms for these devices. As the number of IoT devices are increasing day by day and more devices are getting connected to the global information network, and since IoTs have multi-protocol communication systems, current security schemes lack these properties.

Furfaro, A. et.al (2017), Since IoT devices contain lots of personal information related to the patient like their daily lifestyle habits. This is one reason IoT security is threatened. Many criminals, hacktivists are some of them interested in such type of data. One such person is referred to external attacker. They do not have any permission to access any system or device, they just remotely target a device with bad intention of accessing the data and getting critical information. Another such entity is a malicious user, who is basically the owner of the device, who wants to steal or expose the secrets of the manufacturer and sell it to a third party. He can also have intention to gain access to features not available to the users. But the opposite can also happen where a manufacturer wants to access the information about its general users. This can with use of security holes, thus access the user data, violating his privacy. There can be one more way in which the rival companies may break into the devices of the users of their rival company so as to destroy their reputation. We refer such entities as 'Bad Manufacturers'. A DoS (Denial of Service) is another threat to IoT devices. It refers to eliminating or disturbing the network to do its expected function. This can prevent the transfer of vital data as these attacks interfere with the radio frequencies of the sensors.

Summary

As population around the world is increasing day by day, the need for faster and wider healthcare 7facilities increases. So, to cope up with the rapid change, various devices are introduced in the healthcare industries. One of them is the IoT devices. These devices can be sensors or devices which can store huge amounts of data, that can be accessed anywhere by the professionals at the time of crisis. IoTs can send data regarding a patient's health monitored by sensors present in /on his body. This is very helpful when there are rapid unnoticeable changes in the body which can be life threatening. These devices are small and consume less power and mobility of these devices is also easy. But just like any other device connected to a network, the chances of critical information of the patient being stolen is quite easy, thus security patches are introduced to prevent this. But sometimes people do access the information with bad intentions like financial damage, lowering of the reputation of rival companies by degrading the service of its general users. IoTs can interact with other devices forming an integration between the two devices. This make IoTs really flexible and easy to adapt to.
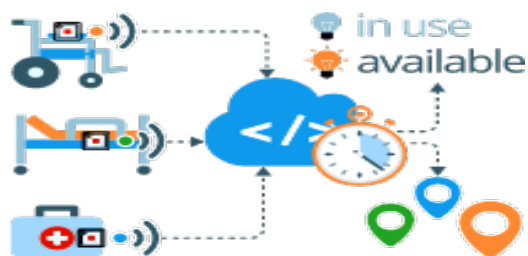
Conclusion

Technological advancement in India will be huge factor for development. Since India is a huge country covering huge areas with different terrains where transportation can take large amounts of time to reach and provide assistance in cases of emergencies. Thus, these remote locations lack proper healthcare facilities and staff. Such advancements can be of huge advantage to the common men and women as they can make use of the healthcare facilities in the remote locations. This can save numerous lives which are lost due to lack of time and improper transportation from remote locations to cities or the nearest healthcare facility. Hospitals like Apollo use their Telemedicine network to share everything from reports to graphs. IoT in health care can be of great help in remote areas with lack of medical professionals as they can do basic jobs that they are supposed to do so without any human interference or involvement. It can be of great help to doctors as well as they can be in continuous touch in case of any emergencies. This makes IoTs really flexible and easy to use. Personally, I think that the introduction of IoTs in the medical industries is a great achievement unlike the olden days where lack of communication and transportation were some of the main reasons of death of a patient. This has helped save many lives and I hope even better technologies will be introduced in the future.

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ARTIFICIAL INTELLIGENCE – A BOON FOR HEALTH CARE INDUSTRY

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Introduction

Nilsson et.al (1998) The main concept of Artificial Intelligence deals with how machines behave. The aim of Artificial Intelligence is to create machines which show same behavior as humans. We can simply explain it as creating machines which can think and show qualities such as communication skills, logical reasoning, learning ability, problem solving skills and almost every other trait which makes them more like humans.

Rita Sharma. Healthcare / Medical Industry is a sector which provides facilities and services to treat patients suffering with various ailments and while doing so they face a lot of challenges. The current pandemic makes the situation even worse. Some of these challenges include:

- The rising healthcare costs have always been a critical challenge. It immensely affects the healthcare industry's revenue as many patients who can't afford the expensive treatment and the prescribed medicines checkups and various lab tests which finally affects the patient's health.
- Healthcare staff shortage can turn out to be a major crisis in the future. Many industry groups have predicted that there would be a shortage of around 100,000 doctors by 2030. Improvement in infrastructure and development at professional level can help to decrease this shortage.
- Data breaches by hackers have led to the theft of a huge number of records of patient's information. Due to this, patients lose their trust for the healthcare industry.

Borges do Nascimento et.al (2020) Artificial Intelligence is a cluster of technologies. It has the ability to perform healthcare tasks such as precise diagnosis of disease and medicine applications as well as or maybe better than humans. The most common way of Artificial intelligence used in healthcare industry is Machine Learning. Machines 'learn' or are trained with data. They can analyze what sort of treatment will be most likely required by a patient and its possible outcomes. Another important way Artificial intelligence technology can be used is by its ability to understand human language. This includes translation, speech recognition, text analysis etc. In Healthcare industry this feature contributes to create and understand reports and clinical documents, create prescriptions etc. Robots embedded with Artificial intelligence are a huge part of healthcare industry. They perform tasks like welding, assembling, lifting and transporting objects. Such robots are also used to stitch wounds and perform some surgeries. They can perform tasks precisely on a very minute level.

Although, in all these ways Artificial intelligence is a boon to society but on the other hand this technology leads to unemployment. Machines are rapidly replacing humans not in just healthcare but all sorts of industries. Laborers who used to work in factories are now jobless as now all these tasks are performed by intelligent robots. In this review, role of Artificial Intelligence in various fields of Healthcare industry is discussed.

Literary Survey

Applications of AI in Healthcare Industry

Khanna D (2018) Artificial Intelligence is not just used in industries but can also be seen in the day-to-day aspects of our lives like, logging into any online platforms for shopping etc. Artificial intelligence is capable of helping in decision making, increasing treatment accuracy and support human judgement. Artificial Intelligence plays a crucial role in the healthcare industry by performing highly complex

tasks in a very short span of time and also at a low cost. AI can learn different features from a large amount of healthcare data with the help of algorithms. These algorithms can correct themselves as needed to improve learning skills and develop more accuracy. This also helps it to predict health outcomes and risk alerts. By learning from a large dataset an algorithm can associate between subject features and outcomes. This will enable it to analyze various kinds of information such as medical reports, scanned images, physical examinations etc. AI health systems which have machine learning algorithms can be used to decrease the time taken for the discovery of drugs. While developing any medicine, lab tests and clinical analysis done by humans will consume many years, while the same discovery process carried out by Artificial intelligence technologies will be cheaper, quicker and safer. Overall, Artificial intelligence contributes immensely in the efficiency of the industry, due to which better care can be taken of the patients.

AI and Human Resource Crisis

Meskó, B., et.al (2018) Quality care cannot be provided without a strong and capable workforce. The Human Resource Crisis is a challenge faced by the healthcare industry worldwide. Some major causes for the occurrence of this crisis are: shortages of doctors and physicians and a high and ever-increasing demand for chronic healthcare. According to the data, more than 400 million people do not have access to safe and affordable healthcare services. This crisis not only affects the patient but also the doctors and other healthcare workers. Due to the constantly increasing chronic healthcare demand and shortages of workforce, doctors and physicians are overworked which soon results in burning out. Doctors suffer from sleep disorders and other psychological disorders. How can an efficient healthcare services be provided if the industry's workforce is facing health issues itself? Therefore, the health of doctors is as important as that of patients. This is where Artificial Intelligence comes into picture. AI systems helps in taking decisions, predicting treatment outcome and finding errors.

This helps the physicians to take care of high quantity of patients. But no matter how much benefits Artificial Intelligence provides us, it can never replace a human worker in a few aspects. AI systems cannot provide patients with proper communication, empathetic behavior and most importantly the human touch. Still, AI can be a very efficient assistant for doctors.

Artificial Intelligence in Drug Development

Mak, K., et.al (2019) The Drug Development process begins by analyzing various already existing results from different sources. It is an induction-deduction process. In this process, the most tough task is of constantly discovering successful new drugs and medicines. Artificial Intelligence's tools and technologies can be helpful in various stages of this process. Some of these stages of the drug development process include: identification of drugs, reusing drugs, designing new drugs, and also the decision making for clinical testing and trials. Due to this participation of AI technologies, human involvement in the process can be reduced and the errors caused by humans can also be avoided. AI systems can also be helpful for predicting the composition and properties of drugs, their combination, target association and toxicity risks. AI can also be used to find the link between the disease and the drug, this can help in the creation of personalized medicines. Till today, AI is not used in development of any drugs but it will soon be possible in the near future. Then, chemists and pharmacy workers trained with AI programming would be easily able to work with AI technologies.

AI in Treatment of Chronic Diseases

Jiang, F., et.al (2017) AI technologies are mainly used in the treatment of a few chronic diseases since they are some of the leading causes of death around the world and hence their early diagnosis becomes very important. These diseases include: nervous system diseases, cancer and cardiovascular diseases. For the treatment of cancer, Artificial Intelligence can be used to identify different types and subtypes of cancer by analyzing images obtained from various

clinical tests. In the field of oncology, IBM Watson AI system assists in the diagnosis of cancer. In the field of Neurology, AI technologies help the patients suffering from paralysis to regain control of their movement. AI systems are also used to control prostheses for patients who have suffered loss of limbs. When it comes to the field of cardiology, Artificial Intelligence is used in the diagnosis of heart related diseases by analyzing the cardiac MRI images. Another chronic disease which affects a large number of people worldwide is stroke. AI techniques helps in prediction of disease, its diagnosis and treatment. It is also capable of predicting the results and outcomes of the treatment for a patient. Apart from all these major chronic diseases artificial intelligence is also used to analyze clinical images related to cataract disease and diabetes.

Future of AI in Healthcare Industry

Desai, P., Even today, various Artificial intelligence technologies like, Machine learning, Natural language processing, Optimization etc. play a vital role in healthcare industry. These technologies when stretched to their maximum potential can help to solve many of the challenges and hurdles faced by the industry today without the help of humans and improve the services provided to the patients in order to take better care of their health. No matter how much well trained and programmed these AI machines are, there is always room for error. Even a very advanced algorithm can result in taking wrong decision. This will always be a risk for any industry using artificial intelligence. Furthermore, more and more AI systems are rapidly replacing human workers in the industry, still complete replacement of humans by machines is not very likely in the near future. This may lead to issues like, when new medical cases are discovered, the AI technologies won't be able to tackle it since they are not trained/programmed for it yet. So, the presence of doctors would be necessary to handle such situations. In the future, AI systems may not need any human inputs to work and perform high level tasks. This gives rise to a debate where people suggest that AI systems may need to take ethical decisions.

Summary

Murali, N., et.al (2018) Artificial Intelligence is an attempt towards creating machines and technologies which mimic human behavior and thinking. An AI system consists of various features such as Machine Learning, Natural Language Processing, Neural Learning etc. Artificial Intelligence play a crucial role in the healthcare industry. It helps in the prediction of diseases, their diagnosis and treatment. AI systems are trained for decision making and thus they are used to assist doctors in surgeries. Artificial intelligence is highly useful in drugs development process as it requires very less time to analyze work and thus less expense. AI technologies are significantly used in treatment of chronic diseases such as cancer and stroke. With these applications AI also faces various challenges such as the algorithms may take a wrong decision, machines won't be able to deal with any new medical case without the input of humans. Artificial Intelligence used at its full strength can solve many challenges faced by the healthcare industry. In the future, AI systems may replace a large number of people working in not just healthcare industry but every other industry which depends on AI technologies for its work. This may rise the need for AI systems to work and take decisions ethically.

Advantages

1. AI can analyze large sets of data which helps in compiling all the details of a patient and lead to a predictive analysis.
2. AI technology can be installed in compact devices such as smartwatches etc. which makes it easy to handle and use.
3. AI helps to automate various administrative tasks such as maintaining records and keeping check on unpaid bills.
4. AI technology consumes very less time to perform any task which makes it efficient and results in high productivity.

5. AI has very high accuracy resulting in highly accurate reports of a patient.
6. AI has very low error rate compared to manual analysis.
7. With the help of AI technology computers become more useful and powerful.
8. AI machines perform a lot of on-field tasks such as transportation which helps in reducing human efforts.
9. AI machines also assist to perform surgeries along with doctors with precision.
10. AI technology can create virtual assistants which can help to reduce the workload of people.

Conclusion

Artificial Intelligence is a highly beneficial technology especially for developing countries like India with the second largest population in the world. To assist such a huge population, AI technologies and software can be really helpful to provide services where there is a shortage of human staff. Lengthy and time-consuming manual procedures can be cut-short with the help of AI. This is also beneficial from the view of a common man as now they don't have to wait for a long time to complete official procedures. All services are just one touch away as this software is now available in smartphones and other electronic devices. As every coin has two sides similarly AI has its advantages and disadvantages but it depends on how one uses it.AI is a technology which can think, it has a brain of its own, it may or may not replace humans but its abilities can surely be further developed to perform even more advanced activities in the future.

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Rita Sharma Top 10 Challenges Healthcare Companies Face Today derived from https://www.finoit.com/blog/top-10-healthcare-challenges/

EMBEDDED TECHNOLOGY REVOLUTIONISES HEALTHCARE

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Introduction

Khadka, Shree Krishna. (2017). An Embedded Technology refers to a computer system that is a combination of microprocessors, microcontrollers, computer memory and input output peripheral devices that performs a dedicated (specific functions based on their use and field) function within a larger mechanical or electrical system with real-time computing constraints.

Dhariwal, K., & Mehta, A. (2017). There are a lot of embedded technologies that are already being used in the medical field. Starting off with Hospital Information System (HIS) which is also known as Hospital Management System (HMS) is an important element of health informatics which is for the administrational needs of a hospital.

Internet of Things (IoT) is another technology that is of much use in medical field for data storage. IoTis an inevitable outcome of embedded technology. RFID technology also has due importance in improving medical services by promoting non-contact identification and, reading and writing devices. Internet of Things (IoT) with a combination of other embedded technologies such as RFID(Radio Frequency Identification Devices), laser scanners, GPS, infrared sensors and other information sensing equipment can be used to attain the concept of smart hospital.

Riurean, S., et.al., (2019).With the emerging advancements in wireless communication technology the Medical Devices (MD) can be made more wearable. Optical Wireless Communications (OWC) which consists of Visible Light Communication (VLC), Infrared (IR), Optical Camera communication (OCC), Light Fidelity (LiFi), Radio Frequency (RF) Wireless Communication are effective technologies used for Hybrid Wireless Integrated Medical Assistance Systems (WIMAS).

The other embedded technologies believed to have promising future is VLC, OCC and ERMA.

Embedded systems are vastly used in the healthcare industry. Their range of uses in all the fields combined is extensive. Their uses and advantages are also plenty. Use of embedded systems have to be encouraged as it helps in making jobs otherwise tedious, easier. Such a development is actually a milestone in many fields but mostly in medical field. Their use in this field alone is so extensive. They make the collection and storage of patient information easier and also radically improves the accuracy of diagnosis and helps in improving the quality of treatment.

Literary Survey

I. Internet of Things

Yu. et.al., (2012). Internet of Technology is the technology based on integration of multiple technologies. It describes the network of physical objects that are embedded with multiple sensors and software for connecting and exchanging data with other systems over the internet.

Let's consider the 4 main sub sections of Internet of Technology (IoT), starting with RFID Technology. It's a kind of non-contact auto-identification technology for medical articles. It works by making use of non-contact reading and writing devices. This technology can be categorised into passive RFID, active RFID and semi passive RFID. The three common basic components that they share are the RFID tag, RFID interrogator also known as the reader and the backend system. The RFID tag consists of information on the article and may also include sensors. The reader helps in

communication with the RFID tag and the back-end system links the RFID reader to a centralised database. The centralised database has additional info on the article. The non-contact system points to the use of Electromagnetic Induction method.

Secondly, the Sensor Network Technology (SNT), which is considered as the core of IoT in cooperation with the RFID technology keeps track of status of things such as their location and movements. The sensor consists of special nodes called sinks that help in wireless communication. This technology has great importance in the medical field alone.

Thirdly, the wireless communication technology which works hand in hand with the sensor network system and RFID technology, includes WiFi, Bluetooth, UWB, Zigbee, IrDA etc.

Lastly, Embedded technology. Technically speaking, IoT is an embedded system which is based on the internet. Embedded system helps in hastening the services of IoT to a great extent. IoT is a crucial part of Embedded technology.

II. RIFD Technology(Detailed)

Florentino, et.al., (2008, August). RFID stands for Radio Frequency Identification Device. It works on Auto-ID, and helps in the automated identification of articles. Let's consider the different use of RFID technology. It has great potential in hospital Automation, for tracking inventory, locating patients, combat of medicines counterfeiting etc. RFID consists of many smaller technologies such as tags, smart cards. Etc.

Tags are basically identifiers which can be used on medical articles which could basically be a microchip. It can also be passive working in magnetic fields or active working on a battery. Passive tags are mostly used because they are cost effective and independent of a battery.

Readers help in communication with the tags such as transmitting radio waves and reading the information. This communication is wireless. The communication of the reader with a different device is identified using network interfaces.

Automatic recognition of articles is the essence of RFID technology, that can be used in many ways. It mainly promotes automation of processes in clinical laboratories.

Smart card are portable computers that also has storage programmable data. The non-contact smart cards have zero contact with the reader. They are similar to RFID tags. The wear and tear of the cards are minimised to zero due to the minimal physical contact with reader and RFID, this further contributes to the minimum cost of the technology. The smart cards can be of two types, memory cards or mixed cards, in the second case they include microprocessors. The memory card is cost effective and hence more popular.

III. Ubiquitous Computing Technology

Kuroda, et.al., (2012). Ubiquitous Computing technology for public understanding can be summarised as 'access anytime anywhere'. The term was coined by Mark Wiser. The plan is to make computers available throughout a physical environment, but effectively make it invisible to the user thereby enhancing computer use.

As a CSCW tool, Jacob E. Bardram implemented the Weiser's pad and wall system into a hospital, in order to share on-going surgeries, treatments, schedules etc with the board.

Ubiquitous Echogram is a medical imaging device which is computer-based. Here a medical device can be embedded by simply replacing the bs with the HIS. With such a system in effect the echogram terminal's functions can be easily updated by upgrading the server. This way we can reduce the maintenance cost for the imaging which can be obtained even on a TV if connected with the hospital CATV network.

Network Digital Camera that is composed of CCD, storage and display as the functional units, and connected by a bus is an information system. This technology also is used for conventional medical imaging. With the combined use of such technology the quality of medical imaging can be enhanced. The main objective is to connect medical equipment and devices to the HIS. This would drastically improve

the productivity in the medical field. Also issues like network failure or barcode recognition errors can also be avoided.

IV. eMAR Technology

Poon, et.al., (2010). The bar-code system first came into effect after the occurrence of serious medication errors in hospitals. The use of bar-code has helped in reducing the rate of errors in order transcriptions and also medication administration. The prime objective was to improve safety of medication. The implementation of bar-code verification technology has greatly improved this situation. This technology is called bar-code eMAR (electronic Medication-Administration System.)

Bar-code errors are of two types, timing errors and non-timing errors. Timing errors are the ones where there is an early or late administration of the medication. Whereas the other one includes every error that is not related to administration of the medication. Manually transcribing a medication prescribed by the doctor to a patient becomes harder and troublesome as the number of patients is incompatible to the number of medical staff. The bar-code eMAR technology ensures that the right drug is administered to the patient with utmost precision.

Manually performing these tasks are bound to have comparatively more errors, preferring eMAR technology ensures precision. The use of bar-code eMAR technology can also avoid adverse situations such as giving the wrong medication or dosage which may result in human life endangerment. Preventing such a situation would be very difficult if the medicationis handed out manually. By preferring eMAR technology over manually performing the task we can avoid risking a patient's life.

V. ECG Devices

Bansal, et.al., (2018). Cardiovascular diseases contribute a great deal to the worldwide mortality (around 17.3million deaths per year). Considering the lifestyle people have now this value would only increase. Early diagnosis of such a situation is hence crucial. This is where the portable and home-based electrocardiography turns out as a very useful medical innovation. The handheld ECGs have limited information compared to the conventional 12-lead ECGs, so using the conventional ECG is also about having an elaborate information on a patient's heart condition and more accurate readings.

Single lead ECG devices are of many types, Alivecorkardia is the most famous one among them. It is a smartphone ECG device which is a typical smartphone but has electrodes to transmit ECG readings. Another one is Omron heartscan. It's a cordless, portable and user-friendly ECG device. It also has high resolution. This one displays the readings as waves but the device lacks a rechargeable battery. The other mostly used ECGs include Rekha health, Zenior ECG, Schiller miniscope, etc.

Multiple lead ECG devices are the next ones and ZioPatch is the widely used one among them. This one requires no battery charging. It works by placing the ambulatory ECG monitoring adhesive patch over the left pectoral region. After wearing the patch for 14 days as prescribed the data is then analysed by ZioPatch.

Using such newly developed or updated versions of medical devices is important for the well- being of the society. The cases of cardiac related deaths have dropped considerably in the past few years, due to the early diagnosis of the diseases.

Zagan, et.al., (2018, May). The plan is to improve quality of medical treatment without endangering the environment. Today's system ensures safety and precision due to the use of advanced microcontrollers., which also reduces power consumption. In the last few years, the application of such devices has increased drastically. The Green CARDIO device is designed for the remote monitoring of out of hospital patient's cardiac condition. The use of this the device has definitely made the medical instrumentation better, accessible to larger group of people by the use of IoT. the use of the device can be for remote research with the obtained data and also for diagnosis.

The device works by making use of the hSensor platform. The hSensor platform has an energy efficiency greater than 50% compared to the existing

devices. Designing devices for remote and real-time monitoring of out-of-hospital cardiac patients is a novel field with vast possibilities but also a challenge if we consider IoT. mobile tele-electrocardiographs within Green CARDIO system is a big achievement for the medical field. It improves the quality of diagnosis, accuracy of readings, its easy use and cost effectiveness also helps in saving more lives comparatively. The Green CARDIO embedded device can still be improved by rapid prototyping and testing and by improving the software, energy consumption and the overall IoT system's performance.

VI. Latest Embedded technologies

K. I. Papadimitriou et al., (2015) Now let's discuss popularly used modern embedded devices for health monitoring in the medical sector starting off with the Defibrillator. As the rate of cardiac arrests is high and it occurs without any warning and the rate of deaths is also not any less, this device is commonly used to monitor a patient's heartbeat for irregular patterns and shocks the heart back to its normal form every time an irregular pattern is detected, similarly another device is used to monitor the patient's lungs. This device is called a Digital Flow Sensor. It helps in detecting irregular breathing pattern and alarm the doctor about it.

Blood pressure device and glucose test sets that are now commonly in use are also perfect examples of embedded devices because of their accuracy and small handy size. Foetal heart monitoring machine is a device used during pregnancy and delivery to keep track of the heart rate of the foetus.

All wearable devices that are popular among the youngsters is also an embedded device. These wearable devices help to keep track of the health of people who can't go to the hospitals and clinics for regular check up, from their sleep to their blood pressure and numerous other parameters. The fitness world was taken by storm with Fit-Bit. It is the most advanced examples of embedded systems.

Electronic tattoos are now-a-days replacing bulky gadgets like a pacemaker. These devices are more preferable as they dilate with your skin and are temporary. They are also environment friendly as they make use of solar energy for being powered. And due to the nature of materials used you won't even realise that you are wearing a health monitor.

We can now see how the range of embedded system is expanding. The da Vinci Surgical System is the perfect example. It is a robotic surgery system that has the approval of US Food and Drug Administration (FDA). From monitoring a person's heartbeat to performing surgical procedures this technology has seeped into such a high level of development.

Embedded systems are said to be versatile with high accuracy. This makes them apt for taking the biosensing measurements of diagnosis that are required by the doctors for being able to give the best treatments and diagnosis to their patients.

The amount of research happening this field is also extensive. Studies are being conducted on inserting microbots into our body to make tiny surgical incisions, and the now existing medical devices are constantly being improved and upgraded.

Advantages

1. Mass production of embedded systems are more convenient due to their smaller size compared to traditional computers. They are also compact and portable, and so they are cost effective.
2. They are highly stable and reliable products with high accuracy and precise readings. They can collect even minute current and voltage input signals. Hence they are capable of digitally processing incoming analog signals and exporting them back to user as amplified analog signals or in digital format through a USB interface.
3. Embedded systems are task specific. This helps the design engineers to optimize itto reduce its size and cost of production. Hence increasing reliability and performance.
4. They are handy and transportable as they are of small size.
5. They are easy to store because of their small size. Their installation is also very convenient.

6. Although they are complex and will take a competent system's engineer to understand and fix the fix the problem. These systems require lower power and work fast and efficiently as they are small and loading time is also very less as there are fewer elements to manage.

7. Embedded systems makes use of products of high quality and high efficiency.

8. Doesn't use or spend a lot of resources which contributes to lower cost. They are also tightly constrained. All computing systems are said to have constraints on design metrics but those on embedded systems are especially tight

9. They are easy to use and manage as they are constructed using cheap, longlasting material. As they are cheap the treatment costs that the patients have to pay can also can be considerably reduced ensuring treatment to a larger group of people.

10. They are low maintenance products with high level performance. This is one of the most beneficial fact about using embedded systems. They are in all ways favourable as they are efficient besides being cost effective.

Conclusion

We can conclude this paper by realising how much the invention of embedded systems has impacted the medical field alone. The advantages of implementing such a technology in this field is by now very evident. By using this kind of a revolutionary technology we can upgrade patient care to another level which was otherwise impossible. By shifting from manual care to machine care (services) we are not only improving the quality but also increasing the attention that a patient deserves. Embedded system so far is a win-win choice with plethora of benefits and numerous applications. The use and promotion of embedded system has to be increased as it is now the best choice and besides highly favourable for the medical field. The possibilities are endless. The future of medical field is bright with the developing embedded system technology by its side. The cost effectiveness of embedded system is not only beneficial in the production of it but it also makes treatment cheaper for patients ensuring healthcare to a larger group of people who otherwise couldn't afford it. Thereby they lead us to a healthier future. Development of the new existing technology is promising and the medical industry is going to need these new technologies specifically designed to meet the requirements of healthcare.

They are rapidly becoming a catalyst for change and improvement in the health sector. We can witness that this technology is growing by leaps and bounds and has a long way to go. It's not going to be long before you have a robot doctor who can monitor your health with or without assistance of a real one.

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FUTURE OF BATTERY TECHNOLOGIES

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Introduction

Marco Sampaolo. et.al. (2006) The definition of technology as given in Britannica is "Technology, the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment.". From the above definition it is understood that a technology is any device or skill or technique which is used to accomplish a task or a goal. An energy efficient technology is a technology which uses the energy supplied to it such that the energy loss is minimum. Every device or technology has energy loss and wear and tear. So, experts try to develop the existing technology or invent a new technology in such a way that the energy loss caused due to it is minimum and the technology should also be more durable. For instance, the unit of electric energy produced by power station doesn't coordinate with the units dispersed to the consumers. Some of the units are lost in the distribution network. This difference in the produced and dispersed units is known as transmission and circulation loss. This is caused due to the loss of electrical energy in the form of heat due to resistance. One effective method of reducing the energy loss is by replacing the overhead cables by cables being buried underground with the use of cryogenics like Liquid Nitrogen or Liquid Helium to reduce the energy released due to resistance. It is achieved by surrounding the current carrying cables with cryogenic liquids to maintain the cable at very low temperature which in turn reduces the resistance of the current carrying cable. But due to its high production cost, the government is unable to implement this method.

Most of the technologies which are produced now are aimed to be more energy efficient at the same time more productive. So, upgrading to the latest technologies at a regular time period could be one energy efficient method, at least in the case of electrical and electronic devices. But upgrading the technology in a very short interval, for every little development in the technology, where the technology already in use is still good, would result in wastage of resources. In day to day life, electrical energy is constantly used and this can be used efficiently in various ways, such as

1. Not using electricity when it has no important purpose.
2. Not using outdated technologies as it might consume more energy.

AHUTI MISHRA (2019), Most of the devices used for domestic purposes are energy efficient. Electronic devices such as refrigerators and air Conditioners usually have a star rating to indicate its energy efficiency. The quantity of stars on the label likewise causes you analyse the productivity of one refrigerator to one more of a similar volume and comparable sort. For instance, a no star Refrigerator consumes 1000 units per year. But a 3-star rating Refrigerator uses only 626 units of electricity consumption per year. Electronic devices like desktops and laptops which are mostly used for work and home are certified as Energy star products by an organization to indicate wastage of energy is minimum. In computers and mobiles, the processors are also being manufactured in such a way that it consumes much lower energy without affecting its performance.

ROBBY BERMAN (2020), Using the available technologies, energy is being used as efficient as possible. But there are losses which cannot be avoided, such as the energy loss caused during the transmission and storage of energy and the loss caused during. So, instead of worrying about the

wastage of energy, renewable sources of energy could be adopted than non-renewable sources, by using wind mills, solar panels, etc. This could be an efficient technology as it has no wastage of resources. Companies like Samsung are trying to manufacture Lithium ion batteries with Graphene which can store more energy compared to the regular Lithium ion batteries in a way that it is compatible with devices like mobiles, laptops and gadgets.

Diane McMorris, (2009), Many projects of motor engine that functions using water as fuel are being displayed in many events. But those are usually using electrolysis of water which produces Hydrogen. This Hydrogen is the fuel for the engine to work more effectively. There are various web-based advertising offers of units that will change your vehicle over to "run on water," however this ought to be seen distrustfully. These packs, which join to the motor, use electrolysis to part the water (H2O) into its component molecules (hydrogen and oxygen) and afterward infuse the subsequent hydrogen into the motor's burning cycle to control the vehicle alongside the fuel. Doing this causes the fuel to consume cleaner and more completely, thus making the engine more efficient.

Battery Technologies
Yoshino, A. (2012), A battery is a container with one or more cells in it. Each cell produces electrical energy through chemical reactions. A cell contains a positive and a negative terminal. Inside the cell there are positive ions and negative ions and they maintain a potential difference. The positive ions are near the positive terminal and the negative ions are near the negative terminal. The ions are separated by a porous membrane which is semipermeable. When terminals are connected the electron flows from negative to positive terminal and the current flows in the opposite direction. These chemical reactions yield electrical energy. So, battery is device to store energy. Batteries are divided into two types. They are Primary and Secondary batteries. Primary batteries non rechargeable whereas secondary batteries are rechargeable. Dry cells and alkaline batteries are examples of primary batteries. It has wide range of

application in our day to day life, such as the AAA batteries and watch cells used for watches. They are disposable and are for single use only. Secondary batteries are rechargeable they also are used in many applications in our day to day life and they are expensive costlier than the rechargeable ones. There are many types of secondary batteries. The one's which are used in the devices like mobile phones and laptops are usually Lithium ion and Lithium polymer batteries. They are also used in gadgets like watches and wireless portable devices.
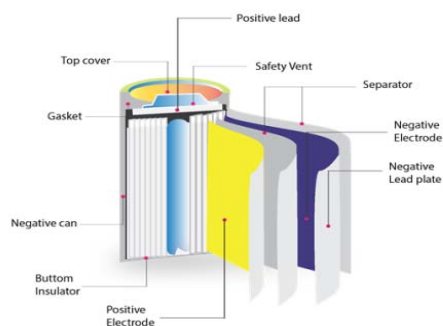
A non-aqueous secondary battery using transition-metal oxides containing lithium ion such as LiCoO2 as a positive electrode and carbonaceous materials as a negative electrode was invented in 1985. This is the present-day lithium ion battery. Nowadays most of us own a mobile phone as well as a laptop or a tab. Most of these devices are powered by Lithium ion batteries. There are several advantages of advantages Lithium ion batteries. It can hold larger amount of energy when compared to other batteries. It has high energy density. It is rechargeable and it has more life cycles than other batteries. The voltage produced by each cell is about 3.6 volts which is higher than other cells. They provide a constant 3.6 volts per cell before falling off as the last charge is used. Rate of self-discharge is much lower than that of other rechargeable cells such as Ni-Cad and NiMH forms. Very little energy is wasted and climatic resistance compared to other rechargeable batteries The Lithium polymer batteries are used in some mobile phones due to its flexibility and ability to be manufactured in many shapes. But its main disadvantage is that it has less charge

density than Lithium ion batteries and is costlier. Lithium polymer batteries are nowadays used in flexible devices. The Lithium ion batteries were invented in the year 1985.Since then it has been used in many devices but there is still no new battery technology which is ready to use. There is no replacement for Lithium ion batteries till date.

Huilin Pan, et.al. (2016), There are many evolving battery technologies which have a higher possibility of becoming a replacement to Lithium ion batteries. An unexpected chemical conversion reaction in a zinc-manganese oxide battery was found by a research team in Pacific Northwest National Laboratory If the team succeeds in controlling the process, the energy density can be increased in conventional batteries without any increase in its cost. This results in the effective usage of Zinc-Manganese oxide battery in the place of Lithium ion batteries
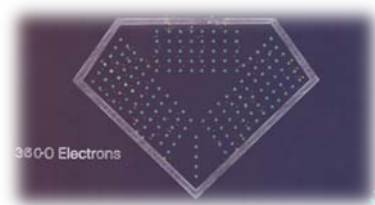
Nano-Diamond Batteries

Loz Blain, (2020), A California based company called NDB (Nano Diamond Battery) has developed a new type of battery technology where they are using radioactive C-14 atoms from nuclear waste materials which are usually buried deep inside the Earth's crust for safety.

As these batteries are made from nuclear waste materials, there is no wastage of resources. In the Nano Diamond Batteries, each cell consists of Graphite part of nuclear waste material. Graphite is used to absorb radiation in a nuclear reaction. The Graphite is used as a moderator and reflector during nuclear reactions to increase its efficiency. After the nuclear reaction, the Graphite itself becomes radioactive. It is very dangerous and expensive to store or to dispose it. The Graphite contains radioactive C-14 which decomposes to produce Nitrogen, N-14 along with an electron and an anti-neutrino. NDB uses this radioactive Graphite to produce tiny Carbon C-14 diamonds. Each C-14 diamond is coated with regular C-12 diamond to prevent the leakage of radiation. Each cell consists of one C-14 diamond and a nano-diamond battery requires many such cells stacked up. At first the radioactive C-14 is purified and then it is processed by a technique called chemical vapour deposition which builds the C-14 nano-diamond in the atomic level layer by layer. They also use a method called Metal sputtering. The nano-diamond battery also has a small integrated circuit board and a tiny super capacitor to store and distribute the energy.

Busra Balli et.al., (2019), Sourav Gupta. (2019), The nano diamond battery generates energy due to the decay of radioactive C-14 atoms present in the C-14 diamonds. This C-14 diamond produces average of 3600 electrons as it decomposes. Thus, the C-14 diamond produces electricity. This electrical energy is stored in the super capacitor and is distributed. The super capacitor acts as the storage device and the C-14 diamond is used to generate electricity. The super capacitor has high capacity and high energy density compared to normal capacitors but it has lower voltage limits of 2.5 to 2.7 volts. The super capacitors are highly efficient compared to normal capacitors. It can last for 10-18 years. It also has a high number of charging cycles ranging from 1 lakh to 1 million times. The half-life of radioactive C-14 is 5730 years and the battery's life span expected to be close to 28000 years. The radioactive C-14 diamond is encased in a layer of C-12 diamond which prevents radiation from reaching out of it. Since diamond is the hardest substance on Earth, there is a lower chance of damage or leakage of

radiation and the company has reported that its radiation levels are much lower than the radiation produced by the human body itself. So, it is safe for domestic use. The company says that the battery could be made in any shape or size or in any standard such as the AA, AAA types of batteries. They have said that it could be used to power any appliances or devices. The battery need not be replaced as it has long life.

The example given by the company for the use of its nano-diamond batteries in a small-scale, is to provide energy to devices like mobile phones and laptops, vehicles like cars and trucks, and even to power houses.

It can also be used as a power source in pacemakers. The large-scale use is that it could be used to power satellites and other outer space technologies. The company said that the cost of the nano diamond battery would not be too high and will be similar to or sometimes cheaper than the regular Lithium ion battery. This is because radioactive C-14 is a waste material which is usually dumped deep under the soil. The company also gets paid for the safe removal of the radioactive waste material from the power plants. The company has completed a proof of concept and they have said that they are ready to build the prototype. They have also said that their low powered commercial product will reach the market in next two years and the high powered one would reach the market in five years of time. This could be an efficient energy technology of the future which could be used in day to day life. This is also energy efficient technology as the energy wasted during its storage is very less compared to Lithium ion batteries.

Advantages

1. The use of technologies which use water as fuel could decrease the use of petroleum and other depleting fuels. It will also reduce the release of green house gases into the atmosphere.
2. The nano-diamond batteries could be used to power satellites and space stations for many years without changing the batteries.
3. The NDB technology could be used to power many devices in our day-to-day life. It could be used to power devices for a very long time without the necessity of changing it.
4. The nano-diamond batteries are completely biodegradable. So there are no environmental effects caused due the nano diamond batteries.
5. The nano-diamond batteries are extremely strong as they are made up of diamonds. So it cannot be broken easily and are not as dangerous as Lithium-ion batteries which burn in the presence of air.
6. Since the nano-diamond batteries can produce energy for many years, it could be used in pacemakers.
7. The nano-diamond batteries may be even cheaper than Lithium-ion batteries since they are manufactured from nuclear waste. The company gets paid for removing the nuclear waste from the power plants. So the only cost would be manufacturing the nano-diamond batteries from the radioactive grapheme.
8. Nano-diamond batteries could be used to provide electricity even in the most rural areas.
9. The radioactive substances will never get depleted since the half-life of a radioactive C-14 is 5700 years.
10. This technology would further be developed and batteries which are more efficient may be produced.

Conclusion

These nano diamond batteries could be used in many other ways to power devices. Once the NDB

completes its research and development and receives the patent for this product, they could production in large quantities and it would be made available for domestic use.

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PROS & CONS OF ARTIFICIAL INTELLIGENCE IN MEDICAL FEILD

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Introduction

Fakoor R ...et.al (2013) Artificial Intelligence with medicine is the combine effort of medical science and information technology. In 21st century we are in a world full of Artificial intelligence and now it's taking role in the field of health care industry. According to a research it has proven that AI can also perform tasks very accurately as human in fact it also reduces the human work in diagnosing so much diseases. AI has grabbed its position in medical field in such a way that now it's seems impossible to remove AI from it. Weather it's a small physical robot which enters in our body and perform tasks very accurately and cure disease is one of the most unique invention of AI till now, surgical robots were first approved and come into practice in America in 21st century only. It provides immersive power to surgeons to see precisely and reduce the invasive incision stiches and so. Common robotic surgery includes gynecologic surgery, prostrate surgery, head and neck surgery. In future we hope AI robotic surgery can also do others surgery too.

Deloitte Insights State of AI in the enterprise (2018). Artificial intelligence in health care industry is increasing day by day. AI is very useful in medical field when to deal with large number of people for screening in less span of time. This technology can improve health care system in every aspect, not only in medical field it is also developing in every other field like industrial work, transport system, business systems etc.

Ritesh Patil (2019). Artificial intelligence has their own many benefits and it is found that there has been a steady development in artificial intelligence in medicine from past few years. It can save the lives of current people and of future generations by their latest technology. The new latest technology of artificial intelligence which includes robotics doctors, virtual nurses, robotic surgery and the advanced screening system to detect whether the cyst is benign or malignant by the specific algorithm for detection of such type of disease which was very difficult to screen at earlier times. In fact, it's also helped the physicians to provide patient with their best skills and cure disease in less span of time.

Huma Haider (2020). Artificial intelligence at health care is more beneficiary for the future generations and for few people in present time as most of countries did not have the latest technology like if we see the countries in Africa and few countries in south east Asia most of the counties in that region is below poverty line. People in those counties did not have enough money to survive so how they can be literate and get the information about the importance of artificial intelligence. Meanwhile in other countries where the situation in better, there proper knowledge should be provided about the artificial intelligence as people from rural areas who met AI for the very first time didn't not trust it. First the trust should be provided to the patient when it come to a robotic consultant and especially for robotic surgery, patients should be provided with their past record and show that they perform all the task very much precisely than humans, moreover machine should be regularly checked that they are performing well and accurate.

Literary Survey
Trendsin Artificial intelligence

Rao A...et.al (2017). The trends of artificial intelligence in medicine are growing at an unstoppable rate. Countries are more focusing on growing artificial intelligence in their country to increase their medical health facility, to become

more develop as the more we get towards artificial intelligence the more we enter into the future era.

Decision Support System (DDS)

It is widely used by doctors to screen the patient, set adequate guidelines by recognizing the best treatment, manage and check regularly how recovery is going on and according to it changes the treatment procedure and avoid any type uncertainty during treatment. Looking further artificial intelligence perform many tasks in health care industry such as prioritizing the patient according to their medical needs as it is very useful to provide medical facility to the needy person to save his/her life. The uses of subcutaneous insulin pumps which can controlled the blood sugar level , wearable device which can automatic perform tasks in the absence of humans doctors, and if can't can call the immediate help of doctors , automatic ventilators in intensive care unit can automatic supply the required amount of oxygen according to the needs of patient all these are the applications of AI in medical science which can save energy, money and give the better result in most of the aspect whether it's recovery speed , safety.

HSN

It is basically an idea in which a massive group of doctor's setups some social networking site in which AI give immediate response to the best possible cure to the patient by recognizing symptoms when doctors are unavailable, it's also helpful when the number of patients is more than doctors. Healthcare Social Networking is implemented nowadays to provide immediate first aid to patient when require at a small level. common diseases can be easily cured by this method as AI can easily recognized the symptoms of common diseases. Secondly social media provide a very good opportunity to the doctors the improve the health care system to a great extent. Its helps people to gather the knowledge about diseases, to interact with different people to know and share their experience about prevention, treatment or precaution about any diseases, and to reduce the stress of patients.

Shapiro SC. (1992). Artificial neural network (ANN) is a commonly known AI technique in the medical field till now. ANN are the computational analytical tool which can run in parallel in biological nervous system. They are made up of highly interconnected computer processor called neurons. It is widely used by radiologist to perform many tests accurately like PANPET (screening of malignant or benign cell) MRI, CT SCAN, UTRASOUND etc.

Fuzzy Expert System

It was a different system to see the science in different aspects in a mathematical way. It believes that everything Lie between the shades of grey instead of black and white. The application of fuzzy technique was proved beneficial in many Medical field. It's has been proven that this technique is more beneficial for patient to recover from lung cancer then rather than older multiple Logistic regression analysis using tumor marker profile. Also finds that fuzzy logics can cure acute leukemia, breast and pancreatic cancer.

Evolutionary Computation

It is AI based evolution process which seems to be very natural to filter the fittest from the population. Which can be widely used as an application of medical science. the algorithm can solve many problems to solve the natural problems. This help to study about the fittest and can get know about the combination of genes it consists to evolve the future generations

Hybrid Intelligent System

It is basically the combine system of two or more AI technique to use the machine in a more effective way to treat a disease. The diagnosis of most of the cancer is the best example of hybrid intelligent system, dialysis of kidney, organs transplant, or to control the amount of anesthesia while giving to patient all these are only possible due to combine work of AI technologies and human efforts.

Spector, L. (2006). In today's world artificial intelligence is gripping it's influence in almost every field, in fact people are unaware of the fact that how

much they used artificial intelligence in their day-to-day life in which the greatest example is smartphone which mostly all the people have. And the craze to implement AI in every field especially in health care industry is increasing at a global level in which many countries started investing huge amount developed AI more effectively. Results in the creation of advanced health care tools of better treatment.

Drug Creation or Invention

Artificial intelligence is very useful in inventing medicines for new diseases in this modern world as it records the bid data of past and present and its algorithm is set in such a way that it finds the best combination of compounds to provide the adequate medicine for a disease, although in much cheaper way and consume very less time as compared to any others ways. One of the major examples of it is that few years back there was outbreak of Ebola virus in west Africa in which AI has developed two medicine within a day by analyzing the structure of virus and give the best output of medicine that should be treated for Ebola virus in spite of humans who have taken several years to analyze that same medicine.

Management of Data and Records

Data management is also one of major role that is played by AI in medical field whether it is the record of any medicine from any period to used it whole or it's small component to develop its better successor whenever needed in future in a very accurately and effective way. Or it is to record the medical history of any patient to provide him/her best treatment for any diseases by concerning his/her past medical records. Nowadays it is also very useful to trace the source of infection of any disease and storing it.

Future of AI in Health Care Industry

In the coming years we will see artificial intelligence in health care industry in more effective way, as the doctors and government are focusing more to implement AI and investing more on it. We will see the treatment of diseases more accurately, safely in spending less amount of money and time. As well as the sudden medical help we will be provided to each section of society irrespective of area or city. We will enjoy the faster recovery from any disease by diagnosing in much more advanced technology than today's life.

The Emerging Technology of AI in Medicine

C, Asch (2017). The research in Artificial intelligence in medical field is growing day by day. AI has shown the tremendous growth in detecting the suspicious skin lesions. AI very accurately give the result that if the lesion is benign or malignant through the specified binary number. AI also help to diagnose large number of people at a same time thus it is very useful to countries in which the population is high. In many developing countries in which there is an outbreak of Tuberculosis. A recent study tells us that AI can correctly diagnose pulmonary TV with a sensitivity of 95% specificity of 100%. In future the collaboration of AI and general medical health care will increase, it will save more time and will be more effective. In today's life most of the time and money is wasted to identify the disease but in future AI will automatically shows the record of person which boost up the time period in identifying diseases.

AI is Supporting Doctors not Replacing them

AI lack of human qualities such as empathy and compassion, thus the patient Prefer human's consultant rather than AI. Moreover, all the commands are done by the humans only. And the fact in today's world AI can't think as a human doctor maybe in future we can see the robotic doctors who can think, take best decision instantly but currently all AI are operated by humans and perform as per the norms set by humans. They are here just to perform the tasks steady and accurately as algorithm. It just supports the doctors as each and every time humans' doctors can't be available to check the patient.

Limitations

Samantha Mc Grail (2020). According to a survey it was found that the major's problem faced by Artificial intelligence in health care industry are that majority of the people does not trust the privacy of

AI. KPMG surveys says that 75% of the people are afraid of losing their data through AI. Another major problem is that to setup AI technology in health care industry required a lot of collateral and time. Therefore, it's become very hard to setup for owners who already running out of money moreover most of developing countries didn't have the latest technology of artificial intelligence. Also, it is found that most of the people prefer to consult human doctors rather than AI robot to recognize their disease from their symptoms.

Problem Faced by Artificial Intelligence

It takes so many years maybe decades to come in developing countries. They do not have AI and latest technology in their hospitals. Also, the latest technology which come into practice is affordable by poor people. Due to lack of proper knowledge people don't consider it as a better option over humans' doctors. There should be proper knowledge should be given to people to trust AI in hospitals and also to staff about how to operate the AI technology. Also, the implementation of AI may take so many years. Major problem is that imagine if a machine in hospital have some technical error how much disastrous it can be for people, either it's a testing machine it can give positive report to the negative person or it's a machine in intensive care unit or operation theatre it can be reason of someone death. Therefore, hospitals need regular maintenance of all the technical appliances. Another problem is that when a new AI technology comes it takes so many years to have a good amount technical sound people of that particular technology to operate it. Last but not the least AI records and hold the patient data which can create trouble if confidential records of patients can get accessible to wrong hands. As a result, we have to set such an algorithm in artificial intelligence in health care industry that only a selected group of people are only accessible to the particular patient data.

Challenges faced by HSN

As all of the data available online is not beneficial for health care system, there are some fake people who claim themselves as doctors provide wrong information which can be very dangerous for patients. Also, the experienced shared by people can't be always good for another patient as different people react different with same medicine, moreover without any test or screening it can be dangerous to take medicine by referring online as many diseases have same symptoms

Advantages

1. By implementing the artificial intelligence at hospitals, it boosts the efficiency of treatment.
2. Recovery span of any disease is reduced by more than 50% by using AI at hospitals.
3. Artificial intelligence reduced the unnecessary visits to the hospitals, can be very beneficial for senior citizen.
4. Helps the doctors to know more precisely about patient disease by referring his/her medical records.
5. Improve the successful rate of surgery by performing accurate task at micro levels.
6. Implementing robots at hospitals helps to assist patient, reducing doctor work pressure.
7. Robotics body parts developed by AI helps the differently abled people who enjoy normal life.
8. AI in hospitals gives equal opportunities of treatment to each section of the society. Thus, eliminating the discrimination on the basis wealth and power.
9. Improve the manufacturing speed of drugs creation, result in availability of medicine in less amount.
10. AI at health care center can deal with large population at time, can be very beneficial for areas where the recommended doctor-patient ratio is low.

Conclusion

If we implement Artificial intelligence at hospitals in India it can be very useful for our country, as India is in second position in terms of population and also a developing country in which number of doctors is very less as compared to desired number of doctors for such a massive population. As AI can't be setup

directly to the rural areas where doctors are required because in rural areas people are not much familiar with technology and don't trust it. Therefore, it will be best if we implement AI at big hospitals in mega cities so that it can deal with people of that particular city although no trust issue will be there in city in people while taking treatment with AI, and now making the doctors free so that they can take round to village areas for the beneficial and for upliftment of that area, and guide them about the importance of artificial intelligence in each and every sector. AI can be equal useful for both the gender of our society; algorithm can be set as per the gender sensitive language which helps to remove any kind of discrimination in terms of gender during treatment. In my opinion AI can be very useful at health care system whether it is to deal with large number of people in less time, whether to increase the efficiency of treatment and cutting down the recovery time or to produce medicine for any disease immediately. But can be life threatening if not handle in carefully, no matter how much advanced technology come into function but it can't replace humans. Machine can't think, they don't have emotions, they can't boost up their performance at the time of need, can't do overwork as humans. Therefore, AI should always be observed by humans and should be regularly checked.

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IMPORTANCE OF BUSINESS INTELLIGENCE

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Introduction

Tuncay Erhun & Belgin Onder (2010). One of the greatest and most valuable asset to a company or an organization is the information they possess. Whenever any operation is held in an enterprise an extremely large amount of raw data or information is generated. This raw data as such cannot be used up to its full potential. To make complete use of this data or in technical terms processing the raw data effectively and in much less time business intelligence comes into the picture.

Business intelligence is basically utilizing the existing knowledge of business structure in collaboration with specially built software to get effective analysis results in less amount of time.

Hurbean Luminita. (2005) Many organizations have made huge investments in building up the technological aspect of their business i.e. they have initiated the use of business intelligence. In today's world, the quality of information and the timing of the information especially in the business sector is not a thing to compromise on for an enterprise because to some extent it decides the existence of the company in the market so it's no more a choice but a question of survival in the market. BI make use of already well developed digital information and help companies to use valuable data stored in legacy systems.

Business Intelligence software can be a great asset for an organization. It can minimize guesswork, improve the way of planning and can help an enterprise to act more quickly to the change in the market conditions.

BI data can comprise of various information from recorded and documented data to real time information from the source systems of an enterprise as its generated. This raw data which is initially disintegrated and spread across various systems in an organization has to be gathered, refined and integrated using data integration and data quality management tools before it can be used in a BI software. This processed data after passing through various tools is stored in data warehouses.

Skills needed to be a BI Analyst

Sandra Durcevic (2019). A career in this field is full of opportunities and not to mention well paid. The specific skills needed to pursue a career in this field depends on whether one wants to be a front-end or back-end professional. Back-end skills are more technical whereas front-end skills include the presentation and communication of data. There is no rule stating which skills one can master so one can master both skills but managing both ends can only be done on a small scale by a single individual because as the organization grows the work load increases and it gradually becomes difficult to manage all the data the organization is producing. Regardless of what one chooses there are few skills that are necessary to learn to build career on strong foundation and reducing the chances for potential failures in future.

First and the most common BI skill of all, **SQL (or Structured Query Language) Programming**. Regardless of what type of professional one is (front-end or back-end) they need to know SQL and how it is used.

Data Analysis. Most of the work in the business intelligence department comprises of analyzing and processing data, so one has to be good at handling and examining data and giving accurate results about it.

Problem Solving. BI is more than just analyzing data. It also helps an organization in forming business strategies and solving actual problems by using the processed data

Specific Industry Knowledge

Communication Skills. Having skills of an intelligence analyst is good but on top of that one need to be able to express themselves, they need to be able to convey their findings and progress to other professionals in a way that they understand. If one pursue their career as a front-end professional then they will have to develop their communication skills to the best as at some point they will have the responsibility to explain all the technical concepts of their analysis to people from non-technical background.

Attention to details. As a BI analyst or developer one will have to deal with many small pieces of data and will have to make useful information out of them. In order to interpret the data correctly one must pay very close attention to the details. Because even a tiny bit of knowledge if interpreted wrongly may result in wrong coverall conclusion.

Business Acumen. Last but not the least, to prosper in a business intelligence career one need to have the ability to make good judgments and be able to take effective and quick decisions which not only solve the current problem but is also helpful in the long run.

Literary Survey

Gurjar Y. S. & Rathore V. S. (2013).By definition cloud computing is a model which enables a user to access information and data available on network, whenever and wherever they want by means of internet services. The idea of bringing together cloud computing and BI i.e. delivering BI technologies as services through cloud which is cheaper but faster and flexible is revolutionary. In a study conducted of 859 respondents in the market, the results showed that there has been a strong investment in cloud based BI and the interest among organizations to use cloud computing and BI together is growing. Today every organization needs to store, process and analyze machine generated data in large amounts at ultra-high speed to stay as a competitor in the market and they cannot take any chances of lagging. The traditional BI solution systems are not fast enough to meet the speed of current analytical needs. The majority of data used by an organization is unstructured i.e. not arranged in columns and rows but is in the form of images, mp3 files etc. to process this unstructured data organizations need more advanced technology, which is not affordable for all organization thereby limiting the scope to analyze unstructured data using technology. Using BI with cloud can be very productive but this architecture has its own limitations:

1. Moving large Amount of data in cloud can be very time consuming for many organization as upload speed is often slower than download speed.
2. To many sellers selling BI services providing a lot of different offers makes it hard to choose the right service on the basis of service quality and required needs.
3. Majority of data is exclusive and privately owned by an organization. Security of this data is essential. The concern over the security of this data may become an obstacle for an organization in using cloud services.

Hurbean, Luminita. (2005). BI software can be a great asset for an organization. It can abolish guesswork, enhance the way of planning and can help organizations to act more quickly to change in financial conditions and supply chain operations. Analysts estimate the BI will keep on growing and evolving in the market. BI can act as a large pool in which a lot of activities can take place. One of the evolutionary step in this directionwas the concept of Corporate Performance Management (CPM). CPM is condensed term used to define methodologies, processes, metrics and systems used to monitor and manage business performance. CPM helps organizations in planning, measuring and adjusting to the changes in the business thereby improving the overall performance in the market. All the stakeholders who get affected by the performance of

an organization wants more from it and want is faster, CPM enables them to achieve that goal. The difference between CPM and BI can be said as, *If CPM is the desired objective then BI is the way to achieve that objective*. Competitive companies should understand the importance of BI because it is a popular business term these days. Unlike enterprise application system which is more expensive and hard to implement BI is easy to implement and show positive results sooner. The demand for such technologies lies in the fact that they add value to immense value to already existing data by integrating it. The idea of predictive analytics is the next milestone for CPM softwares of today, they are predicted to give an in-depth analysis of the business performance of an organization and will also be able to predict the future deviation in performance and its impact on the organization.

Fowler, Jonathan. (2019). From just data reporting and visual pleasing presentations in early 1990s to Big Data by 2000s and the use of cloud computing with BI at present, BI has evolved significantly. Now higher education is also emerging in this market. As any organization, universities also need well managed and structured information to maintain its position in the market. The goals to be achieved may differ among a corporate organization and a university but the analysis they need about their existing structure is same to some extent which is, to get what's happening, why it's happening and what options they have to proceed further. Though BI was initially made for business domain, at present it is applicable to higher education too. Universities have a lot of data which needs to be organized, organizational structure of large universities can also be considered similar to that of corporate organizations. Planning is a crucial step before implementing a BI system in any organization. Plans are made by keeping some goals in mind. For an Educational Institute the most common goals can be admitting students, prevent their dropping out and finally graduating them.

There are few factors that act as a barrier for Educational Institutes to start with BI technologies, they are, the faculty may not want to change the existing structure, different departments may want to keep their data and activities to themselves, there may be a lack of funds in the institute or there may be a fear of treating the educational institute too much as a business.

Kelidbari Hamid & Rayat Mahsa. (2017). Business Intelligence systems helps an organization in analyzing the situation that they are in and take appropriate actions in that particular situation by running mathematical models and algorithms and provide factual information which helps in better decision making and reduce uncertainty in the decision thereby giving the most favorable result. Out of all the data in an organization, part of it is from internal sources whereas some part of it is from external sources. If we somehow managed to store this data systematically there is no guarantee that we will be able to make decisions based on those results directly. The data must be extracted properly from the source using suitable tools, processed and should be converted into useful information effectively so that it can help in making proper and most effective decisions. A BI system consists of various components that help it in processing data – Data Warehouses, BI tools, OLAP (Online Analytical Processing), Advance Analytics, Data Sources etc.

A study was conducted on Iran's Airline companies, so the methodology adopted here is applied. A total of 17 airlines were studied out of which 13 were cooperated. Specific predefined sets of standard questions were used to conduct the study to assess the organizational effectiveness, effectiveness of BI systems, organizational strategy, structure, processes and culture. According to the conceptual model of the research effect of organizational factors should be show on organizational effectiveness in Iranian airlines because of Business Intelligence (BI).

van der Krogt Augustinus et al.(2020). There is a need for small and medium sized enterprises (SMEs) in the West and Eastern Europe to grow and match the standards of today's world if they want to compete in the market. This goal can be met if these SMEs adopt the use of BI technologies in their respective businesses. The type of research is

exploratory and descriptive. In this research 9 European countries were studied.

A company is said to be a SME or a large company on the basis of number of employees in the company and the total turnover of the company. SMEs are the back bone of the European economy and they also produce the maximum number job opportunities. SMEs are those companies which do not have access to many resources. As large scale organization need to evolve and find new ways of executing their business, SMEs also need to adopt new methods to stay competitive in the market. The idea of using BI to increase the efficiency and results of a business is not just limited to large companies but can also be applied by SMEs. The first step towards technology that SMEs can take is that they can slowly introduce use of BI systems in their business. A survey conducted by Gartner Group on more than 4000 IT managers stated that BI is No. 1 technology priority in present day organizations.

BI adoption in SMEs resulted in benefits and efficient results for the business. There are few factors that stand as a barrier in front of SMEs before they can implement the use of BI in their business – Lack of resources (both financial and human), the high cost of setting up a BI system in comparison to their annual balance sheet total and to set up BI systems considerable amount of time is required which most SMEs lack in and the lack of skill to operate BI systems among the employees of SMEs.

Villamarín García J.M. & Díaz Pinzón B.H. (2017) Data needed to make trusted, accurate and timely decisions must be provided ideally, for this an organization these days rely on their BI systems.

Key success factors are those areas of a company which should work ideally if an organization plans to flourish in the market.

Different factors that ensure the success of BI solution are:

- Availability of sufficient amount of funds.
- Formation of a solid business model in an organization which has the capability of analysing possible risks, calculate the cost associate in taking on a project and have other business essential tools.

- Skill level of the person heading the department or using the BI applications in an organization.
- Creation of clear and effective strategies solve any existing problem.
- Readiness of an organization to deal with any kind of changes in the market
- Any project in hand should be carried out only after proper planning and strategizing
- Strong IT technology
- Skilled human resources and top-notch technical resources

The methodology used in the multi-methodology proposed by Mingers (2006),

BI solutions try to focus on developing the technological aspect of the organization but they somehow take a path which put the business needs first.

Advantages

- Faster Analysis, Intuitive dashboard – BI systems are designed in such a way that they can perform processing with heavy loads of data. BI tools collect data from multiple sources like cloud or servers of an organization store this data into warehouses and then analyse the data as guided.
- BI system enhances the data by organizing and analysing it.
- Increased Organizational Effectiveness – BI platforms help an organization in assessing different areas of the organization and form possible measure to improve efficiency in some areas.
- Data-driven Business decisions – BI systems collect and arrange data accurately, added with its capability to form reports in very short duration of time, it helps an organization in making more precise decisions.
- BI can directly improve customer experience by aiding an organization in improving customer service.
- Implementation of BI systems in an organization can help the company to increase their revenue.

- BI tools can also help an organization to expand their profit margins.
- BI systems can give reports about an organization's position in the competitive market and help them to stay in the competition.
- BI helps in identifying market trends, new opportunities and help in building strategies based on existing data making a direct impact on long-term profitability of the organization.
- BI systems can help an organization in eliminating areas of wastes or loss that might have gone unnoticed by employees.

Conclusion

Today use Business Intelligence is growing rapidly in many developed countries while in countries like India it is still in the warming up phase. There is no question about the advancements that such technologies will bring to a country like India. BI technology with India's capable engineering strength will strengthen our capacity of storing processing and analysing data which will lead to formation of better decisions with all the risks already calculated. Development of BI in Indian Market will directly enhance the decision making in an organisation and indirectly help citizens (mostly in the IT sector) to develop by creating job opportunities which will also contribute in reducing unemployment to some extent and growing GDP of the country. Implementing BI in an organization is still a very tedious task it takes a lot of time, building up of proper strategy and allocate resources to successfully establish a BI system in an organization. BI systems are fairly expensive to establish for majority of medium and small scaled businesses in India which is the primary roadblock in implementing BI systems. There is no doubt in the fact that BI has advanced over the period as use of spreadsheets has almost been cut off due to businesses moving towards data visualisation and advanced analytics and this development is not yet over, the best is yet to come. As BI systems grow there will be a need to expand network infrastructures to accommodate larger volumes of data in the country and a vast development in predictive and prescriptive analysis will also be seen. In the end no one knows for sure how BI will be used and advance as we step in future but by looking on the current data and trends one can say that there is a bright future awaiting for BI systems and the country in this field.

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ARTIFICIAL INTELLIGENCE ATHEALTH CARE INDUSTRY

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Introduction

Minal Dhankar & Nipun Walia, (2020), We all know that the field of computer science always have an immense rapid growth and it never gets dropped off due to proportional usage of computers by the human beings and due to this the computer field has grown in a way that's certainly unthinkable and this is mainly due to emergence of Artificial intelligence. Artificial intelligence is a branch where the machines think like humans and does work according to the human needs. Artificial intelligence is a branch that has unlimited resources which are basically still unused, and which can be utilized in many fields handled by humans in future and for this still many are working. Artificial intelligence can be utilized in every field like medical field, transportation, communication etc.

Master of Health Administration, Regis College, (2020),The medical field is a field which plays an important role in everyone's day to day life and as this is a vast field there are many advantages along with disadvantages faced due to many issues. These issues occur not only due to physical aspects but also technically and these problems include information & service integration, protection of devices upholding public health data's, disorder of pharmaceuticals etc. So, since there are such issues there must be some ways to convert the disadvantages to advantages and to overcome this situation currently the professionals are trying to implement the use of Artificial intelligence.

Jiang, F., Jiang, Y, et.al, (2017), Artificial intelligence has a potential to solve problems in more perfect and non-time-consuming manner which gives both patients and doctors greater benefit. So, the need for such assistance by Artificial intelligence is very necessary as there is requirement of such these scenarios and by the utilization of Artificial intelligence the medical field can somehow reduce the challenges faced by them to a greater extent since Artificial intelligence gives a greater idea to both doctors, patients and to the non-medical related issues occurring in the medical field since it gives apt solutions to every problems that normal human beings can't solve with small amount of resources. However, we can say that A/0000000rtificial intelligence may be a great implementation but still there are some issues due to implementation because one day even the diagnosis can be done without any assistance by humans to machines which in turn may be a drawback to the current system where there is someone to assist patients and due to this they may even lose their job, in some or the other way but still we can say that it won't be a greater threat I hope so but by that everyone may have a greater relief form current system since Artificial intelligence may open a window of transparency between patients and doctors so that patients cannot to be get fooled which is still prevailing in some cases . But Still we cannot say that by the complete implementation of Artificial intelligence might be good but, because for every solution, there might be having somewhat any issues which can be considered. However, as far of public opinion Artificial intelligence might be a doorway where there'll be less issues considered to the current system then it'll will be a greater opportunity to ourselves.

Literary Survey

Khanna, D. (2018), By Implementing Artificial intelligence in the health care industry, health care industry can be made into a more stable and complex free industry where there are no disadvantages for the beneficiaries. The helps that Artificial

intelligence provides is never restricted to certain numbers it always helps in multiple ways to overcome crisis and not only that Artificial intelligence can also be used for making drugs also which is great opportunity in the field. The artificial intelligence has 99% advantages because of its efficiency since it almost understands every situation way comparing to the older condition and also it reduces expenses to aa greater extent and hence it'll be more patient-friendly in future. Artificial intelligence also helps the hospital management to simplify the tasks handled by them which saves time and reduces stress and through all this the field gets more and more developed and this development always is a greater advantage to the society. The main reason for the implementation of Artificial intelligence is that Artificial intelligence can use sophisticated algorithms which are being already used to learn various from a bulk volume of healthcare data as of the software engineers uses and then these insights are analyzed to assist in the clinical practices not only this , the algorithms also can be equipped with self – correcting abilities and the improved learning techniques to increase the accuracy which are given by them and along with this ability to hold the information about journals, clinical paper to inform proper patient care was also the reason behind the implementation of Artificial intelligence.

Mak, K K& Pichika M R (2019),As of there are many gateways opened by artificial intelligence, the drug development has been impacted in a great manner and this has shifted the hype to hope in medical industry. These consist of several step such as drug development strategies and processes, the pharmaceutical R&D efficiency and attrition.

The drug development was very large and time-consuming process later but nowadays by the implementation of artificial intelligence it has been reduced to a more efficient manner. This is said so as drug development has several steps in it as it is very complex, The problem in case of drug development is since this the molecules occupy large volume known as chemical space which is estimated to be in the order of 10 power 60 molecules but since there is

intervention of artificial intelligence the tasks such as identification and validation of drug targets, designing of new drugs, drug repurposing, improving the R&D efficiency, aggregating and analyzing biomedicine information and refining the decision making process has been smoothly done by the professionals. As these are the possible ways that can be approached but still there are no drugs developed by Artificial intelligence but it is likely to take further 2-3 years to be developed but the faith in Artificial intelligence has given more confidence and the professionals are still making since it's not simple as we approach.

Neill D B (2013),In the industry there are many challenges faced by the hospitals like high rates of drug-resistance, hospital-acquired infections and failures of care delivery leading to preventable adverse health events and as of studies it has been proven that the use of Artificial intelligence improves the quality and lower the cost of patient care from hospitals. Based on this it was Clinical decision support systems (CDSS) the first successful application of Artificial intelligence which mainly focused on the diagnosis of patient's conditions by giving their symptoms and demographic information and from this the applications of Artificial intelligence have been advanced recently in building more predictive models and real-time interference from the large-patient populations. Also since this has been making more efficiency currently professionals are trying to develop systems that automatically detect substantial variations in care between groups that have impacts on the outcomes of the patients but these impacts can either be positive (which is an advantage) or be negative (which is a disadvantage).Although Artificial intelligence have been giving great advantage to health care industry perhaps the challenge for Artificial intelligence in future might be due to the application towards the entire population , monitoring huge quantities of data which automatically detect problems and threats to patient safety and also to discover new best practices on patient care.

JhaS & Topol EJ (2016), As there are Implementation of Artificial intelligence in health

care field, it also directly affects all the parts of the industry like for example in case of the reports that were given during the olden days are being replaced by computer given reports which exaggerated the users and hence the Radiologists have been always reverting machineries and technologies. Radiology were once confined to be only having projectional images like chest radiographs and by the intervention of Artificial intelligence it has become more complex and data rich since there is facilities like Cross-sectional imaging such as CT, Magnetic resonance and shows anatomy with more clarity compared to the others. hence the amount of data that are being processed has been increasing which includes both extractable by the human eye and extractable only by certain software's, thus we can say that Radiology has been upgraded from perceptual skill to an objective science. Since these processes are complex the use of computers extracts only fine information with null mistakes. In the case of Radiology which are using Artificial intelligence the pathologists also have great dependence of Artificial intelligence in recent years because some tasks that was done manually, presently can't be done due to practical difficulties hence the computer (Artificial intelligence) have given them a grater shelter. From these we can say that both pathology and radiology having common destiny, they could have been merged as a single entity like "information specialist "only with the help of Artificial intelligence.

Challen, R, et.al (2013), In the medical field, we know that Artificial intelligence research is becoming increasingly focused on applying machine learning techniques to most of the complex problems which allows to make predictions like the doctors usually do but here the chance of being accurate more since these are machines and by these the predictions create more political appetite for its rapid development in Artificial intelligence industry and the healthcare becomes to be the more priority area where technologies are yet to be exploited . As the health Artificial intelligence research have been providing impressive results but it hasn't yet given any clinical values. The main problems that clinicians faced by the Artificial intelligence is that

the Machine learning systems may sometimes be poor at recognizing a change in its context or data as it is pre-trained and since this cause mismatch between training and operational data hence this is a great drawback but also by inappropriate application of a trained Machine learning system to an unanticipated patient context this can be rectified. However the development of Artificial intelligence in healthcare by the application of Machine learning is a fertile research are but due to rapid increase in change , diversity of different techniques it gets difficult to get clearer idea how accurate these systems may function in clinical practices, but currently there are measures which can be implemented but we can't just predict what the future will be like but the hope to this is that we have endless resources to be utilized under circumstances.

Murali N & Sivakumaran N. (2018), By all these references we can say that Artificial intelligence is a better option in health care industry comparing olden measures but still there will be drawbacks along with it. Consider an example like in case of doctors if many new diseases have been found and it's not necessary for them to by heart all they need is the help of computers (Artificial intelligence). So, in some or the other case it is time saving and friendly towards doctors as well patients. As the progress in Artificial intelligence keeps on increasing the capability of Artificial intelligence to expand the energy of a person's thinking capability of Artificial intelligence to expand the energy of a person thinking skills, it can be broadly classified into three crucial regions and these includes highly developed computation, statistical analysis and finally the hypothesis generation and subsequently, These three regions correspond to the three unique waves within Artificial intelligence's progress. In Artificial intelligence the concept is that arithmetical algorithms along with the help of data-science from the human body concludes to make diagnosis and its further process. In the hospitals the more stress is handled by the department of cardiology and radiology because there are such tasks as analyzing tests, X-rays, CT scans etc. and by the intervention of Artificial intelligence they only require attention

towards the foremost sophisticated cases where human supervision is required and this was first commenced by IBM and later was known as 'Medical sieve'. So, by all of these facts and discoveries Artificial intelligence have proven some evidence that it can play a major role in helping both doctors and the patients to deliver healthcare much more professionally in the 21st century.

Advantages

1. Artificial Intelligence guarantees fluid and error-free collection of data which reduces complexity in several situations.
2. Artificial Intelligence can reduce the risk and increase the accuracy of radiology tools used in treatment by its detailed intervention.
3. Artificial Intelligence can be used to identify infection patterns and these helps in highlighting the patients those who are at risk even before they begin to show symptoms.
4. Through Artificial Intelligence the whole system in hospitals is digitalized which in turn saves much time compared to the older method.
5. By the analytical methods of Artificial Intelligence, which drill down to the most pixel level thereby identifying the nuances which escapes the human eye.
6. Artificial Intelligence can be used to enhance the ability to identify deterioration and avoid the complications which improve the outcomes.
7. Artificial Intelligence can smoothen up the tasks such as Billing, Finance and Accountancy.
8. By Artificial Intelligence the treatment time can be reduced to a maximum level due to the efficiency and management by the tools used for this through Artificial Intelligence.
9. Artificial Intelligence is used sometimes as superhuman spell checker which assist doctors in eliminating human error which causes threat to the patients.
10. Artificial Intelligence can reduce the work load of staffs in hospitals as they are machines so 24x7 support can be given by Artificial Intelligence to the patients.

Conclusion

Artificial Intelligence is very useful to countries especially like India which are still occurring development in every fields and the health industry is the main area that the development should focus because as the population is high the health facilities must be upto date and proportionate according to the population. The Artificial Intelligence in hospitals provide greater transparency compared to the past years and by this the impact is that the common people can complete their treatment in effective and less expensive way so that they are satisfied with their treatment. Also, there will be no false treatments done as the records are completely digitally recorded through Artificial intelligence and inspected by authorities so the torturing done towards the common people by false treatment is however reduced and by this treatment are provided in a way which doesn't affect the patients. So, the by all these we can say that the implementation of Artificial Intelligence is a great advantage for both the development of the nation and to the common people.

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NATURE- FRIENDLY TECHNOLOGIES USED IN OUR DAILY LIFE

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Introduction

United Nations Industrial Development Organization. (2006). When we talk about energy-efficient technology, first we know the correct meaning of energy and its correct way of utilization. Machines are made to make things easier but anyone knows what the primary thing on which machine works is? Yes, it's energy or power. In physics, energy is the quantitative property that must be transferred to an object to perform work on, or to heat, the object. Energy is a conserved quantity; the law of conservation of energy states that energy can be converted in form, but not created or destroyed. The mainly large form of energy is derived from coal mines from burning coal in the form of electricity. Coal and sun are the main sources of energy. Science has invented many technologies to convert sunlight to many other forms but it still cannot able to utilize the sunlight properly. Energy plays an important role in the commercial sector whereas it is one of the main reasons for the GDP growth of countries. Energy consumption increased over the past few years and nowadays the whole world is facing issues related to the scarcity of coal and pollution occurring via the burning of coal.

Energy conservation is a hectic task for science and scientist. Scientists are working hard to make energy-efficient machines. Energy efficiency is understood to mean the utilization of energy most cost-effectively to carry out a manufacturing process or provide a service, whereby energy waste is minimized and the overall consumption of primary energy resources is reduced. In physics, the basic law of efficiency states that if the ratio of mechanical output (that is, the work is done using the motor) to the electrical input is one then it is an ideal body with 100% efficiency.

Arun Kumara, Sudhir K. Jain…et.al. (2003). There are plenty of ways to save energy and to be used efficiently. Energy conservation can be done simply by turning off lights and appliances when you don't need them. If we talk about efficient use of energy then we must improve the wiring of our houses and all electrical appliances after certain years to prevent heat loss and electric discharge. Encourage the usage of government certified appliances with an energy star mark. Traditional incandescent light bulbs consume an excessive amount of electricity and must be replaced more often than their energy-efficient appliances such as LEDs and CFLs. Up-gradation of an HVAC system, an HVAC system is composed of heating, ventilation, and air conditioning. Insulation plays an important role in preventing heat loss via eddy current. Houses must be properly ventilated. Appreciate the installing a programmable or smart thermostat thus helping in efficiently cut off the power from appliances. Using modernize MCBs and ELCBs. To save petrol, the carpool system must be encouraged thereby reducing pollution. Nowadays many new technologies have come up to save energy for example Hybrid vehicles, electric cars, solar equipment, inverter air conditioning, solar panels.

Satyendra K. Vishwakarma, Prashant Upadhyaya…et.al. (2014). Nowadays science has invented a lot of things and progressed in the field of energy conservation.

In industries: An improved design and better insulation of the water heater, tanks, and piping could reduce losses to 15 percent (efficiency 85 percent). Usage of steel alloy boilers to avoid corrosion and reduce heat loss. The general data from the journal issued in 2014 says that India is projected to sustain the world's second-highest rate

of GDP growth, averaging 5.6% per year. The all Indian gross electricity generation from utilities excluding that from captive generation plants was approx. 50000 gigawatt-hour during the 90s.jounal comprises all the details and numbers regarding usage of electricity and its generation rate of the past 30 years.

Prasad bhukya and dr.Debasish Basak (2014) Technologies are:

Solar light pipe, Air pre-cleaner, Intelligent power factor controller(IPFC), Energy-efficient motors, Eddy current drives, slip power recovery systems, fluid coupling, laminated transformers,

Many other energy-efficient technologies such as hybrid vehicles are used to conserve fuel in a car where a hybrid battery is placed besides thus adding more power to the car and thus save fuel. Batteries are upgraded thereby charging in a small amount of time and gives output for long period by using the new technology of Li-ion and Li-poly batteries. Many generators are provided better insulation and lamination thus preventing eddy current.

We should support all the government skims regarding the conservation of energy and faith in science for providing more advanced technologies.

Literary Survey
Smart Energy Efficient Home Automation System Using IoT.

Vishwakarma, S. K., Upadhyaya…et.al, (2019). The report contains a detailed overview of using IoT for the construction of a smart home using automation systems. The basic idea of the report is to use day to day home appliances remotely but in a smart way that consumes less power.

In this paper, a smart energy-efficient home automation system is proposed that can access and control the home equipment from every corner of the world. For this system, the Internet connectivity module is attached to the main supply unit of the home system which can be accessed through the Internet. Human-machine interaction (HMI) has become, more realistic in day-to-day life due to the advancement in technology. Thus to save energy according to this report proposed to use the IoT that is the 'Internet of things'.

This era is marked by a lot of inventions in various fields thus in this modern world everyone is demanding to modernize appliances in their houses also. Most of the previous system based on these techniques are either based on DTMF (dual-tone multi-frequency signalling) or Bluetooth system. Drawbacks of using these technologies are Bluetooth can restrict usability just because of its fixed range and though DTMF is power efficient yet it requires a separate channel that is' public switched telephone network'. Home automation using MQTT which is a network protocol is presented for sending and receiving data from the sensor. For this Raspberry pi is used as a gateway for accessing the data from the sensor.

But the main question is what if appliances are not smart and not embedded with such sensors? So IoT is used which provides the better option to make your non-smart device smart to accessed from distance without any contact. In this report, they mention the working process of IoT devices. Thus, users can access and control their smart home using Google assistant or Siri and web-based service using an IoT based application that uses Adafruit and IFTTT to maintain the communication link. In this technology, all the devices are connected to Wi-Fi and with the help of Google assistant, based on the user command the home appliance can be turned ON/OFF with the help of the designed system.

Vishwakarma, (2019).In conclusion, this paper has presented the procedure of the smart home automation controller unit. With the help of the design control unit, the home appliance can be converted into a smart and intelligent device using IoT. This system has many advantages firstly it can easily provide verified users to control the appliances quickly and remotely, increases connectivity, durability, and less power consumption. Secondly, it helps the old age and differently-abled people to control the systems easily through their mobile phones.

Investigation on the Revolution and Need of Energy Efficient Smartphone Development

Have you wondered what the primary thing on which all smartphones work is? Yes, battery.

Pandikumar, S., & Sumathi, M. (2015). Thus battery needs to charge again and again for use and thus science has invented multiple technologies to get better battery backup. Moreover, battery capacity is significantly restricted due to constraints on the size and weight of the device. This paper discusses the importance of energy-efficient Smartphone developments. The journal consists of all the percent using different services of mobile for example 3.5 billion LTE subscriptions in the world at present and is predicted to reach 8.4 billion by 2020. The research data depict that in 2018, it is expected that 3G/4G will represent over 50% of all active M2M (Mobile-2-Mobile) subscriptions. Thus all the new technologies required the charge and optimism.

This paper consists of invention took place in the batteries of the mobile phone. The first smartphone was invented in 1992 in which the Lead-acid battery was used. After then science invented a new form of rechargeable batteries of Lithium-ion and nickel-cadmium. Power sources are the heart of any electronic device especially in mobile phones, tablets, laptops, and other gadgets. The manufacturers and governments invest in research on clean and energy-efficient technologies and longer-lasting batteries to cater to portable electronic devices with power-hungry features.

The early stages of the smartphone faced a lot of problems regarding the failure of the battery, battery bursting, and quick battery discharge. Thus the battery backup is the major issue that renders the portability of smartphones and smartphones are equipped with a lot of new applications, sensors, cameras, and many more which require a certain amount of charge. However, batteries cannot cope-up with the rising expectations for longer life, and it leads to the research on energy-efficient software development. Whatever the physical component technologies are developing that will be controlled by software.

Necessity for Energy Efficient Smartphone Development

High performance usually requires power sacrifices. The objective is to find a perfect balance between these two within a particular design. Thus the ultimate aim is to make a low consumption of high-performance batteries. **Shannon's law** predicts that the transmission performance improves by two times in 8.5 months. Given Moore's law, semiconductor manufacturers take 18 months to double the number of transistors and therefore double the microprocessor performance.

Thus paper emphasis the requirements of a high-performance battery and the requirement of energy management. Nowadays the smartphone comes with a huge amount of battery like Samsung made a battery of 7500 mAH the most powerful in the mobile segment. In this present scenario all the smartphone brands likely efficiently invent the fast charging technology by using the right amount of voltage.

A short overview of such types of batteries

1. Nickel-cadmium were batteries choice during the 1980s and 90s
2. Drawbacks: bulky, cadmium is toxic and problem to dispose of after the battery dies.
3. Nickel-metal batteries later 1990s
4. Drawbacks: bulky due to nickel metal.
5. Lithium-ion batteries are thinner and last longer. it takes less time to charge but it was much expensive.
6. Li-poly batteries which have 40 percent more power than older NiMH batteries.

Energy-Efficient Cluster-based Routing Protocol for Wireless Sensor Networks

N. Thangadurai (2013). In our daily life, the weather plays a very important role. Weather forecasting is a fast emerging technology that is used by many common men, industrial purposes, and sailing purposes, or traveling. The wireless sensor network is a great technology useful in every sort of field such as the agriculture field, seashore areas, etc. though it has several advantages, it has some drawbacks such as limited communication

bandwidth, energy consumption, etc. Paper emphasis the improvement of the sensor clusters and to design them properly to reduce the power overload and energy wastage. The usage of the clustering concept in hierarchical protocol provides more advantages than any other traditional routing protocols. LEACH and LEACH-C are the most commonly used hierarchical routing protocols. This paper focuses on improving the LEACH-C protocol. The sensor network is a very important technology because of its sensing application and processes the data to the user. But in some application it is difficult to change the battery if it's drained off, leads to network failure. sometimes the node uses more power in processing the data to the user hence sometimes voltage fluctuation leads to failure of the whole system and efficient node consumes less power in processing data's to a user. Network Lifetime-In WSN, nodes use limited power supply by using batteries, which is difficult to replace in a certain environment. The solar cell is more efficient but at the same time node requires a high amount of energy which is not possible in the solar cell. There are many characteristics of WSN are 1) Maintainability the nodes must maintain their health status by monitoring its conditions like depleting batteries or damage2) Quality of Service-WSN applications must be tolerant for latency 3) Programmability- If a task is completed4) the nodes must have the flexibility to change their task by developing a new program.

R.Dhanasekaran, Ph.D. (2013).Proposed system: modification of the LEACH-C system is done by clustering via a central control algorithm thereby producing better clustering by spreading the CH throughout the network. This algorithm minimizes the energy consumption of non-cluster head nodes during data transmission to CH. Finally, when the CH is selected by the base station it broadcasts this CH–ID of the node to the network. If this ID matches the particular node then that node will be denoted as a CH for a particular round. The remaining slots are used for the transmission process. The advantage of using LEACH-C is the algorithm in which CH selection is based on energy level thereby reducing the chances of network or node failing, so the

lifetime of the network is increased. In this paper, they propose a new cluster-based routing protocol called VR-LEACH which is an enhancement of LEACH-C protocol which is used to stabilize the power utilization problem of various sensor nodes and to minimize the overload energy consumption problems. The result was predominantly observed by using an NS2 simulator. In conclusion, this paper proposed the enhancement of the algorithm of clustering protocol by using an adaptive round time method with a mobile collector. The mobile collector provides a better connection between distances and minimizes the energy consumption of nodes in the network.

Disseminating Energy-Efficient Technologies: A Case Study of Compact Fluorescent Lamps (CFLs) in India

Arun Kumara, Sudhir K. Jain...et.al (2003). Electricity plays an important role in one's lifestyle. All human beings are dependent on electricity as it is the most important thing on which every appliance works. The paper consists of a detailed review of the people using incandescent lamps and enlightens the benefits of using CFL bulbs. It clearly explains the benefits of using CFLs over incandescent lamps. CFLs could save up to 20 percent of electricity and it is more efficient than approx. 4-5 times to incandescent lamps. According to figures, In India in 1999-2000, electricity consumption in the domestic sector was 86.6 billion kWh, accounting for almost 22% of the total electricity consumption, which stood at 395 billion kWh.one of the major drawbacks of using CFLs was lack of knowledge about it and probably it was costlier than incandescent lamps. The paper contains the detail of the sale of CFLs in the past 30 months therefore in the last 12 months graph show S curve. Thus the Indian government must be required to set a first step towards the promotion of CFLs to make a good sale. According to the survey, most of the locals were unaware of this new technology and most were not interested in updating. The survey emphasis that most of the people were unaware of CFLs and most could not afford them, particularly those with monthly family incomes of

less than Rs. 10,000 ($250). CFL use was found to be very low even from that segment which was aware of this new lighting product. The major source was an advertisement to make a good sale of CFLs. The maximum awareness was in the highest income group, i.e. with income above Rs. 20,000 where 70% of the respondents were aware of the CFLs. Because of the initial high costs, customers must be assured about the longevity of the product through a suitable warranty and/or a certificate of quality from a government laboratory. The main reason to encourage CFLs is the compact fluorescent tubes which light-ups in a small power that consumes less amount of electricity and its heating effect is less as compared to incandescent lamps. It's a good step to conserve nature.

Modeling and Control of a Power-Split Hybrid Vehicle

Jinming Liu and Huei Peng, (2008). In this fast-moving world, everybody wants a speed that is conveniences in the way of living. Nowadays four-wheel vehicles have become the most useful and essential part of the human lifestyle. Cars are considered as a helping hand in a fast-moving world. Thus core part of the car is their engines on which they run, science has developed great engines but the major drawbacks of those engines were its low efficiency that is less mileage, and less power. Many times due to mechanical wear n tear, it fails to provide torque to the wheels. This paper comes with a new idea of using smart hybrid technology to overcome the problems of torque and mileage. An HEV (electric motor) adds an electric power path to the conventional powertrain, which helps to improve fuel economy by engine right-sizing, load levelling, and regenerative braking. As compare to normal engines this hybrid system provides extra torque at low speeds and at the time of braking it acts as a battery thus recharge it to store an excess of power which can be further used while accelerating. Based on the mechanical architecture, HEVs can be divided into three categories: parallel hybrids, series hybrids, and power-split hybrids. This paper focuses on the power-split hybrid because the first two have major

drawbacks of low efficiency in different terrains and this is the mixture of those two technologies. A three-state dynamic vehicle model is represented in this paper. . The first design is based on the stochastic dynamic programming (SDP) approach, introduced by Lin et al in which he made a certain algorithm of SDP which is more suitable for a general driving method for all-wheel drive cars, in this paper, the SDP approach is modified and applied to a power-split HEV. Whereas the second design in this paper is the equivalent consumption minimization strategy (ECMS) algorithm, which is proposed by Paganelli… et al. The modified ECMS for power-split hybrids is another contribution of this paper. Although there are four equations, the number of mechanical degrees of freedom of this system is two. Engine speed and the ring gear speed, which is proportional to the vehicle speed, are chosen as the two states for the mechanical motions. In a power-split device, the engine speed can be decoupled from the vehicle load. Therefore, the engine can operate efficiently, similar to a series hybrid which helps the car to save fuel in city mode. For highway driving, similar to a parallel hybrid, power flow is mostly through the mechanical path to improve fuel economy. Simulations of the same vehicle model with SDP and ECMS controllers are conducted under various driving cycles to evaluate the control performances. In conclusion, this paper consists the valuable knowledge about smart vehicles and a new approach to improve fuel economy thus making it energy efficient by indirectly saving fossil fuels.

Energy Conservation by using Energy-Efficient Electric Motors

Mehmet Ababa (1999) electricity plays an important role in industrial areas where all the machinery directly or indirectly depends on electricity and fossil fuels. This paper demonstrates the use of an electric motor and explains how electric motors are more efficient than standard mechanical motors economically. Over the last decade, the cost of electric energy has more than doubled in most countries all over the world. As a direct result of this, the annual energy cost to operate the motors also

doubled. In many industrialized countries, more than 70% of the total produced energy is consumed by electric motors. On the other hand major factor for consideration of electric motors is the environment where the vision is to emit non-polluted gases and prevent toxic waste. In mechanical motors, pollution occurs when the mechanic part of greased and oil is exposed to air and water thus polluting the ecosystem. These facts led electric-motor manufacturers to seek methods for improving the motor efficiencies, which resulted in a new generation of electric motors that are known as energy-efficient (EE) electric motor. In this paper, the writer has made a clear difference between the standard motors and electric motors, their characteristics. The writer has compares the full 200HP motors and provide valuable graphs demonstrating the peak values in the efficiencies at different temperatures. The relevant cost for financial analysis depends on the type of installation. When a new motor is purchased, the incremental cost of EE (electric) motors over SE (mechanic) motors is the value to be used in calculations of the pay-back period. While installing the new EE motor user must need to know the two economic criteria of SE motor first is the cost difference between rewinding a burned-out SE motor and buying a new EE motor and the second is that the rewound motor might not be as efficient as the user expects when it returns from the repair shop. The author compared the two motors side by side of 200HP and he found that the electric motors prove to be more efficient because of its high-quality steel sheets (high flux density and low specific iron losses) in the EE motor and the skill of the designer in optimizing the design for high efficiency. He then uses copper windings to check the output and he observes that a 4.6% increase was achieved inefficiency, which resulted from using better grade steel laminations and in optimizing the design. The analysis presented shows that EE motors are up to nearly 5% more efficient as compared with those of SE motors. This characteristic leads to saving a much Applied significant amount of energy. The high efficiency of EE motors is achieved by using high-grade steel sheets in the magnetic circuit and skillful design concerning the reductions of copper and iron losses from the motor.

Advantages
1. Using energy efficient technologies can be resulted into saving lot of renewable sources and can reduces the power consumptions.
2. Energy efficient technologies can reduce the exposure towards risk of overheating or exploding as it uses less energy to get enough power to run and can lowers the emission of Greenhouse gases such as methane, CFCs, carbon and so on.
3. Energy efficient technologies can directly or indirectly helps to increase the economy of the country by using less power, creating job opportunities to handle new systems, electricity prices gets stabilize and maintain the flow of wealth easily.
4. Energy efficient machines are pretty expensive but it is a one-time investment and it provides an implicit return on investment when compared to the lifetime costs of adopting more conventional products.
5. In the real estate market, energy efficient buildings frequently sell for a higher price than standard buildings with comparable features. Every project that increases your building's energy efficiency adds a fraction of its cost to the final selling price.
6. By optimizing your energy use, you can increase the comfort of living and working in your home and offices, in many cases, see notable health benefits. When you conduct energy efficient measures, your building will be warmer, drier, and properly ventilated, which lowers the risk of illnesses and mould growth.
7. Energy efficiency is a great way to reduce your carbon footprint. For instance, electricity for lighting makes up around 20% of the average electricity bill. If you replace your incandescent light bulbs with Energy Star qualified LED bulbs, you can reduce the amount of electricity you use to light your home by 75%.

8. By working with electric and gas utilities, regional energy efficiency alliances, and other organizations dedicated to improving energy efficiency, local governments can leverage resources and capitalize on the expertise and unique abilities of utilities and alliances to improve energy efficiency among end users in their jurisdictions.

9. Less heating of motor due to the efficiency factor being high means these motors have a great longevity and futuristic.

10. NFRC and Energy Star performance ratings can help you identity the energy-efficient windows that best fit your needs.

Conclusion

In conclusion, it's a great option to switch to energy efficient machineries as in present world our main aim to increase the longevity of natural resources. Ecological footprints and biodiversity plays an important role in the development of each countries and to conserve biodiversity we must have to respect what the nature has given to human beings, thus to maintain its balance we must try to use less resources and produce best out of it. Energy-Efficient technologies provides a path to save the precious amount of time as well as resources in a smart way by avoiding leakage in any of its parts. Machineries are built to make user-friendly interface to perform certain tasks but to in performing task it consuming a lot of power which can either used for other better process thus energy saving is main focus.

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DRONE USAGE AND DISASTER MANAGEMENT

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Introduction

Anderson. G.J., (2016).,et al., The term drone originated from the military referring to any Unmanned Aerial Vehicle with a pre-programmed path basically no human control, today the term has broadened to include anything from the highly sophisticated $100,000,000 global hawk to the $30 teeny-tiny UDI839 quadcopter. The quadcopter (four propellers) is the most popular consumer drone. Two propellers spin in one direction while the other two spin in the opposite direction which is of course required to compensate for the Newton's third law of physics. The remote control communicates to the quadcopter which also has onboard accelerometer and a gyroscope then a microcontroller tells each propeller exactly what to do to allow pitch yaw and roll.

Chang.V., (2017) et al., Let's have look at a few applications of drones. Defence-Drones in the military are mostly used for surveillance and offensive operations. Emergency response and disaster management-Drones are used to access damages, locate victims and deliver aid. Urban planning-Drones have great role to play in mapping and surveying the land which has to be developed. Conservation of endangered species-Drones are used for monitoring wildlife, tagging animals, collecting samples. Healthcare-Drones enable quick delivery and access to drugs, blood and medical technology in remote areas. Agriculture-Drones help farmers to gather data and automate redundant process to maximize efficiency.

Sterri, A. B., & Moen, O. M. (2020). Being a multicellular organism, we all face different types of emergency situations.1[st]in medicine, we face emergency conditions like Heart attack, stroke, breathing difficulties, accidental injuries and so on. Coming to natural disasters which includes flood, heat waves, hurricanes, wild fires, volcanic eruptions and other uncertain natural disasters.

Kharchenko, V (2016).,et al., We can integrate the use drones in many fields, firstly let's have a look at the disaster management activities. After a natural disaster like earthquake, snow slide and landslide, the rescue of affected people and the people who are seems to be alive is drastically retarded by rugged terrains and some obstacles. Now the UAV comes into play which enables the rescuers to find the people who are in struggle and to arrange the required resources who are in need of it, which aren't possible by any ground vehicles. Secondly, the integration of drones in medicine, Let's have a look into this matter with an example. A patient in UK was severely affected by stroke and he was in need defibrillator, at that moment he was treated within 5 minutes with an Automated External Defibrillator (AED) carried by a Drone, which was not possible by roadways vehicle. Thus, integration of drones in emergency services save lives.

Drones can be used in every aspects of life, not only in emergency situations but also in normal purposes as it is cost efficient, time saving, less man power, fuel efficient etc., Now the leading online stores in USA like JEW nana and HSN deliver the products to their customers by means of drones which is to be appreciated and implemented in every country.

Literary Survey
Drones in Medicine - The Rise of Machine Ideas/Problems/Solution

- Balasingam, M. (2017)., The main idea of implementing drone in life saving activities

especially in medicine is to deliver telemedicine and some medical supports like delivery of transplantation organs, delivering of Automated External Defibrillator(AED),small aid packages and so on to the remote areas, areas with high contagious germs and to specific community of people affected by major disasters. It also includes the provision disaster managements when other means of entry are intensely restricted.

- The application of drone technology face challenges such as political legislations, climate zones and topography, legal medical aspects and licensure issues. FAA in USA and EASA in European Union are some examples of legislatives governing the usage of drone, these agencies have effects on drone usage by many limiting and bureaucratic factors. There are no timely legislations relative to the steep advances in technology has had the effect of disheartening or creating a barrier for drone use. The efficiency of drones will depend on the one aiming to deliver help to the emergency victim, this could be a person and not someone who can administer medical treatments, Storage and transportation of drugs and biological products like specimens via drones needs to be carefully implemented and exercised. Any defect in temperature and duration in storage could lead to serious consequences of patient. These are the problems to be noted.
- These problems should be addressed by people who are in medical, drone industry, legislative authorities and government bodies for the quick legislative measures which would result in enhancement of drone technology.

Uniqueness
Telemedicine and the provision disaster assessment
Findings/Solution
With many advances in drone technology, it shows that drones may expand further to include diagnostic activities, especially in imaging field. The enhancing telemedicine technology has boosted access to cardiac ultrasound, which ensures the value of long-distance consultations and remotely controlled medical examination of patients where the areas are

hard to reach, which ensures the longevity of human population.

Short Summary
Drone technology shows steep with increasing worldwide applications. They have developed into an astonishing tool in medicine by showing their ability to address issues faced by patients and personnel. Disaster assessments in restricted areas, delivering aid packages, specimens and some other medical supplies are the common drone applications in medicine. Drone technology is showing notable remarks for blooming healthcare and medicine in 21st century.

Use of Drones in Emergency Medicine - Practical and Legal Aspects
Ideas/Problems/Solutions
- Konert, A., (2019) et al., Shortening the time of travelling to the sick and reducing the complication in affected persons owing to a short period to wait for rescue are the main ideas for implementing unmanned aerial vehicles in the medical field.
- Strict legislation in some countries stands to be the main problem in deploying drones in medicine.
- Stakeholders, Legislative authorities and some personnel who are in drone industry should address this problem for the improvement of drone technology.

Uniqueness
Use of Automated unmanned aerial vehicles in rescue operations.

Findings/Solution
An unmanned aerial vehicle attached with Automatic External Defibrillator (AED) can travel at a speed of 100km/h and delivers it to the patient in 5 minutes 21 seconds compared to ground way ambulance which takes 22 minutes. Only 1 out of 10 persons survive cardiac arrest by outer hospital care. For every one minute without Defibrillation increases the possibility of death by 10%. comparatively 5 minutes

can make a huge difference in saving lives. These factors emphasise the requirement of drones.

Short Summary

The application of unmanned aerial vehicles for medical purposes brings lot of advantages, such as instant help, lowering the time of rescue and the potential to reach places inaccessible because of floods and blocked roads. Conclusively, the use of unmanned aerial vehicle in medicine improves the longevity of people and enables the medical personnel to do their work better and quicker manner.

Life Sign Detector using a Drone in Disaster Zones

Ideas/Problems/Solution

Al-Naji, A.,(2019) et al., After a disaster like flood, earthquake, landslide and snow slide. The rescue of affected people and the people who are seems to be alive is usually retarded by rugged terrain and some obstacles. Now the UAV comes into play, which enables the rescuers to find the people who are in struggle and to arrange the resources who are in need of it.

Uniqueness

The use of proposed system as a life sign detector by the rescue personnel

Findings/Solution

A research was carried out in South Australia in accordance with the principles of Helsinki, which was granted by the University of South Australia, HREC. This research was performed with eight living subjects (eight males and eight females) and a mannequin as a deceased person. In this experiment GoPro camera was installed with the UAV and it was used to record scenes in disaster zones and the ROI (Region of Interest) particularly the thoracic region of the subject with eight different position of the target subject. Graphical User Interface (GUI) panel which runs with MATLAB program integrated with MS Windows 10 OS. This interface enables the user to load the recordings recorded by UAV, it

automatically recognizes the ROI of the subject and executes its algorithm. The cardio- pulmonary motion in ROI of open pose of the subject is the key which allows GUI to detect the subject as alive or deceased.

Short Summary

Universally the survival of people in a disaster zone is critical task. Here it shows for the first time that how a technology with standard colour cameras integrated with consumer drones by default, which can detect the life signs of a human and mannequin lying on the ground. the results obtained from the pictures which were taken from 4-5 meters from the subject shows 100% accuracy.

Water Related Disaster Management Supported by Drones

Ideas/Problems/Solution

Restas, A. (2018).,Drought and flood are two extremities of water level. At these two extreme levels drones comes into play which helps in surveying the flooded area at three period of time(pre-, at, post). Drones are used to survey the basins in prior to drought period to avoid severe scarcity of water in a particular place. These methods facilitate the first responders to do the fruitful works to the people who are in need of it.

Uniqueness

Usage of drones in flooded areas in search of survivors and to find the possible ways for the recreation of affected places.

Findings/Solutions

Using drone while the two extremities of water levels enable the management to differentiate the critical places and optimal use of available resources. Drone provides help not only with live cast but also with beneficial activities like supporting during life-saving activities dedicated logistics and medical supplies. If severe water scarcity occurs in a particular place, the water level of reservoirs becomes low. In this situation experts take photo-

surveying of basins and reservoirs by means of drones inprior to the situation.

Short Summary

In most cases the pre-flood drone applications are similar to post-flood droneusage. Post-flood management is a type of prevention or preparedness for the next disaster. The activities which are carried out using drone helps in building responsible organisation and people with resistant and resilient towards next flood.

A Survey of Drone Use for Socially Relevant Problems
Lessons from Africa
Ideas/Problems/Solution

Washington, A. N. (2018)., The non-commercial use of drones in various parts of Africa for life saving activities is being spoked here. It is so important to know that why African countries are most successful in drone usage and how they can leverage the drone technology in medicine before other countries do. In Rwanda, a zipline with ministry of health Rwanda delivered blood to health care centres where classical means of supply are severely affected.

Uniqueness

The Sudden boom of drone usage in northern and southern part of Africa in the field of medicine.

Findings/Solutions

In Malawi, HIV test kits, nucleic acid samples, tuberculosis test kits and blood are being delivered from and to rural areas to base station health care centre and research centre with more accuracy and less time consuming. Emphasis is being built on non-commercial application as they map clear way for how western could stretch the impact of drone technology for African social problems.

Short Summary

The drone network in Africa has victoriously saved 50 lakhs people by providing the medical aids in mean time. Especially the maternal deaths because of blood loss during let down process, labour pain and ashen induced by malaria. This method was applied in Tanzania where 120 drones serves one thousand saving 100 lakhs patients. These practices have steeply improved health care and quality of life in many urban and rural irrespective of races, dwelling place, skin tone. Especially women of the country are being helped by this activity more effectively.

The Application of Drones in Healthcare and Health-Related Services in North America - A Scoping Review
Ideas/Problems/Solution

Hiebert, B (2019) et al., Here drones are assumed as a UAV which includes single to multi-copter piloted remotely. Drone application in northern parts of America in field of medicine is still in its budding stage whereas in Africa blooming stage. Much of the researches are undergoing with a focus on how drones could be integrated within healthcare. Two terrestrial factors affect drone performance are geographical factors which includes high mountains, terrains, land covered by snow, dense forests and cities occupied by skyscrapers. Secondly, climate which includes weather conditions such as storm, heavy rain and snow fall.

Uniqueness

Budding and blooming stages of drone technology in north America in the field of medicine.

Findings/Solutions

Usage of drones in medicinal care and medical related purposes is comparatively recent application in northern parts of united states. A methodology covering scoping review with the approach of policy developing, researches in future any knowledge gaps. The most frequently spoken benefit of drone is their response time in emergency services as they can fly above road traffic, waterways, areas covered by forest and reachable to taller buildings in time. Secondly, potential access to health service in unreachable areas. Thirdly, improved clinical research outcomes.

Short Summary

Description of north united states use of drones in health care field. Synthesis of knowledge from the application description of many countries, identification of knowledge gap in the base. All authors of drone survey portray that drone is a time saving entity and also improves the longevity of people globally. This paper provides us with the overview of north American drone usage for people well-being, health care and clinical related purposes and finding the priority for future biological researches.

Advantages

1. The disaster workers, rescuers and medical personnel are less exposed to unnecessary dangers.
2. The effectiveness of responders is enhanced.
3. The usage of drones helps in having unique view angles which is not possible in manned aircraft.
4. It enables first responders to have a look into various information layers in a personalised (flexible) way.
5. It simplifies and boosts the situation evaluation and sharing, making ideas, with help of a small crew.
6. The use of UAVs in mapping disaster areas is cost effective, environment friendly and time saving.
7. Drones reduce the threats that pilots face and helps in battling fires effectively.
8. Drones helps in airlifting victims affected by disaster after the effect.
9. Promptly food and medical aids can be done using drones with less man power.
10. It helps responders and firefighters in accessing the place of survivors.

Conclusion

Drone technology has proven to be one of the most hopeful technological outcomes of 4th industrial revolution in India. Having a look on recent trends brought about by the pandemic, adoption of drone is mainly seen in sectors like rural healthcare and agriculture. We have also seen that drones remarkably used in COVID-19 emergency response, sanitation &fumigation of infected places and in controlling locust in northern part of India.

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DRONE TECHNOLOGY: A BOON WITH A MISSION

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Introduction

Wikipedia, The Free Encyclopedia (2020), Drone is an aircraft which does not require a person to be on board as a pilot. It is operated autonomously: either controlled through a remote by a person or it can be computer/robot based. Drones are also called as Unmanned Aerial Vehicles (UAVs). They are the component of Unmanned Aircraft System (UAS). UAS include a drone, a controller and a medium to communicate between them. Earlier they were used for war fighting but now their use is rapidly increasing to commercial, agricultural and scientific applications.

Jayna Locke (2019), Drones have reached homes and also serve as an important tool in sports and entertainment due to their ability of offering aerial photography. They can perform the toughest jobs in the world which is difficult for us as humans to perform in an emergency situation. It has become an important tool for photographers. They are used as a most efficient alternative for sellers all over the world. Drones can be used in rescue situations: as in case of drowning boat, it can be sent into the water to help in rescue or if there is an avalanche, it can be used to look for those caught in snow. It can fly to a great height in forests helping to track the wildlife populations. Drone technology can be used in cases of first aid to get life-saving medical supplies for patients in emergency needs. Taking an example, if you and your friend are walking and suddenly one of you collapse. In this case, the cause may be sudden cardiac arrest. So, drones have the ability to save the life by providing you the equipment such as external defibrillator that is designed to restart the heart pumps. Drones can plant seeds, along with nutrients for their survival, very quickly and with most accuracy, decreasing the cost and effort used for planting.

Rayomand Engineer (2018), Burns and scald can be caused at homes through fire, dry heat and moist heat like steam, boiling water or hot oil. They have the same effects forming blisters or reddening of skin. If the burn is minor it can be treated with first aid at home but if it is a major case, then the patient is to be moved to the hospital as quickly as possible for anaesthetic requirement. Another emergency can be a sudden cardiac arrest which occurs when there is lack of blood supply that is blocked by a clot. Chances of survival increases if treatment is provided within one and a half hour of the attack. Major cuts and wounds through knife, needles and razors can also be a part of emergencies. Electrical shocks, fractures, bites of animals like dog or cat, stings of insects like bees, choking and discomfort in the eyes due to foreign bodies entering the eye are some of the emergency situations that we can face in day-to-day lives. Some emergency situations can also appear during disasters like earthquake, flood, Tsunami, forest fires, etc.

Fintan Corrigan, (2020), Drone technology can assist us or be helpful as an important tool during emergencies. They can provide us with live-saving equipment as first aids for above stated emergencies. DJI Phantom is one of the most popular drones with professional aerial photographers. This Phantom drone contains the UAV, camera and gimbal. UAVs are made of light materials to reduce its weight and increase the effectives. Drones are referred as ground cockpit and are controlled by GSC. As it does not require any human pilot, the body of UAVs is packed with drone technology systems. Its nose is the area where all the sensors and navigators are placed. All the light-weight materials are used to design UAVs

for absorbing vibrations that reduces the produced sound. Almost all UAVs have GSC or cellular connection through an app that allows to fly the drone and to track the flight being covered. No fly zone feature is added to increase the safety and check on accidents in restricted places. This feature is regulated by Federal Aviation Authority (FAA) and can change the zones by updates. In near future, UAVs will change the cities by revolutionising the travelling of people, delivery of goods and supplies and also by providing the bird-view of the areas or apartments that are constructed. Drones have anti-drop kit to prevent the falling of camera and stabilizer from unmanned vehicles.

Literary Survey

Balasingam, M., (2017), Use of Non-military drones first started during disasters in affected areas due to their ability to fly up in the air bypassing road closures without any risk. They are frequently used to supply first-aid packages in disaster affected areas. 2010-earthquake in Haiti, 2012-hurricane in north-east US, Canada and 2015-earthquake in Nepal. Drones are also used in fights against HIV, by delivering HIV testing kits in rural areas of Malawi, Africa. They significantly reduced the time required to test children living in such areas. In Africa, drones can be revolutionised if acknowledged as cost-effective and efficient than prevailing delivery process. They were also used to transport blood products and medicines by navigation using GPS and cellular network to hospitals within 30 minutes in Rwanda, Africa. Drones are more cost-effective and can provide door-to-door transportation of medicines and materials than conventional transport system as its expansion can be costly. Drones can improve the overall care provided to patients in the hospitals. Senior populations can be benefitted with the use of small drones that has arms for manipulations for bringing medicines or for household needs. It can be accepted as a part in the daily life of patients due to its reliability. Researches are being done to create a drone that is beneficial for both humans and environment. This technology has enormous advantages in our day-to-day lives but it has equal

number of disadvantages too. For drone technology, to attain success globally, the makers need to work together to add it easily in the community. Drone technology is rapidly developing in 21st century with its increasing applications worldwide such as providing access to AEDs to patients during cardiac arrest.

Konert, A., et al. (2019), Now-a-days everyone can afford a drone that can fly from the range of 5 to 7 kilometres up to some hundred metres or even more depending on its demand. It has become a reality by saving people from sinking and providing blood in remote areas. Drones can be a better option to transport blood products as it was used to transport red blood cells and frozen plasma placed in cooler attached with it, in about 27 minutes with no important changes in platelet counts and other parameters, thus, enhancing its possibility for use. When the conditions are cloudy, drones can take the flight of low altitudes that is difficult or almost impossible with normal helicopters. Drones can monitor and is advantageous as the recordings through the cameras can be played over and over again such that several people can view the content, lowering the risk of ignoring the important details. Drones can be used to reduce complications faced by injured in a way by reducing the time to wait for rescue, support and medical emergency. It can also provide opportunity to reach areas for basic needs that cannot be accessed because of floods and blocked roads. However, it is very significant to be aware of regulations that prevail to protect against the dangers through the presence of drones in the place where it is not meant for.

Euchi, J., (2020), now-a-days, commercial use of drones has increased significantly. Amazon is about to launch the plans to use drones for delivering packages to the customers. Future of drones is going to be very exciting in healthcare field too. We all know that the cases of COVID-19 are increasing tremendously day by day, which is a deadly communicable disease. So, it would have been nearly impossible to deliver the required supplies if drone technology was not known to us. Thanks to UAVs, food aid, medical supplies, vaccines and drugs are

directly supplied to the source in the affected zones by the pandemic reducing the risk of spread ad people's exposure to each other is reduced. Drones can be used as a transport in the sectors that are mostly polluted causing global warming. If we see the environmental aspects of drones, its use can help reduce the emissions of greenhouse gases under certain limited conditions. Professionally, drones can reduce the time consumption for monitoring railways, high-voltage lines, and also the gas and oil structures. UAVs designed for COVID-19 pandemic has the potential to deliver supplies, aerial sprays and disinfectants and for detecting the patients suffering from this disease. It was also used to monitor the curfew and provide the real-time information.

During this time of COVID-19 pandemic, it is very important to deliver the samples of patients for testing very quickly, so that, the doctors can take the decision for patients earlier reducing the risk. Drones are the best way to make this possible reducing the time limit in this pandemic.

Pathak, P., et al., (2019), Delivering through drones is not a new concept. In Africa live organs and medicines are delivered between villages in rural areas for testing. Rural areas do not have blocked roads or traffic where we find any need of using drones, still they are already in use in such areas. In no less time, we will be able to see UAVs delivering services, available in the major cities. But, today, most of the people find this technology of no use, rather identify it as a publicity stunt. Several models of drones have been invented in the military field. The General Atomics MQ-9 Reaper is one of the main strike tools for drones. Militaries also have F-16 fighter jets that are transformed into drones and bombers without human-pilot. There are certain constraints of using drones commercially. Before the drones are commercially accepted all over the world, the feature of 'sense-and-avoid' needs to be improved to perfection, so that, it can reach the location without colliding with humans, vehicles and even animals. In addition to this, drones used for delivery will also have to be perfect for use in all weather conditions. The number of drones that can fly in rain, storms or at night, is significantly low.

Other reliability issues such as battery life and its consistency are to be considered as well.

Washington, A. N. (2018), UAVs provide bird views of the topography which encouraged their use for detecting, mapping and for archaeological site view in Nigeria. Drones can identify excavation sites faster, cheaper and much better than that ground-based equipment. Globally, drones can also be used to reduce and remove human genocides which are present in Sudan, Kenya, Nigeria, Sri Lanka, Burma, Syria, and Kyrgyzstan. They can identify exact position of atrocities and provide warning in advance that helps improving the time the time of reaction. Research on the use of drones for Search and Rescue (SAR) is focused globally. SAR projects were sponsored by the European Union that included ICARUS project (to provide this technology for both maritime and urban SAR) and SHEPRA project (to help in alpine SAR). Private operators are needed to use UAVs for emergency response which may block the ability to help quickly in SAR. UAVs are still not allowed for public use in many countries due to its limitations for privacy. Small drones can capture sensitive information that can cause objection by local citizens. It is necessary to educate people on drone technology and the way of using it. Overall, drone technology is of utmost importance as it provide support in medical assistance, door-to-door deliveries of groceries, agricultural aspects and various life-saving activities.

Restas, A. (2018), We all know that climate change is unpredictable. Since most of the surface of Earth is covered by water, hence more evaporation can take place in high temperature, finally leading to the rise in amount of rainfall or snowfall. It can lead to serious floods and droughts where drone technology can be used to rescue people globally in less time from the affected areas where it becomes difficult even for helicopters to reach on time, increasing the chances of saving lives of living creatures. In cases of forest-fire, drones can be used to detect fire quickly thereby increasing the chances of control of forest fires much effectively. Due to this, damages and burnt places will be minimum. Drones can be used to identify trapped people in

houses during floods or leakage through dams. UAVs can not only provide information in reduced time but can also provide assistance in activities like saving lives, logistic and first-aid. Drones can be supportive in water related disasters providing three options at different timings. Before disaster, it can check flood by providing river bed surveys. During disaster, it can provide aerial view of the affected area to provide information and support the decision-takers. After disaster, drones can be used for re-mapping the area to know about the damages that are caused due to flood.

Advantages

Now-a-days drones, are not just for supreme admirers because these have entered the world of technology along with use for customers. Most of the business in present world, are looking forward to use the capabilities of drones to the best possible. Despite of basic uses of UAVs, there are very creative uses of drones that could be usable in your life. Let us find some of them that helps you to put these UAVs to work:

1. Detecting bombs: Due to the small size of these UAVs, they usually enter into the areas that are constricted. In addition to this, they have very effective cameras, making the drones suitable for the purpose of detecting bombs. Hence, these drones are very appropriate for detecting bombs and eventually saving lives of people.

2. Surveillance: In any country, the defence system conducts regular check of the hazardous regions to ensure the protection of the people and the region itself. Drones, in this case, can be of great use, as it does not require manual workers and in addition to this, we get a wider view of the region. Also, it does not disturb the lives of people normally as there is no need of them in entering these hazardous regions. Although there are some limitations to this, such as the privacy issues and the ethical boundaries.

3. Delivery and shipping: These uses are still developing and it could be a revolutionary change for the world in the coming years. It can improve the time taken for delivering the parcels

and can also reduce the labour work done by humans. As discussed earlier, Amazon is working on this idea for facilitating the delivery services through UAVs at your doorstep.

4. Disaster management: UAVs have widely used applications in disaster management. Mismanagement of resources are often noticed after a disaster, irrespective of being artificial or natural calamity. Drones can significantly help in these cases by synchronizing useful resources and reducing the need of manpower and can eventually help in saving lives.

5. Health care and life-saving activities: Drones can be used to reduce complications faced by injured in a way by reducing the time to wait for rescue, support and medical emergency. Drones are of important use during night and also in regions where we, humans, cannot reach. These are very important when the rescues are critical which has very less time.

6. Cinematography and journalism: The idea of use of drones to the fullest has entered the world of media too. Most of the movies are shot using drones and quadcopters. With the high-resolution cameras fixed with sensors, drones can take good photographs, videos and collect large volumes of data.

7. Maintaining safe environment by performing rescue operations: Drones are used in many instances because of their advancement in safety. UAVs discover locations, and inform about the possible hazards and life-threatening conditions. These help them to create and preserve a safe environment. We can say that rescue operation is a fight against time and due to this we need the work to be done very fast and smoothly for the rescue operation to be successful. So, the use of drones in this case is very effective. Drones can find the people who are lost due to disaster, with the help of thermal sensors.

8. Archaeological surveys: The archaeological surveys require a lot of energy and consumes a lot of time of most of the people. With drones, the work gets easier as they consume less time

and almost no labour work and in turn brings up the important footage and details about the excavated sites. These allows the archaeologists to concentrate their efforts on research and analysis.

9. Enforcement of law: UAVs have a lot of uses in terms of law enforcement. They have the ability of moving around the regions without getting much attention from the people. Hence, it can be used for surveillance and for public safety specially during the pandemic like covid-19.

10. Technological advances: With advancement in technology control, drones can be operated with relatively minimal experience. Combined with relatively low-cost models, drones have become accessible to a wide range of operators. Drones do have a greater range of movement when compared to a human laboured aircraft. They are able to fly lower and in almost all directions, allowing them easily to navigate even in restricted or hard accessed areas.

Conclusion

With many new advancements in this technology, it is concluded that UAVs could stretch more and include diagnostic competence. This technology is rapidly spreading throughout the globe with its worldwide applications. Common implementations of UAV technology take in providing help in disaster management when other means are prohibited, delivering packages, medicines, blood, vaccines at door step in secluded regions. It is very crucial to be mindful of the subsisting reconciliations. Kartikeya Saigal, (2020), The operation of drones will only expand when the technology itself gets up to the minute and also reachable to the medial consumer. Drones are already worked upon by those who can offer it for blogging and generating information, that can be used for both business and personal purposes. During the present days, the government and the large MNCs like Amazon are discovering the chances that UAVs can afford such as delivering, conducting surveys, security, transport, rescue operations and so on. In India, there is chance that this industry may enhance very rapidly and become an essential component in the fields such as mapping, agriculture, hospital facilities and other purposes that are productive. During the pandemic such as COVID-19, it is very important to deliver the samples for test of patients very quickly and drones are of very good use for this purpose. Rules for the restricted use of drones in the private regions needs to be licensed as a solution for enhancing its efficiency in healthcare. It represents a good time for the health care sector and we expect the countries to make the best out of them. This work helped me to get to grips with drone technology and revolutionize in the field of health care and life saving activities. Hoping for the advancements that will help deliver medicines by moving robots and UAVs.

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ENERGY EFFICIENT TECHNOLOGY: THE PRESSING PRIORITY

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Introduction

Energy efficient technology are the need of the hour as it is obvious that the world is going to require a humungous amount of energy in the coming future so why not start to conserve that energy while we have time without sacrificing the need of the generation. This is possible by making the system we use as efficient as possible or make the technologies that provide the same energy output but with less energy input.

When we talk about conserving energy the possibilities are not just limited to stop using appliances when not required or switching off the lights when not in use, here we are rather talking about a different approach i.e. making the whole system more efficient and get the max out of it by providing it with the minimum energy. As we know we are using all our resources to fulfill the energy demand of the world and we also know we may exhaust our resources in the near future, hence we have to use the energy in such a way that we can conserve the resources to the extent we can think of.

The energy efficient technology are all around us the best example would be the LED lights that we have at our home are before the LED's were invented people used CFL and typical bulbs which used tungsten as their primary filament. One bulb ran for a month or two at max and then fuse out. In this life of one to two months it consumed a huge amount of energy, if we were to give this amount of energy to LED it would run not for months but years this not only conserves energy but also the resources that were wasted. Another example of energy efficient technology is the air conditioner and the refrigerator that we use in our homes these days are very energy efficient as compared from before.

If you ask me the world requires not only conserving energy by some common methods or by making some energy efficient technology but also get some new ideas on how to generate great amount of energy to fulfill the requirement of the future generations. I know I should not think of the far future but we should start the preparations for making the mega structures as they are the infinite soured of energy and will eradicate the problems that we think of regarding the energy shortage in the future. These structures may take years or even decades but why not start to prepare if we have time.

Literary Survey

Energy Efficient Routine Protocoland Wireless Sensor Networks

Uniqueness

Thangadurai, N., et.al (2013), To make the system of wireless sensor more energy efficient the author has proposed the idea for using an adaptive cluster hierarchy using WSN. In this system the nodes are grouped in clusters. The system is known as Leach system. Since the efficiency of the system used to reduce due to the collisions between inter-clusters and intra-cluster the system uses TDMA/CDMA MAC to reduce the collisions and increase the efficiency making it more energy efficient since there is very limited energy available because of the use of batteries.

Problems

The present wireless networking system is battery oriented and since it is battery oriented. So, in order to get a prolonged network lifetime, the system must use minimum use of energy of the battery. The battery is used the most while sending the message

and during this process many times the battery drains and hence the battery has to be changed which results in network failure and result in not reaching of the message in the respective place. Secondly for recharging of batteries the solar cells are used but, in many cases, it is not possible due to environmental causes and for the same reason changing of battery becomes difficult at times. Maintainability- the node must be able to process and acquire the present condition of battery. The author has claimed to solve all these issues by using the WSN technology. The protocols cannot be used for larger regions.

Proposed Mechanism
In the following research paper, the author has proposed to use the cluster-based routing known as VR-LEACH which is used to stabilize the power utilization problem of various sensors and also solving the problem of overload on the cluster as the mechanism will reduce the inter and intra cluster collisions resulting in less usage of the battery. Here the network time is divided not in a fixed time but on different round time which is adaptive by the system so there is no unbalanced round time which causes unbalanced load on the batteries causing a power failure. The adaptive round time makes the clustering algorithm more immune to network changes.

Performance Evaluation
When we evaluate the Energy consumption vs Time graph between the old system and the tested prototype of this system it was observed that as the time increased the energy consumed was increased but with the VR-LEACH system the power consumption was kept low as compared to the present protocols.

The Throughput vs Time graph shows that the general average successful delivery of data packets in network was higher

Summary
The present wireless sensor networking system has many problems which mainly revolves around the problem of the efficiency of system due to limited power supply, but since the proposed system was designed to adaptive for different round times so that the overall load on the system is reduced and the drainage of the battery is successfully prevented. The simulation studies reveal that the LEACH system has the best performance so far in terms of energy consumption and efficiency of the overall system as compared to the present protocols

Using Iot to Make Energy Efficient Home Automation System
Need of the energy efficient system
Vishwakarma, et al., (2019), Since the earth has experienced population explosion in the last two and as the mortality rate has also increased drastically because of advancement in medicine field the demands of population are also increasing at the same rate. Though we have made a lot of advancements in the field of technology, but as the tech in our daily life increased so is the demand of electricity for running this infrastructure. India shares about 17% of the world population and has very limited energy resources. However, in India, ICT sector had a total consumption of 24TWh which has increased to 31TWh in the last five years (from the period of 2009-2014). Thus, the main concern at hand is to prevent the usage of electricity in access and make the system as energy efficient as possible. In this paper the author has proposed using the system of IoT in order to make the smart, energy efficient home automation system.

Uniqueness
Most of the previous systems used either DTMF or the Bluetooth system. The problem with the DTMF system is that it requires a dedicated PSTN system for the communication between the controlling device and the supply unit. The writes put forward the idea of using the Raspberry pi Soc which will be used as the gateway between the controller and the sensors present in the room to measure the temperature and the humidity of the region surrounding the sensor. Another home automation system presented which is based on the Raspberry pi is that the controller can control the automated products using the web interface. The system is

designed using the Zigbee. Iot is used to convert the non- smart devices to smart devices making the user able to access these devices using the internet. The system allows user to monitor their home and turn ON/OFF their devices which will definitely save the electricity and the electricity making the system energy efficient.

Implementation of the system

In order to maximize the usage of the system owner will surely prefer using voice input and nothing is better than using the google assistant along with the web-based interaction which can be used to control the home. But we cannot solely depend on google assistance because as the background noise increases the efficiency of the assistant degrades so here it is suggested to use the web-based application which can be used to control your home.

System Requirements

1. Node Mcu: - An open-source firmware for providing the flexibility to build the IoT based applications
2. IFTTT: - Stands for "If this than that" to provide web-based service in which devices that are connected to the mobile application making it easier to work on
3. Adafruit: - It is a library that comes with the support of MQTT (Message Queue Telemetry Transport) for sending and receiving data.

Work Model

The chart shown below shows the working of the application
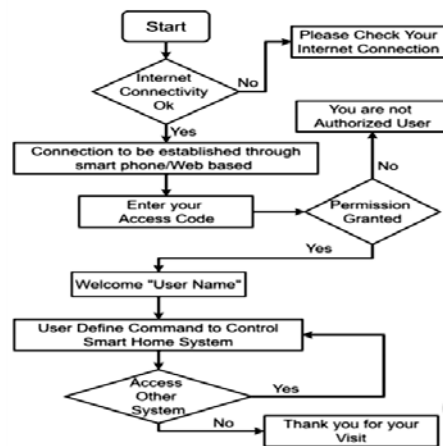
Summary

The following paper has presented the step-by-step working of the smart home automation controlling unit. This system will enable one to convert the non-smart devices to smart devices making them more accessible even when one is not at the home using the IoT connectivity. The model proposed by the writer was tested using three bulbs. The proposed system has two advantage, firstly, owner can monitor and access the smart home easily from anywhere. Secondly, it acts as a helping hand for the old age and differently abled person. Since the system is new the writer proposed to add new devices to the smart home making it more usable and intelligent that can be practically deployed in the real life.

Smart metering and in-home energy feedback; enabling a low carbon life style
Uniqueness

van Elburg, H, (2009),The new metering system that the author proposes in this paper is about the new metering system which is more energy efficient than the present system as this system uses automated meter management (AMM). Another name given to the system is the 'smart metering system'. The system enables the energy suppliers to provide their customers with energy at competitively priced, with the information of individual meter based on the time of use as well as generating the accurate bill. The installing of these smart meters has already been started in Italy, Netherlands and Sweden. Many

countries are taking this system seriously like France, Ireland, and Denmark. At the present time the smart metering system is being reviewed on the world-wide bases by the pioneering countries. It is said that this system will be appealing and trendy enabling one to have modern lifestyle presented to their home. The paper follows most valuable insights regarding to use the feedback technologies.

Problems in present metering system

The readings given by present metering system are not very convenient for the consumers as well as the energy providers. The meters are installed in the buildings and homes separately so in order to get the correct reading the providers have to go building to building to get the proper reading. Another problem in the system that the consumer is unable to look back to the past events or information about the instantons information. The metering system shows the cumulative total. The present system is also very inaccurate and at times may result in giving huge bills to the customers. One great disadvantage is that as the system becomes smart the privacy concerns are increased and the information of the customer may be put to wrong use and this information may be used for criminal purposes. Since the system is new customer satisfaction may be very disappointing

Advantages of smart metering system

The customer awareness will be increased along with more energy saving and better information. The feature of recording all the events and past records. The bills provided will be based on real rather than average or estimated results. The flexible system will also allow consumers to decide their consumption of electricity and planning their savings. The system will enable the consumer to change their providers whenever needed and reducing the time required to change to take place. Since there will be more providers so in order to get more customers there will be competition and hence the prices will be reduced. Customer will be enabled to manage micro-generation such as combined heat and power.

Energy efficient manufacturing from machine tools to manufacturing systems

Need of energy efficient manufacturing system

Salonitis, K., et al., (2013), It is a well-known fact that affordability as well as availability of energy is going scarce day by day and energy has become a critical parameter which may affect the human life greatly, also affecting the whole cycle, also the whole life cycle of the product. The energy consumption taken by the production sector globally is well more than 25 percent of the total energy produced. World really need to evolve and adapt the strategy of "max gain from max resources" as this is the need of the hour. Till date the main criteria of production systems were mains based on monitoring four main classes and those are flexibility, cost, quality and time, it is clear that the efficiency has not been kept as an important criterion which needs to be changed and this paper mainly focuses on making this production system more efficient. The four main criteria should be mainly focused on sustainability.

Limitations of the presented system

The system is mainly dependent on the scope of the project. These scopes are divided into five distinct levels, those levels are identified as multi factory systems, supply chain, multi machine system, facility, process level. The focus of the paper is based on two levels mostly, which are machine tool level and the global supply chain level. All of these levels have different outputs that they provide, different inputs and different assumptions. The challenges faced by the system and the barriers due to the cultural point of view.

Energy efficiency on manufacturing system level

The system will follow the hierarch following the four actions. The first is prevention which states that the system will be able to switch off every equipment which is not in use cleaning the air as well as cleaning the room of air at night. The second is to reduce the load on the system by relaxing the set points or by enabling the equipment to run in cluster batches in a closer design hence decreasing the load on the system. The third point follows the concept of

reuse that says saving the power of one system and using it on another one. The fourth point it follows the concept of dispose which states that the system will use the atmosphere to cool the system rather than using the heat sinks. The system mainly focuses on avoiding any kind of wastage of energy in any form and using and using more and more energy efficient methods.

A ZigBee based Energy Efficient Environmental Monitoring Alerting and Controlling System
Introduction to wireless sensor networking

Krishna, K. L., et al., (2016), Wireless sensor networking has become a crucial part of the technical world and has the potential to control most of the things in this technical world be it any device at home or in a factory without the presence of a living soul there. This networking system will do all the computing, measuring and communicating with the user and enabling the user to take the appropriate action based on the information being monitored by the system. Once the system is installed the network is unmonitored regarding the physical attributes. In the structure several pre-planned sensors are installed throughout the place with each sensor having its own significant use, for example, the sensors used are infra-red sensor, ultra sound sensor and many others with their particular use. The current advancement in the wireless system and sensor technology has helped the agro-based industries to grow drastically, industries like Floriculture, horticulture and greenhouse. The sensor has helped these industries to increase their productivity increase by many folds in fields of various crops, as these systems keep track of every aspect important for the growth of the crops be it the temperature, humidity, carbon dioxide content in the atmosphere and takes actions accordingly keeping the crops from the extreme conditions.

Challenges faced by the wireless system

The present wireless networking system is battery oriented and since it is battery oriented. So, in order to get a prolonged network lifetime, the system must use minimum use of energy of the battery. The battery is used the most while sending the message and during this process many times the battery drains and hence the battery has to be changed which results in network failure and result in not reaching of the message in the respective place. Secondly for recharging of batteries the solar cells are used but, in many cases, it is not possible due to environmental causes and for the same reason changing of battery becomes difficult at times. Maintainability- the node must be able to process and acquire the present condition of battery. The author has claimed to solve all these issues by using the WSN technology. The protocols cannot be used for larger regions. Another problem faced by the system is that the connection range of the system is not very far hence failing the purpose of the system. The nodes required for indoor work are different whereas the nodes for outdoor required may be different.

Implementation and the results provided by the system

When the system was put through a test run the results monitored by the system that were obtained proved that the system is very efficient and was able to control the environment of the place as the readings taken by the systems were accurate and the data provided kept the environment close to perfect for the rearing of respective crops, as the system successfully activated the sprinklers from time to time depending in the temperature and the humidity of the place hence controlling the moisture to the required level. The system is very robust as well as very user-friendly and, in the future, it may prove to be an important factor in growing the crops.

Dynamic Stream Control for Energy Efficient Video Streaming
Uniqueness

Kennedy, M., et al., (2011), The video streaming in the present times have been faced with an exceptional high rate. Some studies suggest that the mobile video streaming has increased by 92 percent in the past ten years. The only problem with the present streaming system is that the system takes so much amount of energy that the best phones also drains completely by four to five hours. The paper

suggests that it will make the system so efficient that it will increase this battery life to more than 12 hours. The system focuses on the ambient display technology and controlling the background tasks during the streaming. The main aim of the paper is on the energy-optimisation that can be easily achieved in the mobile phones using the system.

Adaptive video streaming

The author suggests to change the quantization parameter of each macro-block on the users mobile phone, also proposing the system changing the scaling of the algorithm to alter the frame rates accordingly. The main processes taking place in the streaming are the dynamic display control and dynamic voltage scaling which are the main components. This model is also used for altering the colour scheme replacing them with the schemes which have more energy efficiency rating, hence conserving more energy for the mobile device to run on.

Testing and Results

The whole setup was tested using the phone HTC nexus which was running android version 2.3 as this device has the wide range of functionality as compared to all other competitors of the phone. The phone was put through 2 tests whose objective was to record the Bae-Amy algorithm. It is important to note that the adobe system has poor video streaming quality and also it consumes a lot of energy the system proposes to remove the need of ADOBE AIR. The system proved to be very energy efficient as it saved a significant amount of energy using the BaSe-AMy algorithm, and it also passed both the tests with very satisfying results.

Summary

The main focus of the paper is to focus on the advantages of implementing the BaSe-AMy algorithm to practical use in video streaming in the mobile phones as it is capable enough to replace the Adobe Air system which has been used for a long time and consumes a lot of energy and also this old system is responsible for poor quality of video streaming. The system focuses in implementation of the system in the future streaming solutions by increasing the quality of the streaming as well as conserving a huge amount as compared to the present system. The system promises to improve the battery life of the mobile devices by 10 percent while watching the video streams.

Advantages

1. One of the biggest advantages of using energy efficient technology in our day-to-day life is that, it not only lightens the energy input but also the bill that one has to pay for using the appliances. These appliances may impact your savings greatly for example if one is using energy efficient water heater or cloth dryer the impact on the electricity bill is really huge.
2. People should not think that the expense on energy efficient technology is waste of time as it may be more cost efficient in the longer run. Savings can offset the initial price premium on energy efficient options, and offer a significant return in comparison to conventional, non-efficient alternatives.
3. Moving from old energy consuming technology to more energy efficient technology is a great move towards reducing your carbon footprint. In the year 2016 the total of 19 percent greenhouse gases were produced from homes and moving to energy efficient technology may reduce your emission contribution.
4. The needs of future generations must be fulfilled without sacrificing the needs of the present generations this can be done in two ways either providing the world with unlimited source of energy or else start to plan the usage of energy and its production in an organised manner and conserving the energy which is possible by making the technology as efficient as possible.
5. Using energy efficient appliances limits the exploitation of the natural resources i.e., the fossil fuels, natural gas, oil water, and coal. Conversion of these resources is a great way to achieve the goal of sustainable development by using energy efficient works.

6. The more a company is energy efficient the more competitive advantage over the companies who are less energy efficient companies and hence earning more profits. These companies are capable of earning more even if they lower their prices in order to gain market share or combination of both.

7. Using the energy efficient technology also increases the resource security: - as we know the prices of fuel are increasing day by day and the natural resources are being depleted drastically these efficient appliances may meet the demand without using these precious resources which is the need of the hour.

8. Another benefit of using energy efficient resources is that, as this tech is reducing the pollution it will also reduce the harmful effects of pollution caused to the environment like improved air-quality and reduced corrosion of materials along with health-related benefits.

9. The more the efficient the vehicles the less the fuel the use and hence less is the expenses to operate the vehicles, and as the time is passing, we are moving to hybrid or electric cars hence reducing the use of precious fuels.

10. As we know about the LED's they are highly capable and better than their counterparts as they take more than half the energy with output of manifolds. This is the power of energy efficiency technology.

Conclusion

As we know that India is also known to be a young nation and as this young generation is curious for every kind of tech and we are adopting every kind new technology out there we really need to look at our energy consumption. Another fact that can't be ignored is that the population of India is one of the biggest in the whole world and so are our demands so energy efficient technology is the answer to both the population and curiosity is energy efficient technology among us. It is well known that the energy demand is already so high that some places are still unable to get 24x7 electricity and we need to get some solution to solve this problem with sacrificing the need of the young generation who are

the future of the nation. We also know that India mostly consists of middle and lower middle-class families and they focus a lot on savings on everything they can including the electricity bill and energy efficient technologies are a great solution to decrease these bills exponentially on a longer run. They not only consume less electricity but also provide us with the same output as it was provided before or even better at a cheaper price. This technology not only lightens the load on electricity bills but also reduces the carbon footprint. In my personal opinion this energy efficient technology is the need of the hour and they have the capability of revolutionising the world as they have the capability to run longer even after consuming the same amount of energy.

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HOW AI IN HEALTHCARE SHAPES THE INDUSTRY

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Introduction

Artificial intelligence refers to the process to create machines which are programmed to think and do actions like humans. The important characteristic of artificial intelligence is to think and take the actions that have the good chances in approaching a particular goal. Artificial intelligence, an automated system capable of analyzing and making decisions autonomously. AI is not about building mind, it is like a tool to solve the problems. Artificial Intelligence is used to improve our daily lives by certain processes more efficiently with the help of a computer which are complicated and cannot be done by humans. Artificial intelligence in healthcare is a new technology which aims to enhance interactions between patients and care ones to both improve the experience. Artificial intelligence in healthcare can be developed by using virtual assistants of staffs, AI-powered chat bot. personal health companions, AI in pathology.

Jennifer Bresnick., (2018) Artificial intelligence is poised to become a transformational force in healthcare. It is time to take particular action on health care industry. As payment structures are getting increased, the data level also increase at a high rate. Artificial intelligence plays a main role in creating solutions across this aspect. Artificial Intelligence has been playing a major role in maintaining the patients care and overall treatment efficiently and accurately.AI offers many advantages over many analytics in creating new techniques.

Codrin Arsene., (2020) Artificial intelligence in healthcare refers to design huge projects which are used to perform particular tasks in this automated world. In future healthcare, machine learning and artificial intelligence will be deeply connected.

Mostly we can apply artificial intelligence in many places of healthcare industry. When a person injects some data to computers, it will be converted to a new algorithm and can suggest us solutions to complex medical problems.

Data Flair Team., (2020) AI helps in detecting the ailments in early stage. By this information, AI algorithms are assisted in better way and improve decision making process. Then by previous medical reports of the patients, AI can help the individual and clinicians in having a better treatment. AI expands the access to medical services. Artificial Intelligence is associated with the care by giving a superior suggestions based on their health conditions. By analyzing the data with the help of AI clinicians can get lot of awareness about the patients and can have a better track in maintaining their health.

Literacy Survey

Jennifer Bresnick., (2018) Using computers, machines to interact is not a new idea, but creating some communication between technology and human mind is the part that is useful for the particular research which helps to lots of patients. Some diseases related to nervous system can take of the ability of a person to speak, write and also to interact properly with other person. In these kind of cases artificial intelligence can play a major role by creating Brain-Computer Interfaces (BCIs) which can help the patient to express their feelings. Artificial intelligence is helping to enable new products by the combination of machines and human mind. Artificial intelligence will provide a base for many major problems. However, algorithm developers must be careful while creating an algorithm. It helps in refilling medication and also helps to prioritize tasks that are truly required and

making the obstacle easier for the person who works through it. Artificial Intelligence can increase the productivity of the material by comparing and modify it by new features with before human clinician data reviews.

Deepak., (2020) Global Artificial Intelligence in healthcare market report is about various details which includes size, trends, growth, cost structure, capacity and also forecast of the market. It reports present about comprehensive assignment which includes everything about the market, by doing this we can improve and boost up the growth of the market during the forecast period. Global artificial intelligence report gives an accurate analysis to improve many competitive dynamics. It describes about the various factors driving or restraining the growth of the market. By that report the client scan have discussion about the strategies and can take the further step to increase the growth potential within the market. In this way artificial intelligence in healthcare markets makes useful insights to boost upgrowth potential and development in healthcare industry, so that it can provide recommendations to the people based on the analysis and can also implement new personalized data with the help of it.

Fady Jameel., (2019) Artificial Intelligence is a type of key which is used to accuracy. Data crunching and deep analysis will lead to major changes in this particular sector. Real word interventions powered by artificial intelligence include robotic surgery and this is no longer future dream but have taken area in healthcare in delivering significant benefits. They include a 21% of patient's reduction in hospital and also five times fewer complications while compared to surgeons operating alone. In these days the machine learning is also being assigned in embryo potential during in-vitro fertilization. Artificial Intelligence helps in managing many problems, it does not need any assistants in particular as humans need. It works 24/7 without tiring and can provide quick answers to the questions and in monitoring patients. In this way there are many advantages of artificial intelligence which analyze large quantities of data to simple one with

far greater are most commonly used this modern world in many fields.

Micah Castelo., (2020) There are various types of applications of artificial intelligence today in the market and some are waiting for the approval which can improve the patient care and potentiality, also can save their lives. Those applications can have various types as language recognition, translating, robotics and also pattern recognition. Artificial intelligence includes various techniques that trains many software algorithms and worksup on new analysis to improve performance. Virtual assistants, Robotic assisted therapy, Caption guidance and soon, these are some latest tools that leverage artificial intelligence in various medicine and healthcare industry, they can help the people with various diseases like Alzheimer's disease, stroke recovery. Artificial intelligence helps in early identification of a particular disease which helps to take necessary therapy by a particular algorithm. AI should not replace human interaction as despite grows in presence of AI in healthcare industry. Artificial intelligence was first established as field in 1956.

Shikhar Srivastava., (2019) In India there are many startups claiming to develop artificial intelligence to help healthcare industry in their growth. AI powered solutions in India for healthcare industry can be found across many AI applications. Machine vision is a strong grip for most medical imaging, while the analysis is used to understand about the patient health in that particular area. Only Indian company using the solutions of natural language processing (NLP) though it can be found in many parts all over the world. There are also some systems which take patient DNA samples and prepare analysis with AI and it findout causes for medical diseases or disorders, so by this they can find best courses in keeping their health stable. Zerone Consulting offers an eponym software that claims can help their companies in analyzing and summarizing the data from large amount of documentation to natural language documentation. In India the companies are offering AI solutions to advertise their software for medical imaging.

Dennis Turpitka., (2020) Artificial intelligence provides a wide range of opportunities in healthcare industry, from reducing the obstacles and in inventing a speedy solutions. Though the AI in health market is boosting up there are a range of challenges in technology for medical purposes. The algorithms of AI cannot be implemented unless by checking whether they are completely trained on a high volume of right data. The highly regulated and protected data which will be collected will be distributed to hospitals and it has strictly limited access and this will be used when we are treating with rare diseases. AI algorithms should be trained properlyor else it leads to severe consequences. To prevent this kind of issues the AI based solution is to be fitted with strict requirements of healthcare industry, should review datasets with high quality images and should avoid errors, have to make sure that data is completely sufficient and then finally have to create a AI driven model. By this one can prevent creating mistakes and can reduce the high consequences.

Advantages

1. Patients or clinicians can read the data with the help of smart algorithms.
2. Helps in gaining more autonomy with the help of digital devices over the care.
3. It helps in reducing the human risk.
4. AI is always available with faster decisions.
5. It helps in extending the human experiences.
6. It helps in increasing the efficiency of diagnosis disease with better data driven decisions.
7. Clinicians can pursue better collaboration opportunities with the help of AI.
8. Helps in improving the patient's health with the help of earlier detection and making more accurate decisions and treatment.
9. AI helps in creating efficiencies by shifting manual process to digital process.
10. AI helps in reducing unnecessary hospital visits and alerts the staff when the patient is needed.

Conclusion

Artificial Intelligence in healthcare helps in managing and analyzing the data. It helps in conducting conversations and making the decisions, so that the clinicians can change their roles drastically in that way. AI helps in reducing human errors. It analyzes the relationship between patient outcomes and treatment techniques. The problems or tasks which cannot be solved by humans directly can be done with the help of AI. Artificial Intelligence is becoming a real opportunity for enterprise. AI also leads to unemployment. There will be more choices and conveniences in future AI. In future AI, the appointments can be scheduled faster and easier. There will be only few errors and can increase patient's satisfaction and can reduce waiting times in future AI. The effectiveness of the AI systems will depend on identifying the problem and solution with accurate algorithm. Though it has some disadvantages, AI can deliver good and accurate healthcare solutions. In this way Artificial Intelligence helps in improving the Healthcare Industry by enhancing the patients experience.

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ADVANTAGES OF EMBEDDED TECHNOLOGIES IN HOSPITALS

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Introduction

Margaret Rouse, et.al, (2020), An embedded system is an electronic system, it is a combination of hardware and software designed for a specific task and specific function. It is programmable and non-programmable. An embedded system comprises hardware, software and firmware. An embedded system usually varies in complexity and it affects the type of hardware, software and firmware. An Embedded system is a group of analysing or performing a specific task under set of rules. An embedded system is an integrated circuit hardware consists of microprocessors or microcontrollers. Embedded system is always written high level language. The embedded system is most commonly found in industrial machine, cameras, household appliances, airplane, vending machines, toys and mobile devices.

Technical Editor (2017), The characteristics of embedded system are processor, power, operating system, performance, memory, size, reliability, correctness and reliability. The main characteristics of embedded system is power consumption and safety. Power consumption depends on batteries, which decided the lifetime capacity of batteries.

Liberati, et.al, (2017), An embedded technology is widely used in healthcare field. It is very useful for doctors to check patients and it is applied in monitoring vital signs, found in electronic stethoscopes, CT scans, PET scans, MRI's and imaging. Glucose monitors, pacemakers and a variety of biomedical remediation has a great impact on embedded technology. One of the best example for embedded technology is advanced computerised decision support system (CDSS), it helps clinicians generating recommendations based on up to date data evidence. It has great potential to improve the patient care. The main parts of embedded technology in hospitals is power supply, processors, memory, timers and input/output circuits.

Mila Jones (2018), An embedded technology is widely used in health care field which helps in maintaining health care records of the patients. It includes diagnosis, lab reports, details about hospitals stays, surgical inventions and prescriptions. Radio frequency identification (RFI) enhances patient's vital signs and temperature. Diagnosing injury with technology includes CT scan, MRI scan, ultrasound scan helps in detecting fractures and injuries.

Literary survey

Hospital Automation System RFID-Based: Technology Embedded in Smart Devices (Cards, Tags and Bracelets)

Florentino, et.al, (2008), Hospital automation helps in solving recurring operational problems. Radio frequency identification (RFID) used for automated identification of objects. The two main characteristics of RFID is identification fields and it does not need a direct view to the object. Moreover, this facilitates to store data of the patient such as allergies, blood type and exam result.

According to panescu, RFID has highest potential in tracking investigation, location of patient and combat of medicines. Chan introduced smart cards to store medical records of the patient. Tags are transponders and they consist of antenna and microchip. Antenna makes communication between tag and reader. passive tags obtain energy through magnetic field and it used in program due to low cost and independent.

Smart cards are storage programmable data because they have no contact with readers like RFID. Smart cards can be only storage device and they have a microprocessor. It offers low costs. Due to storage capability, smart cards are easily accepted for storage of lab records. The pattern which was used for hospital smart card was ISO14443B. Data is stored in card for identification and authentication of the system. Data is stored in the form of examination. There was a serious error in storing data correctly. So, RFID technology was used. RFID tags is attached to tubes and bracelets for identification are placed in the arm of hospitalised patient.

Multi-Parameter Measurement of ICU Patient Using GSM and Embedded Technology

Kharote - Chavan, et.al, Patient monitoring system is a process where it helps a surgeon to monitor the patients continuously using a wireless sensor in a remote place. This helps surgeons take the patients current and previous health status of the patients. Advancement of patient monitoring system should be done regularly.

"Embedded mobile deductive system for low cost health monitoring system (2011)," by natasha cibera, a wireless system used to monitor oxygen saturation using pulse oximeter and transfer to computer monitoring via IEEE802.15.4. It is a wireless sensor for storage and display." Real time monitoring system for patient based on zigbee (2008)," the system is divided into sub system. Data is displayed in the form of graph. Multiparameter monitoring system made up of front-end monitoring system. Based on mobile monitoring system the physicians can give final conclusions to the patient.

Telecare assessment by android OS smartphone helps in monitoring the behavioural patterns, vital signs of the patients and it gives alarms in the site of danger. The major drawbacks of medical monitoring system is accompanied by numerical readouts of computed paragraphs. These machines saved many lives, but they are sensitive to electrical interface, base level fluctuations and absence of numeric readouts.

Patient monitoring system is must because the physicians has to frequently visit the patient previous and current health status, so they can get accessed to global system for mobile communication (GSM) it helps the doctor to send the health status of the patients via message through mobile phone.

A Non- Invasive Blood Pressure Measurement Using Embedded Technology

Rokde, et.al, Health care is given utmost importance in the 21st century and the rapidly developing medical advancements hold credit. As scientists develop better biomedical equipment and instruments, the readings for the body's metabolic functions can be recorded accurately in a short period of time. This leads to many advancements in the medical field. Many devices based on plethysmography technique which is also referred to as PPG are now being used in order to measure with the help of an optical measurement circuit. If such instruments are used, the blood pressure is recorded remotely from an LCD screen.

Blood pressure is the most vital and salient feature of the body that is noted down for every medical and physiological practice. It is noted down for detection of any signs of hypertension, which is a highly hazardous cardiovascular disease. It may also point out to any other brain heart or tissue deficiencies which are corelated to cerebral stroke or cardiac fracture.

Photoplesmography technique is used to monitor oscillometer method and is extensively used to increase mobility and home-care and long-term monitoring of blood pressure. It is also cost effective. A technique for highly non-invasive and continuous blood pressure measurement using special methods with the help of the photoplethysmography technique.

Photoelectric plethysmography is used for the detection of bp and falls under the optical measurement technique. This device is put to practical use by the mechanism of transparent living tissue that bounces some of the light rays to source pass from the tissue to the light ray emitting photo-detector.

A microcontroller is used to display the information of the measured blood pressure and then it transmits it to a device such as a computer through Bluetooth. This system utilizes an easy-to-interface and helps in easy blood pressure measurement.

An LCD or liquid crystal display is famously used in digital watches and computers. They are connected by electric current through the liquid, which results in the alignment of these crystals such that the light is unable to pass through them.

Bluetooth technology is a condensed and easy method of detection of blood pressure. It is a simply designed to display results through predefined serial ports.

An RF or radio frequency module is a device that is used to pass radio signals to and from two different devices. It is effortless and easy method that can be accomplished through optical communication.

With the above-mentioned procedure, blood pressure can be measured and remotely controlled for a long period of time. This system can also be used to detect heart rate, oxygen saturation, respiration rate, etc. A GPS can be used to make the whole progress much more efficient.

A Traffic Aware Health Monitoring Application Embedded in Smart Ambulance (THESA)

Kaur, J., et.al, (2014), Pervasive computing also known as ubiquitous computing is a concept where computing is made to appear anytime and anywhere. And also follows the advance computing concepts. Examples of pervasive computing are hacking applicants, apple watch and Apple Echo.

The mobile stroke unit is an ambulance with telemedicine technology and a CT scanner enabling brain imaging. There are three modules Hospital information system, Ambulance and Doctor module. The hospital information system can be installed on the mobile as well as the android based server. But the ambulance module can only be used by the ambulance in-charge. The ambulance in-charge, as well as the doctor, has to register themselves in THESA is application using the mobile as ambulance in-charge to access things in the ambulance and as the doctor to review the patient's health records, If

traffic is stuck the THESA it calculates the approximate time to reach the hospital and sends an alarm to the ambulance in-charge and warns him/her if the time gets delayed thereby the in-charger can find a nearby hospital and the registered hospital in THESA can treat the critical patient without any further delay in the treatment. Thereby reducing causalities.

The objectives of THESA includes It focuses on helping the critical/emergency patient, Provide an easy way of interaction with medical info and services, It saves the patient's info periodically, Helps to find treatment and hospital which are quickly accessible, Also helps to select the hospital emergency rooms and facilities using the application in mobile phones and appointment with the doctors can also be made by the application. As we said before if traffic is struck it helps in finding the nearby registered hospital to treat is the patient and PHR can be viewed anywhere at any time (using mobile).

When you open THESA a welcome screen pops up with the options enter. you can enter the application by selecting entire, Once you enter the application displaces the 3 modules which help the users to register for his/her module, Registration page for the hospital appears to fill In all the details asked for and submit. once you submit the hospital gets automatically registered, Then the nearby registered hospitals will show up to the mobile's current location, the application also enables the ambulance in-charger and the hospital to chat in case of emergency and THESA will send an alarm once the time is delayed to reach the hospital.

Medication Errors: Prevention using Information Technology Systems

Agrawal, A (2009), Prevention of medication errors has become high priority worldwide. Mounting an evidence system using information technology (IT) such as computerised physician, order entry, automated dispensed cabinets, bedside barcoded medication are key components to prevent medication errors. Many institutions implementing using closed loop system.

IT system provides clueless piece of information, organize them and identify units. IT is effectively bridging "knowing doing" gap by presenting relevant information to the clinicians. CPOE system are effective in reducing errors. Stand-alone website for patient to enter their medical data, or a physician/ hospital hosted patient portal, giving patient access to electronic health records (EHR) or employer/payer portal giving patients access to claims data.

Patient can access medication information from multiple providers, analyse them, update them and share them with physician. Medication errors of omission can have an equal significant impact when evidence of the benefit of medication is clear. IT systems are keys components of a multifaceted strategy to prevent medication error and improve patient safety.

Embedded Gateway Services for Internet of Things Applications in Ubiquitous Healthcare

Rasid, M, et.al, (2014), Growing trends in software helps introducing various pervasive embedded technologies in the field of healthcare. Ubiquitous healthcare system, wireless medical sensors that looks into hardware efficiency for the growth of healthcare applications. This system can be used either in hospital or home environment. The medical sensors has physiological connectivity with nodes as well.

ECG sensors, temperature sensors, accelerometer sensors, 6LoWPAN are the nodes which as their own IP address. The communication between the nodes are done with help of 6LoWPAN packets, which leads to the development embedded gateway with the help of gateway data for local display. Gateway function provides information with some intelligent, automated point care and emergency management services. Gateway is implemented to collect data from medical sensors using 6LoWPAN. It provides reliable data for further treatment and diagnosis.

Gateway helps in providing current and previous health status of the patient. data is stored the form of database, which includes lab reports, scan imaging, scan reports and communicates with edge router. It helps to display personal health records of the patient in their own devices.

Advantages

1. Embedded technology in hospitals provides increased efficiency and better quality of care.
2. Embedded technologies in hospitals in highly reliable.
3. Embedded Technologies in hospitals provides improved product quality.
4. Embedded system provides low power operation and it can be used for longer time.
5. Embedded system stores information very fast, it is portable and small in size.
6. It provides improved treatment management and improved healthcare management for the patient.
7. Embedded technology in hospitals provides prevention to healthcare conditions of the patient.
8. Embedded technologies in hospitals helps in medical data accessibility, helps in storing data.
9. Embedded system results in reduction of healthcare costs, for example IOT.
10. Embedded system in hospitals in open and extensible.

Conclusion

Embedded technologies in hospitals is more understandable, more affordable and more accessible. This technology will be more useful for India in order to provide world level high healthcare treatment. Online registration in hospitals helps patients to take up appointments easily and helps them to meet doctor on time without waiting for about an hour. Embedded technologies in hospitals helps doctors to save health information about the patient health privately and clearly without an error. This technology helps in saving many people lives. Embedded technology helps in storing accurate current status of the patient to decades of years and many software based equipments like pacemakers helps in saving many heart disease patient. X ray and scanning of human organs helps in saving many people from disorders, diseases and fractures. Intensive care unit patient are taken great care by

setting up an alarms and providing proper medicines. So, embedded technologies in hospitals plays an crucial role in saving many patient.

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