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Dr. S. Balakrishnan
Publisher and Managing Editor
bodhijournal@gmail.com
www.bodhijournals.com
09944212131

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PREFACE

"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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ABOUT THE EDITORS

Editor-in-Chief

Dr.J.KARTHIKEYAN
Vellore Institute of Technology,
Vellore, India

Dr.J.KARTHIKEYAN is a passionate teacher, trainer and a researcher. His research interest spread across the areas of Technology assisted language teaching and learning with emphasise on MALL, LMS, Apps, e-content development and cloud labs. His research collaboration and publication are in the areas of ELT, Anxiety, Socio and Cultural impact on education and Technology in classrooms.

Associate Editors

Dr.ROY P VEETTIL
Sohar University,
Sultanate of Oman

Dr.ROY P VEETTIL is an Assistant Professor at the Faculty of Language Studies, Sohar University, Oman. He has been associated with professional organizations such as ESBB, ELTIF, ELTPN Oman and TESOL Oman. He has brought out several scholarly papers and book chapters on issues related to language teaching, literature and sociolinguistics. He has also authored a book entitled Changing Paradigms in English language Teaching. His research areas include cross-cultural pragmatics, varieties of English and language through literature. Currently, he is on the editorial board of English Language, Literature & Culture.

Dr.SENG TONG CHONG
Universiti Tenaga Nasional
(UNITEN) Malaysia

Dr.CHONG SENG TONG is a passionate teacher and a researcher who works at University Tenaga Nasional. His research interests are interdisciplinary in nature, with special emphasis on postcolonial literature and culture, Victorian ecological literature, ecocriticism, metaphor studies, trauma studies and related issues. He is also interested in philosophical readings of issues related to STEM education.

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ARTIFICIAL INTELLIGENCE IN THE HEALTHCARE INDUSTRY

ANIKET SHARMA
20BCE2641
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

According to B.J. Copeland (2020), Artificial Intelligence (AI) is basically a computer performing tasks that usually require human intelligence to carry out like facial, linguistic and handwriting recognition are a few to be mentioned. These types of processes introduce us to machine learning which can be used in search engines and in the healthcare sector. Machine learning is a very interesting topic and thus is very fascinating to know about at times. Learning in machines can be done in two broad ways. The first is 'trial and errors'. This method of machine learning can be useful as the information that the computer gains after using this, can be put to use if the same situation ever occurs in the future. It is the same as learning from your own mistakes and experiences. Another popular way of machine learning is through 'generalization', i.e. learning by someone else's experiences. This can be achieved by telling the machines the already existing information or answer to a problem which the computer will memorize and use it whenever needed. Other main aspects of AI are 'reasoning' and 'problem solving'. Reasoning involves drawing conclusions through given conditions and problem solving, as the name suggests, is known as solving a situation or problem using systematic steps and methods, a very common strategy for solving problems which is known as algorithmic approach towards problem solving. Despite all these innovative ideas, AI and machine learning still require many improvements and many discoveries are being made almost every day to meet this need. Now when we talk about AI in healthcare, we should first understand why AI required in healthcare is.

According to Wiljer, D.et.al (2019), there are different structures necessary for AI in healthcare:

1. Expert- An expert structure is required for reasoning and finding solutions to specific problems. It is used to develop an Artificial Neural Network (ANN) that is used in diagnosis of headaches and arrhythmias and is also used in predicting the outcomes of hepatitis and healing of wounds. An expert can also be used in graphing treatment plans for radiotherapy.
2. Robotic Process Automation- This structure basically is about using robots to carry out simple tasks such as barcode scanning and auto filling of prescriptions.
3. NLP applications- This structure is used in surveillance and predictions regarding outbreaks and spread of diseases by analyzing medical, media and social media data. This can also be used in automated voice recognition.
4. ML and DL- These structures re part of machine learning which is basically used to predict the future by either analyzing past data or by using patterns in the input, or by analyzing data that has been provided to it via feedback. Overall, Artificial Intelligence has the potential of completely revolutionizing the healthcare industry forever. Using facial recognition and combining it with the constant monitoring of a patient's brain activity, machines can predict a person's feelings and moods. This can make them much more user friendly and thus be much more supportive towards its patients. AI can be used for programming and designing nanotechnology which can be used for performing operations on minor tumors and cancers where human expertise cannot reach very easily. Machines can also be used in providing quick medications, like providing simple injections to their patients and by

mixing the required medicines for making cures and antidotes. The biggest issue a machine can face while treating sick patients is being child friendly. Since an adult can easily understand why a robot is treating them, but keeping a child under control, is a new challenge. Although many of the above mentioned feats of strengths still require a lot of work in the field of AI, it is not impossible. With constant efforts by medical experts and computer engineers this can be made possible. But we should always remember one thing that the need of a medical expert will always be felt, no matter how advance our computers get.

Literary Survey

Potential of Artificial Intelligence in Healthcare

As per the research done by Davenport, T. et.al (2019), machines are capable of doing many things and are sometimes better in accuracy and precision than human beings and healthcare is not an exception. Many different aspects of AI, like machine learning, are employed for different tasks in healthcare, from administrative, like maintaining and updating a patient's files and records, to diagnostics, with same or better accuracy than a human, to even performing precision surgeries. Despite being used almost everywhere in the healthcare industry, there sometimes are few issues revolving around these sophisticated systems such as, due to huge input data about medical knowledge, coming very frequently, it becomes quite difficult to update and maintain these AI's. Another issue is accuracy in detection of these systems, for example, the AI can detect whether a person is suffering from cancer or not, but will be unable to detect the type of cancer. These problems can be solved using statistical analysis methods, but that paves the way of the problem of 'Medical Ethics'. Other issues regarding machines in health care is human interaction. Chat bots are used to communicate with the patients but many times the patients fell uncomfortable in sharing information with a machine and are very concerned about their privacy. Other than that, the machines are sometimes unable to judge the human reactions a person gives when he/she is treated with different drugs. There have been many suggestions by researchers to solve these issues; one of them is non-ruled based AI, i, e, a machine which sometimes bend the rules to be in accordance to their human patients. But this is a very early stage to do anything like that and more work is required. In the administrative sector of healthcare the machines can prove to be very useful. Administrative based AI can maintain and update medical records, perform small transactions, fix appointments, manage revenue and can do many more such things that will not only save the time of the nurses on-duty but can also help the patients. Chat bots can be used regarding mental health and wellbeing. It is a well-known fact that automation will disrupt the human workflow, but not in the case of healthcare, if not, automation in healthcare will create more job opportunities. Firstly, AI is a very young idea and completely implementing it in the healthcare sector will require some more time and development. Right now the most that diagnostic AI can do is read graphs and stats. A human expert is still required. Thus it is very unlikely that AI will disturb the human workflow. Instead machines will require more human companions to learn about and develop for the healthcare sector which will open more job opportunities. The most feared thing about using an AI doctor among patients is of privacy and transparency. For that the government should implement strict rules and punishments regarding the misuse of these machines and identity theft, laws regarding facial and voice recognition. Due to constant change in medical knowledge, it has become very difficult to update and maintain these machines and systems. For that, Tech companies are collaborating with health delivery networks for AI to study huge data and make predictions more accurately. In conclusion, AI and automation has the power of revolutionizing the healthcare sector but there will be many obstacles and mistakes in the way which we will figure out soon.

Artificial Intelligence in healthcare in developing nations

As per Mahajan, A.et.al (2019), AI is a new dawn, but the precautions and preparations that a developing country like India should be doing are also very important. In healthcare AI is commonly used in radiology for detecting, diagnosing, and classifying and risk assessment of breast cancer. It is also used for quantifying and determining the severity of knee osteoarthritis, for diagnosis of stroke and lung nodule diseases. Other than that AI can also enhance productivity and improve the healthcare outcome by keeping everything well organized and tidy. This will not only save time for everyone but also will be easier to modify details. The importance of an ethical framework used by an AI is also very important with certain features like, autonomy (letting patients take their own decision that will prevent the threat on their privacy and data ownership), beneficence and non-maleficence (doing good and inflicting no harm), justice (providing fair distribution of medical goods and services), explicability (transparency) and accountability (being responsible for its actions). The Watson for Oncology (WFO) is a computing system designed to give treatment recommendations by studying data from already existing medical information. It also provides with treatment protocols and patient charts. Since the medical workforce is in a shortage especially in India, AI can be useful in satisfying that need by performing tasks like image analysis and diagnostics that will be later notified to professional physicians for prescriptions and medicines. It should be acknowledged that the opportunities AI will create like the ever increasing scope in data science that will be studied by many talented engineers of the country. Also, educational institutions are giving an early exposure to students towards the vast opportunities and fields of interest in AI. The National Institute of Transforming India (NITI) Ayog is tying up with Departments of Biotechnology of various institutions to improve the AI ecosystem in the healthcare sector in India. NITI has also collaborated with many AI companies, one of them being with Tata Memorial Center Imaging BioBank, which is working on a project on imaging biomarkers for research that can be useful in cancer treatment for a low cost in the future. The problems that a developing country faces are, lack of trained professionals and general awareness, issues regarding data privacy and security, high resource cost and accessibility to the public. In conclusion, AI is a huge resource and India, as a country, is behind in tapping the power that it holds which will not only give an AI exposure to India and help in the healthcare sector but also in many other fields and can help India to achieve world dominance due to its AI resource.

AI in healthcare during COVID-19 Pandemic

Previous studies by Efthymiou, I.et.al (2020), it was found that AI can be useful in monitoring and predicting the spread of the COVID-19 virus by keeping track of real time data, social media and media outlets. Using and combining this information it can easily predict upcoming hotspots and the pattern of the spread of the virus. These techniques can also be useful in prevention and prediction of other pandemics in the future. Artificial Neural Network (ANN) is one of the aspects of AI which is used in recreating a biological network for better understanding and analysation in the field of radiology, dermatology, etc. It can collect data and monitor patients using gadgets such as smart watches and smart clothing. AI can help in the management of patients without putting a lot of burden on healthcare workers also can be affordable to the patients. Other online tools such as chatbots can be used to explain patients the procedures and techniques of taking medicine and injections. But problems like, any error in the AI system can lead to the endangerment of the privacy of a person and many researchers believe that the AI can learn ways to achieve the desired goal without going through the desired method that may cause unintended harm to the user, may emerge. Thus, the reconsideration and double checking of the already existing information and planning all that for future use is very important,

but this method wouldn't be very easy to execute as it will require a lot of labor by data scientists and medical professionals. Thus, AI can prove to be very useful in healthcare and with recent events but there are still some problems and issues that are to be resolved.

Artificial Intelligence in healthcare in Low to Middle Income Countries (LMIC)

According to Alami, H.et.al (2020), the main aim of Artificial Intelligence is to provide healthcare facilities to the people at a low cost, like using a mobile application to determine for fever and eye defects instead of using a very expensive device for the same, and using chatbots to communicate with people in need where cultural and linguistic barriers are present. Since AI is being researched and developed in higher income countries, it becomes very likely that, when introduced, it may be discriminant towards the population of LMICs due to cultural and financial differences. After all, an error by an AI system can potentially affect a whole population. Another problem that LMICs may face is regarding ethnicity due to lack of proper governance and policies. Companies, in order to commercialize, may hamper the privacy and safety of the patients via AI based solutions. Also many LMICs may receive faulty or defective equipment which can become a huge issue in the lack of proper governance. Since AI is becoming a huge aspect in healthcare, it may lead countries to divert all its resources to install AI in healthcare which may result in improper attention to education and defense in the country. Overdependence on AI can also prove to be a huge issue, like for medical professionals to lose their medical and community skills. Also, exploitations in AI can provide private information which can be used against the vulnerable parts of the population. Despite all these issues, there are a few solutions for them, like, policies must be formed with the stakeholders, with seats for representatives of minorities and vulnerable parts of the society which can thoroughly discuss and implement rules for AI management. Local cooperation and leadership is required by the people. Precise training for handling and operating is also required. International leveled agencies should be employed for troubleshooting and keeping a check on misuse and frauds. Lastly, over dependency can be avoided by focusing on other aspects of the society and not just AI.

Determining the usefulness of chatbots through a survey

Previous studies reveled by Nadarzynski, T.et.al (2019), chatbots are a huge aspect of AI in healthcare. This is a very useful tool in providing healthcare to people with a cultural and linguistic barrier, and can imitate the conversation with a human clinician and can provide proper healthcare. In 2018 a survey was conducted regarding the use of chatbots in healthcare. The main aim of the survey was to gather feedback of people regarding chatbots used in providing healthcare. The participants were allowed to use a chatbot for about 20-30 minutes and their experiences were recorded later. The results of the survey were quite interesting. Many people considered chatbots as a revolution in the healthcare industry while many were not very ready to take advice from a computer program despite it mimicking the conversations with a human. Some participants had concerns regarding privacy and accuracy, which are the concerns of the researchers studying about chatbots. The fact should also be acknowledged that many participants were able to leave their intimacy behind and were able to talk about sexual and mental issues with a computer, which is an aspect to be explored further. There is a chance of a few errors in the survey. For example, the participants were chosen by putting up advertisements in university campus and on social media, which meant that the participants were relatively young and familiar with the computer based technology. This can prove to be a drawback as the survey must not have covered the whole population. Nevertheless, it can be said that chatbots can bring a revolution in the healthcare business but it requires some rigorous study and polishing for it to

be comfortable for humans to leave their intimacy and be open about their problems.

Artificial Intelligence in healthcare delivery

According to the study published by Reddy, S.et.al (2019), Artificial Intelligence can provide healthcare delivery with accuracy equal to or better than a human being. A few key features of AI in healthcare are, patient monitoring and assistance. AI technology can be exploited for keeping patients under observation all the time. From sleep patterns, to cardiovascular activity, to electromyography to ultrasounds, everything can be constantly monitored. Other than that, use of virtual assistants is also very common in knowing the well-being and condition of a patient. The emergence of AI has helped in the administrative part of healthcare like maintaining biometric records, filling out prescriptions and booking appointments. Robots are very widely used for taking care of elderly patients, who are much more vulnerable as they are sometimes left alone in hospitals without proper assistance. Robots can fulfill this requirement and also can guide them through unfamiliar environment. Overall, it can be said that AI can provide healthcare delivery to people in need and that too with high accuracy.

Advantages

Artificial Intelligence has many aspects in healthcare and some of the advantages of having AI in healthcare are as follows,

1. AI can be used in computer assisted surgeries which can be useful in calculating the risk and fatality percentage of a patient.
2. Simulation for spread and origination of diseases can be done using the information through the World Wide Web, social media and other media outlets with the help of AI in computers.
3. AI can also be used in for administrative purposes like collecting, sorting and updating of patient records and can also be used for storing information regarding bank details of the healthcare workers for transferring salaries and keeping track of overtime and bonuses.
4. AI can be used for virtual nursing assistances and used as chabots to communicate with a patient about any discomforts or symptoms and thus recommend prescriptions.
5. AI can be useful in detecting minor injuries or common symptoms and can provide directions to first aid or medication and can also contact the hospital if needed.
6. Photographic imaging by full body and CT scans can be analyzed by the AI which can be used for detecting tumors, broken ligaments, fractured bones and blockage in arteries or internal bleeding.
7. AI can keep track of any genetic disorders by mapping the lineage of the patient through constantly updating data as the family tree grows.
8. Detection of diseases like diabetes, dengue, malaria, typhoid and test for pregnancy and determination of blood type can be done using AI using pre-existing data.
9. AI can be used for notifying doctors and healthcare officials whenever there is an emergency.
10. When the AI is reported for an emergency, it can notify and deploy ambulances and healthcare workers on the scene without much hassle.

Conclusion

Artificial Intelligence in the Healthcare industry is a revolution and is very necessary for the evolution of technology and its application in daily life. AI has many useful aspects in healthcare and despite having some flaws; it can be corrected and can be brought to a full scale in this field. It will not only change the healthcare industry forever, but by implementing this technology in healthcare and other daily activities, can help in getting the international recognition a country like India needs, as India is a developing country and there is a lot of potential in the brilliant Indian minds which can be a vessel for this accomplishment. AI will cut costs in healthcare and thus can make it affordable for the people who were initially alienated from good healthcare services due to financial setbacks. This will not only help the people in need, but also improve the socio-economic status of the country. AI, when installed in one

sector, will fuel the development of other sectors of the country as well, such as defense, education and training and research. With this type of upgrade, it will be easy not only to understand a disease in someone's body, but also can be useful in getting to know more about the human body. This technology doesn't limitto just humans. India, containing four major biodiversity hotspots, can use this technology in helping and treating endangered wildlife found in these hotspots. Getting to know about humans, the environment and wildlife, introduces a huge scope for them to be studied by professional physiologists and environmentalists which can lead to new and interesting discoveries. As mentioned earlier, these kinds of improvements and developments can bring India on the list of technologically advanced countries, and on the map as a developed country.

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A LIFE SAVING DRONE

P. AATHIRAINATHAN
20BCE2752
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

John Villasenor (2012), Drones are unmanned aircrafts which are designed in a way that they fly autonomously without manipulation and are nowadays accompanied by artificial intelligence and Global Positioning System (GPS). Drones were previously known as Unmanned Aerial Vehicles (UAV). Drones are of various sizes, shapes and are capable of piloting with high skills. Drones brought a modern change to the field of aviation which previously had pilots in cockpits.

Nevada Institute for Autonomous Systems (2018), The usage of drones for bombing by the Europeans in the mid-1800s was traced by historians which were in the form of unmanned balloon aircrafts. The United States of America in 1917, during the First World War included drones in their military. Drones were later mainly used for surveillance during The Second World War and also for the cold war, which was followed by the Second World war. Drones were later used by Governments of various countries for border surveillance and aerial surveillance. Drones were used by industries for their rooftop surveillance and other purposes. Drones were also used to detect hazardous substances in air during mining operations. Drones can be installed with toxic fume detectors which can detect the toxic particles in air and it can protect the workers which is also a lifesaving activity. Commercial usage of drones began in 2006 and certain rules and regulations were framed for air routes. The Development of drone technology has increased in such a way that nowadays it is accessible to anyone who has commercial necessity for it. When it comes to emergency situations, health care and life support turns out to be the most important factors. Drone Technology which was initially criticized for its military purposes and target killings, turned out to be useful for life saving activities in the early 2000s.

Restas A. (2015), Drones are used for the purpose of life saving and health care mainly during disasters such as Floods, Tsunami, earthquakes, forest fires, etc. During these situations, drones provide medical care, food supplies and other supplies to remote areas and rural areas which areless accessible and thereby saving lives. Transportation of important medical equipment such as defibrillators to remote and rural areas requires the assistance of drones. Drones can also be used during nuclear accidents and also for the detection of leakage of any hazardous substances.

Literary Survey

Balasingam, M. (2017), The industry of health care has made the optimum usage of technology through the usage of drones. As mentioned earlier the prominent role of drones in life saving activities, is provision of supplies and assessments during disasters. They provide first aid kits, medicines and blood. In the case of spread of a contagious disease, drones are involved in the transportation of test kits, test samples and vaccines. In case of cardiac arrest and breathing difficulties, oxygen carriers and external defibrillators are used. Drones having image diagnosis can be used to ensure the health conditions of rural communities by telemedicine technology.

Due to these widespread applications, drones have found their significance in the field of medicine and health care in 21st century. Drones can be catapulted, hand thrown and launched from a launch pad. They can land on different terrains and can adjust with different conditions of weather and climates. They can fly vertically and can drop supplies from a very low height.

Other than aerial drones, recently ground based drones have also been developed and they have been

installed with artificial intelligence to provide assistance to human activities on the ground.

Drones can be cost effective than the normal mode of transportation in difficult terrains. The mobility of elderly people can be assisted with the help of robot-like drones. Current research being made on drones is to make the drones understand the psychology of people who see it and to respond to them accordingly.

Konert, A.et.al.,(2019) The most important role of drones is provision of air transport for freight and nowadays even for passengers. They extensively support rescue operations. Drones can be used to save drowning people during times like floods. They can analyze the level of damages made. They can be used to monitor larger gatherings. In an analysis, Red Blood Corpuscles and certain platelet 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 after 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 Atrax M was used 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. This drone contained ECG monitors, glucometers and defibrillators. The previous shown instances and technological advancements made drones worthier for its usage.

Mayer.S,et.al., 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, radioactivity 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 challenges 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 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 larger 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 emergency situations. Drones can provide important medications like antidotes for a snake bite or a dog or animal bite. Organ transport needs to be very fast and it can be achieved with the help of 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 their 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 rescue made by conventional methods. Drones are relatively cost effective than normal road transport in difficult terrains. Vaccine availability could be increased and it can decrease the costs. Drones can fly very close to the earth and can provide clear images without cloud contamination. Drones can be operated in different terrains such as mountains, deserts, oceans and also in snow covered regions. Usage of drones requires 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. Dueto 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 systems and zooming lenses for tracking lost people in forests. Without the assistance of drones, it would have not been able to track a Scottish climber, who was lost in Mount Godwin-Austen, which is the Second largest mountain in the world. The second benefit is provided by 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 purposes as indicated earlier. Highly Efficient Drones can also provide cellular networks in the aftermath of a natural disaster. Fifth 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 happening. The fifth benefit is that drones can 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 arena. Any operation 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. Earthquakes are usually unannounced disasters 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 done by 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 a 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 hotspot regions 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.

Limitations

1. **Human inefficiency**- Highly trained and equipped staff with continuous ground monitoring are required in order to avoid human errors while operating drones.
2. **Proper Infrastructure**- Proper infrastructure like a runway for take-off becomes highly essential when the capacity of a drone is increased.
3. **Transport**- Drones cannot be used to transport heavy payloads and goods especially over long distances.
4. **Safety and efficiency**- The safety and efficiency of any aircraft is not always ensured and it is the same in the case of drones. Drones have the chance of being hacked and manipulated. The speed of the drones is also limited.
5. **Environmental tolerance**- The ability of drones to escape sudden environmental conditions like turbulence, change in wind speed is always not ensured.
6. **Preservation of Biological Substances**- In most of the cases, biological samples transported are fragile. Hence proper packing and a smooth transit is absolutely essential to prevent tampering of the substance.
7. **Electromagnetic Interference**- Electromagnetic Interference has caused signal distortion, while monitoring the drones.
8. **Accidents** - Drones can interfere with air traffic and cause air accidents.
9. **Damage to properties and lives**- Mishandling of drones can damage and affect lives and can cause huge devastation to their properties.
10. **Battery**- Drones use lithium polymer technology and are at times associated with fire risks, but nowadays they are powered with solar batteries.

Conclusion

Drone Technology has a great future in the field of public health care. They can be widely used to transport blood, vaccines and other biological components to remote and rural regions in developing countries such as India, Brazil, Colombia, Philippines, Indonesia, etc. They can be used on a larger scale to save lives during disasters. Though they have their limitations, the future technological advancement will make them overcome these limitations. Construction of Drone ports can be done near health care facilities for making an efficient transition. More research and studies are necessary on drone safety, accidents, their causes and the necessary prevention.

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IMPACT OF DRONE TECHNOLOGY ON HUMAN LIFE

ANANYA SINGHAL
20BCI0273
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Margaret Rouse, et.al. (2019), A drone is an Unmanned Aerial Vehicle which can be remotely controlled or can fly autonomously through software-controlled flight plans which are embedded in their systems. Drones usually consist of a power source, propellers, rotors and a frame made up of composite and lightweight material. This light weight material is used to increase manoeuvr ability of this unmanned aircraft. Now-a-days drones contain technological components like Global Positioning System (GPS) modules, antenna, receiver, cameras and various sensors to increase its compatibility in every field.

Kashyap Vyas (2020), Some say the very first drone was used in 1849 when Austria attacked Venice, Italy. They used drones which were in the form of unmanned balloon aircrafts. Each balloon containing 11kg to 14kg of bombs in them. Since then drones have gained their importance in the field of military technologies. The first unmanned aircraft was developed in 1916 during World War I and was called 'Ruston Proctor Aerial Target'. In 1930's many countries experimented on this unmanned remote-controlled aircraft and succeeded. During World War II Germany built first ever cruise missile fit with pulsejets. Then came the idea of development of commercial drones. FAA issued first commercial drone permit in the year 2006. Since then, the idea of drones has changed profoundly, these unmanned aerial vehicles are being used in various fields today.

Kardasz P, et.al. (2016), Based on the movement system and control system the types of drone and their usage may vary. Unmanned units are the best to patrol large areas therefore they can be used on a small scale, i.e., to protect one's property or on large scale, i.e., for aerial surveillance of state's borders.

They can also be used to capture aerial photographs for geodesy or to study archaeology. The drones equipped with thermal and night vision cameras can also be used for rescue operations. Today these UAVs can used for varied purposes by many industries some of which can be listed as follows: Fire department- UAVs can support visual actions of fighting against floods, forest fires and road, rail or air disasters. They can track and monitor the sources of pollution, Thermal imaging and detection of fire sources can also be done quite easily. Police: UAVs can be used to patrol a designated area, obtain evidences for a case, for traffic congestion documentation and can be used to operate and monitor mass events. Border Security: Monitoring the border areas, tracking any usual activities, conducting shares of intelligence and for border air traffic control drones have proved to be helpful. Business: UAVs are used for Advertising, for shooting films and for delivering shipments.

There are a lot of emergencies that we can face in our day-to-day life. It can be a threat to our life due to Cardiac Arrest, low blood sugar levels etc. which may require immediate medical assistance or some natural disaster like landslide, hurricane, forest fire, earthquake etc. It can be tension at the state's borders or people facing harassment at a public place. Drones can be used to monitor such unknown disasters/emergencies in order to help save humankind. Drones can also be used to transport medicines, food and other supplies during a disaster/calamity in remote locations and hard to access terrains.

Literary Survey

Bill Read (2017), As listed earlier Drones are being used for many purposes these days. Many drones are being used by firefighters and research squads for search operations in difficult to access areas providing them a clear idea of the danger without exposing them to it. Drones help locate missing people quickly using thermal imaging sensors. These drones are then used to provide food supplies, water and medicines. According to a report drones helped save 59 lives in different countries during search operations. These examples include people caught in floodwaters or lost in fields, mountains, rivers, swaps or snow banks. Today many disaster relief organisations are recognising the importance of drones. Just because these UAVs are easy to deploy, cheap to operate and can get closer to people who need help drones are being used to assist with maritime rescue and search operations in UAE. Drones are also being used for road traffic accident investigation by many countries.

Gravoc Community (2018), The health care industry is making the best use of Drone Technology. Drones are being used to supply a range of medical products including Blood Transfusion supplies, Medications, Health kits and other medical equipment to many clinics. World's first rescue mission took place on January 18th 2018 in Australia where the 'Little Ripper UAV' dropped a rescue pod to two swimmers who were caught in a 10-foot swell which was half mile away from the patrolled beach area. It them just over a minute to rescue the swimmers which usually took an average of six to seven minutes. This drone technology was a part of $344,000 investment project made by the New South Wales Government. Similarly, drones are being used to provide supplies to physicians in remote areas via telemedicine system developed in 2013. Because of this they are being able to treat multiple victims who may otherwise go without care due the location they are living in. Keeping in mind the fact that drones can have a remarkable use. They can cover any part of the land be it a high-altitude region or low-lying areas, Hilly terrains or Deserts which makes these Unmanned Aerial Vehicles even more efficient.

Anna Konert, et.al. (2019),Drones can be used to transport goods on demand, can monitor places with large human gatherings, execute rescue operations, can perform agricultural activities and can also be used for air transportation of various goods. However, there are certain regulations made regarding the usage of these unmanned aerial vehicles which are followed worldwide. Drones are widely used for air transportation by military and civil emergencies due to the lack of restrictions a ground vehicle would face, its ability to reach distant and inaccessible places in a short interval of time and also because to its speed of action. These can also be used in cloudy conditions because of their low flight altitudes which would be difficult with normal helicopters. Drones were first used as a means of transport in 2015 when life jackets were delivered to people trapped on rocks in the middle of a river in the state of Maine. Now the water rescue services in Iran and Chile are equipped with drones which have life belts, and audio-video tools so that the person to be rescued can be contacted easily. First commercial use of drone was made in Germany by company named 'Micro Drones' in order to transport lifesaving drugs from one part of the country to another. Today drones are available for civil use as well, anyone can purchase a drone with a flight range of 5-7 kilometres, up to a hundred meters above the ground or even more. But this mode of transport has certain restrictions such as the adverse weather conditions, the load of material to be transported and much higher costs as compared to other means.

Amit Thokal (2019), Minimising hazards is the top priority for any Industry. So is in the case of mining. Drones can help minimising risk by supervising activities in the areas of high risk such as inspecting coal stockpiles, mining blocks, storage tankers which have inherent respiratory risks. Drones can become an indispensable part of the mining industry as they can be used for much more than just aerial surveillances. Apart from the inspection that would take just quarter the time required for manual

inspections done by humans drones equipped with thermal sensors and high quality cameras can be programmed to follow an automated flight path so that it doesn't require someone to control it. In case, it spots any error or anomaly it can alert the workers present at the site. This inspection can be done multiple times in order to reduce risks of any safety disaster or hazard. Some unregulated and aggressive mining operations have caused some irreversible abnormalities in the environment such as water contamination, deforestation, loss of human life, air pollution etc. in order to reach dangerous grounds for mining. Drones can help in executing such operations easily without causing much damage to environment and human lives by detailed analysis of the place and proximity reports with which properly planned mining operations can be executed that too without involving much of human casualties.

Nina Strochlic (2017), Drones today are used for various civil activities. The aid and service organisations are using these Unmanned Aerial Vehicles (UAV's) to perform dangerous humanitarian and conservation tasks at the places which are hard to reach. These drones are being used to track people and bring cell phone network in remote areas. Amazon used a drone in 2017 to perform an Aerial Delivery of someone's order in San Francisco for the first time ever. UNICEF has experimented sending drones to analyse the damage caused during flash floods and Transport HIV blood tests to laboratories in Africa. These drones are also being used for WWF's wildlife crime Technology Project in order to help rangers spot poachers and know where they are hiding and whether they are armed or not. Scientists at Liverpool John Moores University in United Kingdom have planned to use drones in order to document World's Wildlife. These drones would record a footage of animal species found which would be run through a detection software in order to check if any new species that hasn't been found yet exists. Drones equipped which high resolution cameras will be way cheaper and less dangerous than any other means they can adopt. Drones in Mongolia are being used to ensure World's largest Vulture species is safe and healthy. In 2013 a student from Stanford university created a drone to monitor climate change impact on the coral reefs mapped using the same drone in of Islands.

Benjamin Powers (2018), Drone technology has proved to be beneficial in six ways. The first one includes the rescue operations that can be executed on snowy slopes. Drones equipped with infrared cameras and high-quality zooming lenses are used to track the lost adventurers. As in the case of a Scottish climber who went missing on the second highest mountain in the world "The Himalayas' Mount Godwin-Austen" would not have been found without the assistance of the Drone. The second benefit is Drone Ambulances. In Papua New Guinea drones are being used by the organisation called 'DOCTORS WITHOUT BORDERS' in order to transport test samples from remote villages. These UAV's can carry objects weighing five pounds to locations about 30 minutes away. Third benefit of Drones include aiding in critical ways after occurrence of a Natural Disaster. Drones can be used to analyse the damage caused and restore energy of the place affected. Verizon tested a Highly efficient Drone which could provide cellular service to the areas that lost coverage due the occurrence of the disaster. The fourth Benefit of the drone is fighting Cardiac Arrest. A study says only 10 of 100 people who suffer Cardiac Arrest are able to survive just because paramedics cannot get to them in time. A research was carried out in Canada were Drones were able to deliver the necessary care to victims over 10 minutes faster than usual. Drones are also being developed with Automatic External Defibrillators, Camera and a microphone in order to instruct people nearby on what to do before the paramedics reach to the victim. The fifth benefit of the drone includes Car Crash Surveillance. Drones are being used to analyse any area just after the crash and capture aerial photographs which can help in recreating what might have happened. The sixth golden benefit of drone includes Fighting with diseases. Mosquitoes are the major carrier of diseases. The United Nations Agency have made a drone which releases sterile

mosquitoes which help to supress deadly viruses. Doing so helps warn experts about spreading of deadly diseases like Dengue fever, Zika etc. before they turn to an epidemic.

Advantages

1. Unmanned aerial vehicles are easier to deploy and control even with a relatively minimal technical background.
2. Drones are affordable and can prove to be cheaper when compared to the amount that would be spent on workforces, vehicles and operation activities in commercial uses.
3. Drones can be used for safety and police surveillance.
4. Drones can be used at complicated sites like oil and gas extraction plants, mining sites etc. to minimise the dangers/risk to human life.
5. Drones with high resolution cameras can be used for aerial imaging in order to accumulate large volumes of accurate data.
6. Drones with appropriate GPS in their software can be used in agricultural field to perform various farming obligations like monitoring crop damage and crop health, spraying pesticides, Irrigation monitoring etc. This will help save time and expense of the farmers.
7. Drones can be used to monitor traffic on the roads and report the police headquarters immediately at the time of any accident so that quick action can be taken.
8. Drones can be used for aerial deliveries of parcels.
9. UAV's can be used to perform dangerous humanitarian and conservation tasks at the places which are hard to reach.
10. These unmanned aerial vehicles can also be used for wildlife documentation.

Conclusion

Unmanned Aerial Vehicles have both its pros and cons. This technology is being used from a very long time and has evolved a lot since. From being used in war and for military purposes only. Drones are now being used for personal and commercial purposes as well. Today, Drones with High Resolution Cameras, Global Positioning System, Thermal Imaging features and various other sensors are being used indifferent fields like in health care industry for transporting medicines and first aid kits, for delivering parcels, monitoring mining sites, aerial imaging, exploring hard to reach areas, for life saving activities etc. These drones have proved to be a great asset for human life. In a vast country like India, drones can be put to use in agricultural field for monitoring crop health and spraying pesticides, can be used for mining, for monitoring traffic, by military for border patrolling, to supply basic medication to people in villages and for disaster management. People are now working towards improving the functioning of these unmanned aircrafts so that its use can be expanded further.

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HOW DRONE TECHNOLOGY HELPS IN LIFE SAVING ACTIVITIES

ABEL JOSHY PAYYAPPILLY
20BDS0114
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Anna Konert, (2019).Drones, can also be known as Unmanned Aerial Vehicles or UAV's. They can be small or big, depending on what task it is made to do. They can be remotely controlled by humans or maybe controlled by radio waves or they can run on their own specific AI. Drones are made up of complex electronical parts such as sensors, actuators (which controls speed of the motor) and other parts such as motors and cameras. Drones were invented almost at the same time aircrafts were being used in the military and they played a huge role in World War 2 and had a small role is World War 1 as well.

Canis, B. (2015). They can help us navigate through extreme conditions, help in analyzing a huge area by giving a bird's eye view or simply help us do our day-to-day activities like bringing home groceries from the supermarket. They were originally made the for military so that combats could be fought without sacrificing the precious lives of soldiers but drones are now being used for many other things. The use of drones has drastically changed in the recent years. In the beginning they were only used in the military. Now, since drones are being commercially produced, they are being used for photography, transportation of things and sometimes just used for leisurely activities by people who can afford them.

Van de Voorde et. al, (2017). Us humans evolve at a very fast pace, especially in this age of technology. This means that we will have to encounter more and more problems in our daily life and sometimes even face an emergency once in a while. Let's take a simple example. Imagine someone skiing and all of a sudden, an avalanche occurs. By the time medical officials reach the place and find the person, he or she is most likely going to be at a more severe condition than if a drone was alerted to be deployed and could locate the person via a scan of the area. Another example could be if someone who lived in the 30th floor of an apartment had a heart attack. Waiting for an ambulance to come to the 30th floor would itself would be very time consuming and could put the person's life in even more jeopardy than it already is. Drones could save us from this hassle and could help people in many other instances than this as well. Similarly, for many other emergency situations, drones can prove to be extremely useful to humans and more efficient than humans in the same situation.

Literary Survey

Amukele et.al, (2017). AtraxMis a drone designed by the Polish Air Force Institute of Technology and it was designed to help in rescue operations and air transport. This drone can easily identify the place of the accident, the number of victims and the scale of how bad the accident may have been before medical emergency services arrive. This information provided by the drone can be helpful to the medical officers who arrive at the scene. The drone also has replaceable trays containing first aid kits and basic dressing material which could be vital for saving the life of the victim(s). They are also coming up with a new drone which can help in defibrillation during a cardiac arrest and to transport containers with an oxygen concentrator or nebulizer for quick diagnosis in situations of respiratory failure and to transport ECG, glucometers etc. Similarly, all other countries should also adopt such methods so that lives of innocent people can be saved more efficiently. Drones can also be very useful for people affected during natural disasters like floods, tsunamis etc and

help locate people who may be trapped and can provide food for these people till the situation gets better. This can be done by airdropping essential needs of the trapped people till they get rescued. But deploying drones is just the easy part of the whole process. The hard part is to make these drones and that depends on how much money the government of the particular country is willing to spend.

Tanzi T et.al, (2014). Buildings collapsing out of nowhere is not common in big cities. Especially during natural disasters like an earthquake or cyclone, people may be trapped inside buildings and houses. Drones can help us in this situation by giving us an environment identification analysis. By this identification analysis, drones can autonomously navigate inside or outside buildings which have collapsed by navigating through GPS points. But this is not very feasible because of the presence of many obstacles on the way may be sources of collisions with the drone and may damage it. Therefore, proper programming of the drone is necessary for such situations. A high-definition camera can be attached to the drone to get visual data from the collapse and to understand the situation but because of the power consumption and weight limitation of drones, a lot of sensors and cameras cannot be put on the drone and therefore extremely accurate data may not be obtained. Another problem faced by the drone, is of the construction of the physical environment in 3D and to navigate according to that new reconstruction given to the drone. Two ways which this is done 1 is to have a dense 3D scan of the environment and navigate through the environment by reconstructing the surroundings into 3D a lot of other factors like battery of the drone range and clarity of the camera all depends on various other factors like the speed on how much it moves etc.

Aydin B et.al, (2019). ions. In case of a forest fire, the time there is to supress the fire is very less. It can cause a lot of burden to us which may constitute economic, environmental and social losses. In order to decrease these fire burdens, currently drones are being used by fire departments of many countries around the world. They are used in search and rescue operations and for situational awareness done by monitoring (by finding out a potential fire), detection and triggering of an alarm of some kind in order to alert the related personal, diagnosis and determination of the location of the fire and tracking its progress and also helps to predict if and where future fires can occur. These UAV's are way more effective than traditional sensing technologies, ground based systems and satellite-based systems. The images that are produced from satellites are not good enough to create proper effective fire fighting missions because of bad resolution and ineffectiveness in populated areas. More the fire fighters have access to higher quality information with regards to fire behaviour, the easier and more effective they can be in putting the fire out and this could be achieved by autonomous drones flying around the area and sending the live visuals to the fire fighters. These drones can also navigate through low light and thick smoke or fog by the help of the sensors and HD cameras. Making these drones such that it can withstand extremely hot conditions imposes a problem as then the drone may become heavier and may require reconfiguration.

Scalea J.R et.al, (2019). The demand for organ donors has been increasing but people who require these organs are hesitant to buy them because it involves a lot of expenses, out of which the biggest expense is transportation of the organ from the donor to the patient. Many of the deceased donor organs could be transplanted if organ drones were implemented. Many of the donor organs are thrown away because it arrives late and is of no use. But there are many hurdles to overcome if we need to use drones for organ transportation. First and foremost is speed of the drone. Drones can be made to fly from hospital to hospital but if a drone was to travel at aeroplane speeds then the organ will reach the patient in the stipulated time but the organ may be damaged due to forces and vibrations it may have experienced when it was being transported. But the study shows that a drone carrying a kidney was tested by making it travel at 30 to 42 miles per hour speeds for around 3 miles. The biopsy of the kidney was taken before

and after the test. Result showed that no major damage was to be seen. Secondly, laws do not let drones travel beyond the line of sight but this will probably change soon. The only way we can make drone organ transport a legal and commercial method is if a coordinated effort is taken by transplant stakeholders, entrepreneurs and policy makers of the country.

Altawy R et.al, (2016). Currently the use of civilian drones is being exploited by hobbyists for recreational purposes. But big companies like Apple, Google and Amazon have tested these drones for the delivery of goods and services. These drones can carry out these deliveries faster and more delicately than a normal human would. This means that in the near future, drones will take over the shipping and courier services and will make it more efficient. But these drones will only be able to take deliveries of up to a certain weight limit. So, drones can be best used if the deliveries are for things like books, groceries and clothes but it shouldn't be used for things like heavy refrigerators, washing machines, etc because if these are accidently dropped then it could damage the whole thing and it will end up in us losing money as well as time. Another innovative thing to use drones for is to provide us with newspapers in the morning. Usually, the paper boy will have to wake up early in the morning and start going to others houses to distribute the paper but if drones take up this job, then we will receive our paper every day without fail at a particular fixed time also. Other factors like health of the boy, weather, etc, all are involved when we talk about the newspaper boy whereas when we talk about the drone, the only factor that needs to be looked into is how many papers it can distribute in a single flight. From this alone we can see how much drones can be of help to us.

Ling G, (2019). The most critical aspect of healthcare is how long it takes for it to reach the patient. Faster the better. Even all Armies around the world follow the “golden hour” principle which says that sooner a trauma patient reaches medical care, especially if is within a span of 60 minutes or less, the patient will have a higher chance of surviving. Medical drones have this lifesaving ability to transport vaccines, medicines, blood, lab tests etc over long distances and even to places which are hard to reach remote areas. Particularly nowadays most of the accidents on the road which happen will lead to death because the patient will lose a lot of blood and by the time an ambulance reaches the scene and takes them to the hospital, it’ll already be too late. Bringing in blood using road transport will be very hard due to the amount of poor road conditions and especially if it is during the monsoon season, it is downright impossible. Drones can help in these situations by bringing in blood of the same blood group from a nearby hospital and the blood transfusion can happen faster and may help to save the patient’s life. These medical drones can also help in bringing blood in for malaria patients, anaemia patients and for all other patients who suffer from other chronic blood related issues. Even in a country with well over a billion people, there still exists a lack of blood for transfusion. We should donate our blood once in a while so that it may help someone else in the future and may even save his\her life.

Advantages

1. Drones are able to scan more area and understand the severity of a problem quicker and more efficiently than if a human were to do the same. They can also store all the acquired data and they can provide this data for reference in the future.
2. Drones will provide all details of an incident with video proof. This is much more reliable in case of a conflict or problem rather than asking witnesses of what happened as there might be mixed opinions and answers and will end up confusing everyone.
3. Drones only have an initial cost and almost no money is required there on after to operate it. So, we can say that using drones would be cheaper than hiring a human for the same job given that the job is doable by a drone.
4. Drones will feel no fatigue nor will it feel tired after being used for long periods of time without a

break whereas if a human were to do the same, they will feel very uncomfortable and might give up after sometime. Drones will feel completely refreshed after its battery is recharged.

5. In case of situations like forest fires, tsunamis or other natural disasters, drones can give us a clear view of what is happening live and can conduct rescue operations instantly without compromising the life of another person, i.e., rescuer. This way people, animals, birds etc can be saved while minimising the health risks and dangers for humans.
6. Drones will always listen to the controller or will at least do the right thing at the right time as per the instructions given by the controller. Drones cannot think for themselves and they do not take its own decisions. This way, drones do not make any accidental mistakes by itself when doing a procedure given to it, unless it's a human made error by the controller.
7. Drones can be deployed at our command and do not need any prior notice before doing so. This is very useful in case of a sudden emergency.
8. Drones can reach its desired destination faster than a normal ambulance because drones don't have any traffic its way. It is reported that only 10% of people who face sudden cardiac arrest survive and the main reason is that paramedics don't arrive on time. Using drones can improve this percentage drastically.
9. Drones can be very useful for disease control. Best example is the transport of vaccines and medicines to disease plagued areas. This allows medicines and vaccines to reach its destination without any risk of other humans getting infected with the disease in the process. This can reduce the further spread of the disease.
10. Drones are now capable of capturing oceanic and atmospheric data and can predict the weather and the oceanic activities very accurately. This will help in accurately predicting life threatening events like tsunamis, tornados or cyclones before they occur and can prevent people's lives from getting into jeopardy.

Conclusion

Drones will become an integral part of our lives in the future whether we like it or not. For a country like India, using drones in fields like the military, agriculture, medicine, transportation etc can greatly improve the growth, development and economy of the country. Drones will also enable humans to reach new heights in fields like earth exploration, photography, videography, etc. In order to do this, the government must first take proper initiative and start funding more into the drone industry. Common men and women can also benefit a lot by drones. If drones can used in transporting paramedics instead of the typical ambulance in India, almost double or more than double the number of casualties, especially sudden cardiac arrests, car accidents, bike accidents, can be saved. This is because of the traffic in India, mainly in metro cities. Drones will also enable growth and development of rural villages in India and will make almost everything more accessible to them. But the usage of drones needs highly skilled controllers and not many people are very skilled in this area. With proper training, almost anyone will be able to use drones. The biggest problem is the cost. If commercialisation of drones needs to happen, the cost of the manufacture of drones must come down drastically. Drones also require very complicated software, hardware and programming. There still needs to be more advancements in making the cost of drones decrease as well as making drones more user friendly such that everyone can use it, before drones can be made commercially available. If these advancements can be made, then drones will open new paths which we humans never knew was possible.

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EMPLOYMENT OF DRONES IN MEDICAL, EMERGENCY AND RELIEF SETTINGS

ANANYA ELIZABETH GEORGE
20BDS0116
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Poljak, M., & Šterbenc, A. (2020) Drones are unmanned aerial vehicles. They get their names from the humming noise produced by male bees or drones, similar to the sound that one of the first drones, *Fairy Queen*, made. They are capable of carrying payloads and may be autonomous or controlled remotely, without the need for on-board pilots. Initially, they were solely used by the military, but now they are becoming more widespread, from package delivery to photography, to map terrains and to track storms. In our day-to-day lives, we face a plethora of emergencies, from a fall down the stairs to fires in buildings, accidents on the road and power outages. Children slip and fall into swimming pools and especially now, the coronavirus is spreading like wildfire. The integration of drones and remote technology in emergency response could be paramount to improving response times and saving lives. Balasingam, M. (2017) Drones are of various kinds, ranging from insect-sized to drones of considerable wingspan, drones that fly to robotic, AI-equipped drones that operate on the ground. Drones have the advantage of being capable of taking off and landing in a variety of environmental conditions and on different kinds of terrains. They are capable of vertical flight and hovering and this allows them to hover, drop off packages and land in tiny spaces. Recently, in fields outside of healthcare, they've been used to assess the destruction in disaster struck areas, to monitor traffic, to make maps and deliver packages. In healthcare, they're used for a variety of purposes, like transporting blood samples, vaccines and organs efficiently, they're used to deliver medicines, testing kits and aid packages to remote locations, some are equipped with defibrillators and necessary equipment for bystanders to act as first responders with instruction via video conferencing from healthcare officials, reducing response time and increasing the likelihood that the patient will survive. They have even been used to transport organs. Outside of emergency healthcare, drones can be used to care for the elderly, fetching their medication, ensuring that their meals reach them, helping them navigate and performing chores about the house. Scalea, J. R. et.al. (2019) Despite advancements in science and technology, two major elements of organ transplants act as barriers that reduce access to transplants: geography and transport. Cold ischemia time is the time between when the organ is chilled and cut off from its blood supply and its blood supply is restored and is warmed up. Regular transportation makes use of commercial airplanes and couriers which increases delays, in turn increasing CIT which is detrimental to transplants. With kidneys, increased travel time increases delayed graft function (DGF). This increases the chances of rejection while the chances of graft survival decrease considerably. It was found, that compared with drone travel, the organ experienced more vibrations when transported by a fixed-wing aircraft, primarily during take-off and landing. We can also consider the possibility of having drones travel directly between hospitals, while doing so with airplanes and large aircraft is unfeasible. It is highly possible that by implementing drone transportation for organs, the number of transplants will increase, as the number of organs rendered decrepit post transportation, decrease.

The implementation of drone technology can thus, drastically improve the healthcare system, by reducing deaths, making the life-saving process more

efficient, thus allowing for better care and by improving accessibility to ensure that no lives are lost due to lack of infrastructure. Dukowitz, Zacc (2019) Drones are increasingly being used to aid in search and rescue operations. In January 2019, a 60 year old hiker in Utah, who was trapped on a ledge. Rescue teams used drones to light the area up. Around the same time, an 88 year old man in Texas who had gone missing, was found by a drone. Drones were used to find people trapped on a mountainside in Iceland and find the victim of a car accident after he'd been thrown out of his car, in the UK. Even outside the realm of healthcare, the use of drone technology can be the difference between a life saved and one lost.

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Employment of drones in medicine

Balasingam, M. (2017) Drones boast many advantages with their ability to hover, take-off and land in tiny areas and their capacity for virtual flight. Equipped with artificial intelligence technology, ground-based drones are also becoming increasingly useful. Currently applications of drones include assessment of damages after natural disasters due to their ability to span gruelling terrains without risking human lives, delivery of aid packages to disaster-afflicted areas like Haiti after the 2010 earthquake, the northeast United States, Canada and the Carribean after 2012's Hurricane Sandy, the Vanuatu islands after the category five cyclone Pam in 2015 and Nepal after the 2015 earthquake. Doctors Without Borders use drones to transport dummy tuberculosis test samples from a remote location in Papa New Guinea. Drones delivered HIV testing kits to Malawi, enabling quicker testing of infants. NASA tested drone usage for delivery of medical supplies to a clinic in rural Virginia, while in Rwanda, drones were used to deliver blood to remote regions and critical access hospitals, within 30 minutes. The drones made use of the Global Positioning System (GPS) and Rwanda's cellular network to navigate. Potential applications of drones include intra-hospital deliveries, geriatric care with special thought given to adaptability to a lifestyle with drones, delivery of automated external defibrillators to reduce response time in cardiac arrests and use of drones equipped with sensors, infrared devices and the capacity for telemedicine. Google was granted a patent involving the development of a system, by means of which drones could be deployed in response to emergencies with just the touch of a button. Limitations are put in place to ensure the safety, security and privacy of people. Regulatory authorities have oversight of technical, safety, security and administrative issues regarding aviation. Drones need to meet the requirements that these regulatory authorities specify in these areas. Future innovations include the capacity for ultrasound imaging and telemedicine. Drones have the potential to transform healthcare in the 21st century.

Effect of deployment of drones on organ transplants

Scalea, J. R. et.al. (2019) While improvements in technology have directly effectuated better transplant outcomes, geographic barriers and the actual transportation of the organ continue to hinder the process. To get from one place to another, in most cases, the organ must change hands multiple times. This adds time to the journey which is detrimental to the survival of the organ and the patient it was bound for. With the new KAS, access to kidneys for transplants has increased tremendously. However, the distance that the kidney must travel to meet the patient has also increased as less local and increased inter-regional sharing takes place. The authors of the paper used new technology to track the condition and location of the organ during the flight. They performed various tests, like accelerating the drone, making it hover and flying them over short distances. Biopsies were taken before and after which revealed no damage due to external forces. These findings were compared with those of fixed-wing flight where it was revealed that primarily during take-off and landing, the organ endures more vibration as compared to drone travel. If drone travel were

implemented the number of kidneys being transplanted could increase. In the United States, approximately 20% of kidneys are discarded. Reduced travel time could reduce CIT and increase survival rates of the kidney. The same could be applied to other organs. Speed and federal regulations are obstacles that must be overcome before drones can take over organ transportation. Development of a faster drone capable of carrying an organ to the recipient hospital safely will be necessary.

Impact of implementation of drone technology in Africa and the future of drone usage around the world

Washington, A. N. (2018) Africa, having less stringent regulations about the usage of drones has seen great integration of drone technology into various activities, including archaeology and agriculture. They are used to provide aid in the form of food, water, medicine and other supplies to remote, otherwise inaccessible regions. In Rwanda, blood was delivered, on demand, to areas where traditional medical supply lines couldn't reach. Orders were placed using the internet, phone calls, text messages and WhatsApp, following which delivery took place via drones with parachutes attached to the payload. More than 5,500 units of blood were delivered, aid was provided to over 5 million people and deaths due to anaemia following malaria and due to blood loss during childbirth were greatly reduced. HIV testing kits, TB tests, condoms, birth control, medical supplies, blood and DNA samples were delivered to rural areas of Malawi, Ghana and Madagascar, improving the quality of healthcare and living considerably for the inhabitants of those areas, women in particular. Drones were used to determine where the cholera hotspots were in Lilongwe, the capital of Malawi. Sleeping sickness is transmitted by the Tsete fly in Ethiopia. Drones were used to release sterile Tsete flies into particular regions on a weekly basis in hopes that sterile flies would mate with non-sterile flies to create more sterile flies, with the end result being the eradication of the species. Drives were used to aid genocide prevention, as part of the Sentinel Project. Here, drones were used to provide an estimate for when and where the next attack might occur, reduce the risk of incident and help communities get through them. They were also used to pinpoint the location at which atrocities were taking place, chronicle the ongoing ones and provide prior warnings to enhance response times to the incoming transgressions. Outside Africa, drones are used to assess damages incurred, to provide aid and to accelerate search and rescue operations in disaster-struck areas. Switzerland has an autonomous drone network used to deliver medical supplies in a variety of cities. Sweden has drones equipped with automated external defibrillators, which reduced response time in attending to cardiac arrest patients in rural areas, as compared to ground response teams. There is talk about using drones to help prevent and act in response to mass shootings in the U.S. The future of drone usage depends on the government decided regulatory framework put into place, engagement of the community, partnerships with companies to drive innovation, planning for repairs, maintenance and backups to ensure that the system doesn't collapse and implementation of the best practices with regards to usage of drones. There should also be a system put in place to ensure that the implementation of this technology is not a free pass for the government to neglect the crumbling infrastructure of ground transport.

Drones used in clinical microbiology and infectious disease

Poljak, M., Šterbenc, A. (2020). Drones are used for transportation of biological samples. Transport at room temperature or cooler had no significant influence on the results of various analyses performed on the samples. Strict control of the environment that the samples are in during the transport must be implemented. Performing flipping manoeuvres to gently mix blood samples is invaluable ensure proper separation of plasma for testing. The effect of fixed-wing drone transport on

microbiological samples was studied, taking time-to-growth and the number of colonies and their morphology, to be some of the factors compared between stationary and flown samples. In 2017, Switzerland allowed autonomous drones to fly over cities at any time, for healthcare purposes. A medical transport network was developed using quadcopter drones, with more than 3,000 successful flights. In 2016, UNICEF, in collaboration with the Government of Malawi, ran a test programme to assess the cost-effectiveness as compared to time reduced to obtain results for HIV testing in infants. Drones in Papa New Guinea were used to transport sputum samples from remote locations with little to no road access due to rains. In addition to transport of samples, drones have been used to deliver aid packages to disaster afflicted regions. Rwanda made use of battery-powered fixed-wing drones capable of making 1.5km round trips and carrying 1.5kgs of blood to deliver blood on demand. The orders were placed via text message. Delivery times went from 4 hours to 15-45 minutes, and as of August 2019, more than 18,000 flights had occurred. Tanzania implemented a successful drone transportation programme, with delivery of blood, vaccines, antiretroviral drugs and malaria drugs using biodegradable parachutes. Gavi, the Vaccine Alliance, announced the launch of drone delivery of blood, medicines and vaccines to upto 2000 health facilities across Ghana, in April 2019. In Vanuatu, an area accessible only via 'banana boats', where the lack of electricity means that vaccines cannot be stored properly, drones were used to deliver vaccines to three islands in 2018. For organ transportation, use of drones to make the journey quicker and more efficient, could reduce cold ischemia time, improving transplant outcomes. April 2019 saw a donated kidney be delivered by drone and then transplanted successfully at the University of Maryland Medical Centre. The use of automated external defibrillators to treat out-of-hospital cardiac arrests has improved bystander defibrillation rates. The concept of a lab-on-a-drone has been presented to overcome poor infrastructure and accelerate diagnosis and treatment time. A lab-on-a-drone would contain both the equipment necessary to prepare samples and to analyse them. It can be manufactured at a reasonable price and the on-board procedures were shown to be insensitive to tilts, thus enabling these drones to function in poor weather and perform manoeuvres as needed. There is vast potential for the use of drones in surveillance of vector-borne infectious diseases. Once equipped with sensors and AI, thanks to their scaling capacities, they can provide georeferenced data on temperature, salinity, vegetation and so on, and may one day, replace satellites. There is work to be done before drone technology is fully implemented, such as assessment of the cost-effectiveness of developing a drone-transportation system, rather than improving upon the ground-based system, boosting the ability of the drone to navigate through different weather conditions, working with regulations, building drones' immunity to hijacking, the improvement of technology to reduce crashes and malfunctions and training specialists to operate these drones.

Water-related disaster management supported by drones

Restas, A. (2018) There are three different ways in which drones can supplement water-related disaster management, before, during and after the disaster takes place. The same can be applied to forest fires. Meteorological models can predict fire risk for different areas and make use of fire weather indexes. A higher index implies higher likelihood of a fire occurring as well as increased severity. Knowing the index in advance enables safety measures to be enacted, as well as actions to reduce the severity and area covered by the fire. Drones can also be used for quick fire detection to reduce response times and improve control of fires. The use of drones as patrols can serve to reduce the illegal activities that cause fires. During fire suppression, drones can survey the fire and give the fire brigade information about the location, size and pathway to the fire to put it out as quickly as possible. With regards to floods, drones are used to analyse the river basin, the structural

integrity of the flood gates and dams and evaluate potential risks. Drones can also survey nearby bridges, reliefs, channels, pump-stations and the nearby vegetation. Growth of vegetation can be curbed if necessary, and thermal imaging can be used to check if engines in the pump stations are overheating. During floods, drones can make use of resolution mapping to provide accurate data about the flood and the area affected. They can scan the area for people trapped in houses and water leakage at dams or floodgates. Using this, the leaks can be managed before the situation escalates. Drone surveillance can be used to determine whether or not evacuation must occur when dealing with degradation of crucial elements of dams like flood gates. Drones can help first responders during floods by delivering first aid, finding trapped people and performing reconnaissance. It must be noted that drones are not suited for flight in unfavourable weather conditions. Post flood management to assess damages and then prepare for recovery, could make good use of drones to remap the area by taking high resolution photos. The required authorities can make use of these images to prepare for reconstruction or repairs of the necessary infrastructure, like dams and flood barriers. Drones can also be used to supplement the police to keep the area safe from crime.

Drone ambulance design

Krishna, V. V. et. al. (2018) This paper presents a prototype for a new and improved drone ambulance. As traffic on the roads increases, there are increasing delays in the time it takes for an ambulance to reach someone in need. Drones, traveling by air, can reach before ambulances. By equipping drones with a medbox, real time data about the patient's condition can be transmitted to the ambulance and to the hospital. This allows them to make necessary arrangements in preparation fro the arrival of the patient, which can reduce mortality rates by a significant amount. Existing systems are only equipped to deal with a single type of emergency or monitor a single parameter. The proposed drone ambulance is a quadcopter equipped with a medbox. This medbox contains sensors, like ECGs, temperature sensors and heartbeat sensors. ECG electrodes convert the heartbeat into electrical signals. The drone is an Arduino based quadcopter with a variety of sensors to detect and measure the relevant data. The data is collected using Zigbee technology and can be viewed in the ambulance using LabVIEW software. During flight, a quadcopter experiences drag, lift, weight and thrust. In order for it to maintain its flight, all these forces need to be balanced. The quadcopter is made using an aluminium frame with 4 brushless DC motors on each rail. 4 Electronic Speed Controllers are installed on each rail, each connected to the battery. The propellors are attached to the motors in such a way that the two diagonally opposite propellors move in clockwise direction while the other two move in anti-clockwise direction. The medbox is equipped with the relevant sensors, a thermistor and some medicine. It comes with a user manual to enable passersby to make use of the in-built technology to help the patient. The drone makes use of a Li-Po battery to power the sensors, the ESCs and the flight stabilisation board. In the future, more advancements are possible like the addition of GPS to locate the target, integration of machine learning to calculate the shortest path to reach there, addition of cameras to allow the doctors and EMTs to have an idea of what the situation looks like and use of sturdier drones. The drone can even be made autonomous. There is great scope for research and development in this field.

Limitations of Drones

1. Unmanned Aerial Vehicles operate remotely and thus make use of a data link to connect with the control room. The data link can be intercepted and the control system accessed. This enables a hacker to not only control the drone, but also gain access to private files, corrupt them and leak important data. Drones used in medical settings would inevitably be at a high risk for these attacks as organs, vaccinations and blood are high demand payloads.

2. Legislature and regulations concerning drones are being developed and there is a long way to go before drones are allowed to operate with the freedom they require to attain their full potential in healthcare. While restricted movement of drones is allowed, there is a great amount of uncertainty in this regard. The development of less stringent regulations is hindered by the increased occurrence of drone misuse, including the use of drones to transport contraband and illegal substances, and their role in espionage.
3. The invasion of privacy is an additional cause for concern when developing regulations. In many cases, drones come equipped with cameras, rendering civilians unaware of whether they were being recorded or not. Furnishing drones with audio recording devices supplements this invasion of privacy. As drones are capable of flying high and hovering, they can even be used to look into people's houses.
4. Malfunctions and software issues are widespread in drones and are known for causing misfires and crashes. The technology needs to be made safer in order to deliver invaluable organs and other medical necessities.
5. Drones are heavily dependent on the weather conditions for optimal operation. In poor conditions, their flight is disrupted and unfavourable for the transport of organs that need to be handled with care. Terrible weather conditions can even ground drones. When used in disaster relief, this can render them incapable of gathering reliable data and images.
6. Drones are vulnerable to collisions and attacks in nature. Large predators like eagles are known to attack flying drones, and there have been many collisions with trees. This also raises concern about drones acting as threats to wildlife.
7. In addition to collisions in nature, there have been occurrences of drones colliding with towers, walls and other aircraft, causing harm to property and deaths. To increase the utilisation of drones, they require a more advanced collision avoidance system.
8. Smaller drones that can cover larger distances and be used in more flexible manners, have restrictions on the size and weight of their payloads. Heavier payloads also slow drones down.
9. Equipping drones with the necessary medical equipment comes at a high price, on top of the cost of the drone itself.
10. The operation of drones requires specific training and a pilots license. A large number of people would need to be trained to fully implement drones in emergency medicine and organ transport. This further increases costs.

Conclusion

Drone technology has come a long way and its applications have spread far beyond solely military expeditions. Integrating drones into India's medical emergency response systems and employing them in the transport of vital organs and medical supplies, has the potential to revolutionise the medical industry by increasing access to medical care , reduce response time, notwithstanding their geographic location, reduce response time and improve the success rates as well as the number of organ and blood transplants. Armed with the ability to fly over any terrain, these indispensable little aircraft can reach remote locations and provide relief in the form of food, clean water, vaccines, etc. The deployment of drone ambulances in cities to reach victims of motor accidents, cardiac arrests will reduce response time and subsequently improve the patient's chances of survival and longevity. Determining a means by which these drones can be used in an ethical, non-invasive manner will be instrumental to the attainment of their full potential.

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IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE FRAMEWORK

ARJUN DAS
20BDS0129
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

*Tenenbaum, J.B. et. al (2011)*Artificial Intelligence (or AI) is a diverse field in computer science that deals with a lot of technical real-world problems using cognitive functions, software algorithms and data structures. The computational abilities of the machines used in AI models provide a contrast to Human Intelligence in the areas of data handling and interpreting, even though AI requires the study of cerebral sciences in depth.

McCarthy, J. (1960) One of the first AI model was proposed by McCarthy and it was named as the Advice Taker. The program had the ability to conclude immediate inferences from a given list. Its notable popularity arose from the fact that it was one of the earliest and simplest programs to have 'common sense', indicating towards the logical and reasoning abilities of the program.

Lake, B. M. et.al (2017) It is necessary for AI systems to imitate human-like intelligence with whatever data it receives as an input rather than solving mere pattern recognition problems. A mission to combine the strengths of Deep Neural Network (DNN) systems with well fabricated and advanced cognitive models can help us reduce some concrete challenges. The automation in AI begins when the concept of Machine Learning (or ML) is amalgamated in AI. Machine Learning is highly practical as it aims to develop software that holds the ability to learn from pre-existing data to gain knowledge and experience, thereby improving its learning capabilities and making suitable predictions when given a fresh set of similar data.

Schmidhuber, J. (2015) In today's low-cost computation instruments with availability of giant data sets, Deep Learning (or DL) methods outshine what ML software had to offer. DL deals with a greater complexity of Convolutional Neural Networking (CNN), thereby achieving human level performance in the field of medicinal analysis. A DL reviewed study, using supervised, unsupervised and reinforced learning can be scientists revolutionize the world of deep neural computation. An artificial neural network (or ANN) is a conceptual framework used for executing certain AI-related algorithms. This neural network mimics intelligence similar to that of humans. The framework is highly comparable to the neuron networking of a human's Central Nervous System (CNS).

Davahli, M. R. et.al (2020) The period of AI amalgamation in healthcare sector has been classified into three vivid generations of AI based technology, wherein each generation outshines the notable work of the preceding one. The ongoing generation involves development of DNN and DL to understand and unravel hidden patterns in healthcare crises and analyse complex problems.

DL approach has shown remarkable results in the classification of various types of skin cancers and skin lesions comparable to the competence of that of any human dermatologist. A similar DL approach showed success in the examination of diabetic retinopathy in patients using retinal fundus images. There is an exponential increase in medicinal demands of the growing and ageing population that has overburdened our present organisational structure of healthcare system, pushing them on the verge of unsustainability. Some of this burden can be possibly transferred to accurately performing machines in the near future.

AI in medicine is one of the biggest challenges for scientists and engineers around the globe. The

intolerance towards inaccuracy provided by AI programs in the healthcare sectors along with the inability to make firm medical decision support have left this field in uncertainty, with probabilistic, yet unknown and incomplete data sets in arbitrarily high-dimensional spaces. Research towards building interpretable AI applications in medicine needs a high maintenance of learning performances for a range of DL and human-computer interaction techniques.

Holzinger, A. et.al (2019) The current AI systems show an inverse proportion with explainability and accuracy. The systems are either incomprehensible to the doctors for practical uses, or vaguely comprehensive but highly inaccurate. Addition of benevolent ethics to these systems impose more challenges and heavier programming which adds more datasets to the system. This indicates that the system needs to have a holistic approach in all domains instead of solely focusing on the medical support aspect.

Countries like India and USA can help in pioneering the growth of AI in this field, as AI software systems are still at its infancy. *Aayog, N. I. T. I. (2018)* India's NITI Aayog has set up a national program to develop eco-friendly environment and sustainable neighbourhoods. This program would benefit the country in healthcare industry, agriculture, education, infrastructure and transport. This would help in building smart cities with a high-quality living standard and advanced medical facilities.

Literary Survey

Analytical Superiority

Various Clinical Decision Support Systems (CDSS) have already outsmarted the doctors by successfully determining 96% of numerous the clinical diagnosis as against 95% by the doctors. AI's accuracy in identifying diabetic retinopathy is considered to be at par with human doctors, along with a cent percent result in declaring brains as 'healthy' or 'diseased' by using MRI technology. This makes us agree that a human's decision would be more accurate if combined with the knowledge of AI.A program with high accuracy to determine meningitis in children was made to support paediatricians in its detection.

DL models have also shown a great percent of correctness in physical examination of patients. A computer-vision algorithmic machine had a 79% success rate in classifying patients into Parkinson's Disease affirmative or negative.

Diagnosis of Diseases

*Diprose, W., and Buist, N. (2016)*We envision that due to the advances in future technology irrespective of economic constraints, humans would always be an important part of the treatments and decision-making. However, human intervention would only be required in diagnostics when AI models render less capability in any particular area. Artificial Intelligence can provide an impetus towards the improvement of the presently overburdened healthcare structure. Involvement of complex algorithms can be initiated in tiny steps and steadily gain complete control. Initial diagnostics by doctors are usually pattern recognition from previous experiences, which can be better done by AI as it can retain as well as retrieve millions of previously recorded and synthesised data, thereby improving the accuracy of disease classification and disease diagnosis.

Biomedical Research

Rong, G. et.al (2020) Artificial Intelligence holds the power to exponentially accelerate the time for screening and indexing the academic literatures. In recent times, the biomedical research studies mainly focus on various tumour suppressing mechanisms and aids, inter protein interactions and reactions, and the genetic association of the human genome. Scientists can be provided with advanced Computational Modelling Assistants (CMAs) which can easily execute simulation models and graphs from any concept provided to the assistance system. This would lead to a faster rate of discovery of many protein interaction mechanisms and tumour suppressors, thereby accelerating the efficiency and productivity of scientific outcomes.

Patient Adherence

Davenport, T., and Kalakota, R. (2019) Patient adherence has usually been the least concerned problem of the healthcare industry, as if it is the last benchmark to be achieved for attaining a perfect health. It is often found that patients do not adhere to the treatment recommended by medical prescriptions, clinical routines or the following check-ups. The work of AI along with Data Science comes into the picture when there is the need to motivate non-proactive individuals for realising the necessity of self-care. User-friendly systems can provide tailor-made plans and be a choice architecture to chronic or acute patients, based on the data set provided by them. Software graphic designs embedded in smartphones of smart watches that are easy and comprehensive by the patients can be used to alert or remind them of their daily healthcare schedules.

Precautions for Dementia patients

Hossain, M. et.al (2019) AI software helps the family of old people with dementia (a neuropsychiatric disorder) by using a simple, yet smart GPS tagging system to alert the family members in case the patient's location is found to be out of the pre-set boundary from home. Demented people often wander off and are often unable to return home, hence a tagging solution was brought into effect.

Global Pandemic Crisis Situation

Mohapatra, I., and Giri, P. (2020) The recent Covid 19 pandemic situation has proved the inequality in our healthcare systems, starting from the uneven ratio of skilled professionals to patients and availability of hospital beds from proper treatment. AI has been helping the healthcare industry in this time of crisis in several ways. The computation of biology with demographics has been helping us to do contact tracing and identify potential hotspots. Data scientists were also able to predict and monitor the course of this viral disease. Biotechnological support from AI has helped scientists in determining the protein structures to its corresponding amino acid sequence. As a matter of fact, AI systems can create protein molecules without any manual support, and establish pharmacological relationships in the new structure.

Ethical Implications

*Wang, W., and Siau, K. (2018)*The ethical issues that we would be facing from AI is transparency, privacy and accountability. Transparency holds the most ethical issue here as AI models works a lot through image analysis and it is not possible with current AI systems to provide a reason to the patient regarding the cause of the disease. There is not much of a proof that can be given by the AI systems to support its reason for the assignment of a disorder to the patient.

There should be an option available in the future for patients to get to know about their illness from a doctor, who can show emotions and empathy, instead of a machine. Assumptions of a disease in the patient can be made by the factors of gender and race, which does not necessarily count as a suitable parameter in many cases as a characteristic cause of a particular disease.

Findings

Artificial Intelligence is already helping us in various medically focused fields such as ophthalmology, radiology (pneumonia detection), cardiology (diagnosing myocardial infarctions), pathology (lymph node metastases detection), dermatology, gastroenterology (in colonoscopy), paediatrics, and psychology (mental health status).

Apart from these, AI also may also have certain additional advantages such as:

1. Automation of clinically supportive tasks that may saving some time.
2. Unburden healthcare administrative workload as well as lower the cost.
3. Wearable AI based technology being integrated to people's lives can promote everyday healthcare activities at an individual level.
4. Usable AI based applications can reduce visits to the medical institutions for simple consultations.
5. Availability of AI support at all times unlike clinic appointments at a particular designated time.

6. However, there are certain challenges faced by the healthcare sector's association with Artificial Intelligence and Computing:
   1. Improper means to measure and analyse the performance and aptness of the AI algorithm.
   2. Extremely low interpretability of the program's algorithms (referred as black box AI algorithms).
   3. Inability to be generalized for each and every sort of clinical and medicinal use.
   4. No legal liability if an error occurs followed by ethical issues with patients' choices.
   5. Potential coding biasness being generated from the program, thereby hindering evaluation processes.

Conclusion

The overall advancement in the field of Artificial Intelligence for the healthcare industries are not enough to provide large scale support to this industry. Although the path of progress from infancy to today's stage is remarkable, the field has enormous potential to grow and prosper. At the same time, there exists numerable challenges that requires to be tackled in order to provide holistic and worthy output to everyone. Analytical superiority of AI proves that there is an unparalleled scope for AI applications in the healthcare sector and the unhinged perspectives of scientists to develop better AI technologies can be extremely beneficial for mankind (possibly expanding to animal facilities) in the future.

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DRONE TECHNOLOGY-A HELPING HAND TO HUMANS

ANGAD CHAUDHRY
20BDS0130
School of Computer Sciences and Engineering
VIT, Vellore, India

Introduction

Hassanalian, M., & Abdelkefi, A.(2017). Drones are the unmanned aerial vehicles that can fly up to thousands of kilometers but drones that are very small in size can only fly in limited area but just any type of missile cannot be classified as drones. Drones can be used for a variety of purposes and can even perform these events in very harsh environments. They are equipped with variety of cameras and sensors to do these enhanced tasks. For example drones equipped with infrared cameras can give images even when a little light is there and the drones which are very small in size can be used for reconnaissance inside the buildings. First application if drones is that they can be used for search and rescue mission, in these missions these drones can get an overview of the situation in just a short amount of time and hence these are time efficient . Second application of drones is that the drones can be used for managing national parks , lands , tracking the wildlife, monitoring of biodiversity and these drones can also be used for the investigation of disasters and even forest fires. Third purpose of drones is that they can be used for delivery of parcels which is currently being used by amazon and google. Vignesh Santhanam (2020) Unmanned aerial vehicles can be the last step to conquer in the medical industry. They can allow the large scale delivery of many essential products like vaccines, medicines and even human organs, as some countries can not afford the storage of things like platelets, drones will ensure that these supplies are available on demand of people .Today drones have flown a great distance for deliveries of these products in remote areas, in areas of Africa they are initiating deliveries of COVID-19 Pandemic testing materials. The drones project can have a positive impact on the cold storage systems of less developed countries like India and the healthcare sector can witness boost in deliveries of blood and even organs. I think that drones would be a revolutionizing factor healthcare industry and other industries provided that the rules related to drones are loosened out.

Literary Survey

Balasingam, M. (2017). Drones are unmanned aerial vehicles or the UAVs that were previously used by military for war purposes but can now be found in every field ranging for variety of purposes like healthcare, home deliveries, patrolling purposes, recreational purposes, surveillance of disaster hit areas , and agricultural sector. Many retail companies like Amazon , Walmart are beginning their research in delivery of goods using drones. The drones for medical purposes, have been used to deliver vaccines in remote areas, small aid during natural disasters example in many earthquakes. In medical centres which are not yet fully developed, drones can be used to transport samples of blood and can even be used to transport organs .Google is one main organisation working in field of drones in healthcare stakeholders or the general public, but for drones to come in reality the regularity limitations must be addressed. Storage and transportation of drug related specimens must also be addressed as any mistake can lead to serious consequences.

DIVYA JOSHI (2019).The drones have become an integral part to the function of various organisations. Drones can be operated remotely or can be accessed via an app and require very little amount of human effort in operating and the development of hundreds of more applications of drones is underway. Now they have been used for

military purposes by many countries for combat missions and can also be used for recreational purposes like aerial photography moreover the sales of these civilians drones are soaring. According to many experts ,current drone technologies are in fifth or sixth generation but the next generation of drones, smart drones, is already in development and smart drones would be more secure, more smart sensors and more independent that would further increase their scope which would lead to their mass acceptance by various countries and rules may be loosened to some extent.

Ashley Southall and Ali Winston(2018). The drones can also be used for mapping crime scenes ,monitoring large events, and aiding and search operations such as being used in United states of America .According to the officials these drones can be used to monitor a large crowd, remote areas ,investigating hazardous waste spills, handling search and rescue missions, and crime scenes by this the police will have an idea about the area before going to that area. The use of these drones by various police departments have soared after the federal governments eased the licensing requirements of drones in the year 2016 and the whole project has costed around half a million dollars. These drones are controlled by a 2 person team on controls the device and other monitors the device. For instance one drone was used to provide rough estimate regarding a car crash while other was used for giving pictures relating to hazardous spill

Truog, S., Maxim et.al (2020). As drone technologies are increasingly being used for medical purposes like delivery of vaccines, blood products, and laboratory samples and the drones used for medical purposes have also gained popularity in areas like Africa. In few studies public is of optimistic view regarding the use of drones but when the public is not familiar with the use of drones the responses are neutral. When a study was conducted across 4 small countries (Malawi, Mozambique, Dominion republic and DRC) people were of optimistic view regarding drones used for medical purposes reasons being increased access in remote areas and time and cost efficient. The respondents also cited some threats, most common being the risk of crash which makes them tough to rely upon. Respondents also advised that the drone controller should be well trained and that drones should be available at beck and call of people .Governmental organisations, contributors should partner with the drones manufacturers to start new projects to help people.

Rob Enderle (2019). When amazon is planning to using drones for delivery purposes, but there are several problems that need to be overcome. First problem is that the drones will drop the package in the open area but this would not be secure enough and package might be stolen .The second problem is that the drones flying efficiency drops by a huge amount in bad weather conditions and can even be dangerous in these bad weather conditions like storms, rains. Third problem is that these drones are not free from the abuse from some mischievous people. Fourth problem is that as most drones are electric so the problems like battery life, weight, size may remain the weakest links and it would be necessary to make drones water resistant and more aerodynamic. Fifth problem with drones is that even though equipped with good sensors they are not good in detecting micro objects like thin powerlines and same kind of problem has been with airplanes and helicopters.

John Villasenor (2012). As the popularity of drones are rising and as they are available in many sizes and are becoming cheaper as compared to their prices before it would be very naïve to assume that these drones would remain only for welfare of the common public and they would not fall in the hands of terrorists organisations. Drones have also changed the way in many countries wages war (for example United States) they can gather unexpected amount of aerial imagery by using platforms which are not easy to detect, they can also strike off the targets without endangering the pilot's life. Many countries are investing billions of dollars in drones industry. Even if a terrorist drone is deployed in an area they would be not very easy to spot with current systems and can be autonomously launched from anywhere. Even after securing many sensitive buildings we cannot lead us into believing that the drones cannot be used for killing purposes.

Advantages

1. Drones are becoming a preferred method of a safer delivery of vaccines, medications and even blood deliveries.

2. Drones prove to be an efficient way of transporting organs for transplantation purposes as compared to transportation through land or other modes.
3. Drones can take an aerial high-definition view of the ground so they can be used for search and rescue mission and can help police in the rescuing missions.
4. Drones can be used to simulate accidents and are also time efficient so they can be used for simulating crime scenes and accidents from different angles.
5. Drones can be used from delivery of care packages in disaster hit areas to the surveillance of that region in aftermath.
6. Drones are an innovative way of tackling mosquitoes, which can be source of countless diseases, by releasing sterile mosquitoes with sole aim of suppressing the spread of deadly diseases.
7. Drones are used for border patrolling to prevent the infiltration of terrorists and illegal immigrants of residents of other neighboring countries
8. Drones can be used to detect radiations after a nuclear hazard efficiently while saving time without exposing any human to the harmful radiations.
9. Drones are increasingly used to monitor erosions, silt deposits, protection of green areas and observe wildlife in sanctuaries and other national parks.
10. Drones are used to have a check on seaside or coastal erosion which can provide protection against calamities like hurricanes.

Conclusion

Drones can play a major role in countries like India for purposes of patrolling, delivery of medications and were even being used to a great extent in lockdown for surveillance , spraying disinfectants through air without exposing anyone to risk of catching corona virus. Drones are used for varied purposes whether it is recreational like aerial photography or life saving activities like transport of medicines and other necessary items and even can be used by farmers for spraying of pesticides or monitoring the crops. I feel drones can prove to be helpful ,like time efficient deliveries of necessary items specially in countries which does not have good transportation facility thus deliveries will be quick through drones in these countries and thus drones can change the face of modern technology.

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DRONE TECHNOLOGY FOR LIFE SAVING OPERATIONS AND ACTIVITIES

AMEYBHAT
20BDS0133
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Balasingam, M. (2017). Drones are unmanned aerial vehicles that do not require any human pilots. Drones are generally used by the military forces. Nowadays they are used for various purposes like in many industries, for safety of the public etc. The industry that can benefit the most by the usage of drones is the healthcare industry. Drones can be manufactured in any shape and size based on the purpose they will be serving. Drones can even be as small as an insect.

Large drones can even be used to carry payloads. Aerial drones can even be controlled in remote areas and can be launched into the air using various methods. Drones are not terrain specific and can land anywhere and at any altitude. Drones even use artificial intelligence to help human activities. Apart from the aerial drones there are ground based drones that are being developed and tested.

Andrew Chapman*(June 2016)*There are many kinds of drones like the single rotor helicopters, multi rotor drones, fixed wings drones etc.

Single Rotor helicopters look like small helicopters. They use gas or can be electrically powered. The single blade of the blade has the ability to fly over long distances. They can be used to survey the land, and map the erosion caused.

Multi Rotor drones are the smallest and lightest drones that are available. They can be used from a particular distance, speed and height. These type of drones are more commonly used by aerial photographers and can spend 20-30 minutes in the air.

Fixed wing drones look like airplanes but is in these types of drones the wings provide the lift instead of the rotors in the other cases .these drone are very efficient as compared to the other drones. These drones use fuel instead of electricity due to which they can glide in the air for more than 16 hours. They are used to deliver food and other essentials to remote areas.

Drones are used by the military to carry out various secret operations and also to perform airstrikes. They can also be used to deliver food items as well. They can also be used to carry out emergency rescue operations where human cannot be sent to do so. Drones can be used to track the wildlife populations of different species, which would be nearly impossible by using humans to do so. Drones can also be used to spray fertilizers over large areas of farms. Drones are also used by photographers to capture expansive aerial photos.

Konert, A., (2019) et.al Drones can also be used as means of transport. They can carry loads less than 2 kg over distances less than 20km. In case there is any breakdown in the drone during the transportation process the drones are equipped with parachutes ,hence there will be no damage to the material being transported One of the most important us of drone is in the medical sector

Drones were also used to transport blood samples and other analysis material. Drones can also be used to transport blood samples and also some other analysis material from one place to another .they can also be used to support the rescue operations .they can also be used to carry out agricultural activities.

Literary Survey

Karthik Balajee Laksham (Feb 2019) Drones were initially used in field of ecology and environment and due to this reason this makes us believe that drones can also be used in public health care during adverse situations. One of the main advantages of

using drones it that they reduce the time for treatment and diagnosis. They can be used to provide essential medications like antidote for snake bite or any animal bite. They can also be used to deliver blood from the blood banks to remote areas as well. One of the main advantages of drones are that they are time saving .Drones can be deployed in disaster hit areas to perform rescue operations. Drones are also cost effective than the normal transport in difficult terrains. Another advantage of drones is that reduce the time of diagnosis and treatment. Patients within a radius of 4.6 square miles can be reached by a drone in a minute which is ten times faster than the rescue provided by the conventional emergency systems. Drones can fly very close to the earth's surface and can provide clear Images without cloud contamination. Drones can be operated in all types of terrains like mountains, desserts, or snow covered areas. Drones need a proper infrastructure like a runway and also well trained individuals for operating and monitoring them. Drones are unable to carry huge amounts of payloads like that by air planes and helicopters .In countries like India drones can be used for several purposes, but due to this there will be increase in air traffic and hence the number of accidents also may increase. This can also affect the people on the ground.

Francesca Oliver (2020): While a disaster is going on drones can be extremely helpful to provide the necessary emergency services. Moreover drones are used to assist these rescue service personnel as well. There are many ways in which the drones can help in rescue operations all over the world. Drones can be used in flood hit areas to find out in which area the flood is headed .They can also be used to predict which building may be at risk so that the residents can be evacuated at the earliest. Drones have been very useful in rescue operations after the natural disasters like earthquake .Drones can also be used to check for population dense buildings like schools, hospitals so that the rescue teams could effectively target such areas. In natural disasters like earthquake there are many casualties, many people go missing and also many of them are stuck in the debris. Also in the case of flood people may get stuck in areas from where they cannot escape safely. In such rescue operation these drones are equipped with thermal imaging cameras that can detect the people trapped under the debris. They are also cheaper as compared to the helicopters. Whenever there is any disaster the basic needs of the people is disabled .In such situation drones can be used to provide the affected people the necessary items such as food and water .drones can also carry these operations more effectively and at a faster rate as well as compared to the traditional way of carrying out these rescue operations. By doing this the drones also keep the lives of the personnel doing this job earlier safe .after the disaster has taken place drones can be used to inspect the damage caused by the disaster and also to take the measurements for the repair of the buildings that may be affected by the disaster without any human individual having to set a foot out on the site.

Agoston Restas (22 Oct 2015): Drones are not only used the military but also being used to support disaster management. Drones have mainly three important roles during the disaster like pre disaster activity, activities to be carried out during the disaster and after the primary elimination of the disaster. Drones can be used during the disasters like earthquakes and flood. During the floods they can be used to continuously monitor the direction in which the flood waters are heading. Floods are slowly developing disasters. As a pre disaster activity the drones can be use to check the water level in the river and dams ,so that if there is any irregularity in the water flow the authority can be made aware of . Unlike the floods earthquake is a sudden disaster and only immediate evacuation is the only way we can save lives. During the earthquake drones can be used to find out place that are safe enough for the residents to stay. When there is any nuclear accidents the drones can be used to find out the direction of spread of the hazardous chemicals into the environment. They can also be used to detect people that are stuck at a place during the incident. Also the operations involving humans is useless during such a

situation, hence drones are a very good replacement for humans during such a situation. The support of drones in forest fires is the most developed and most experienced one as well. Drones are used to detect the hotspots of the forest fires and send the real time information. In such cases drones are more expensive than the conventional methods.

M.PoljakA.Šterbenc (April 2020): Drones are unmanned vehicles that can be controlled remotely. They are capable of carrying some amount of payload. They were initially used only by the military forces but now have slowly spread to all other areas .due to their flexibility and cost efficiency they have been used in various healthcare setting. The use of drones has steadily increased in the field of healthcare over the years they have been successfully evaluated in some programs and are already used in transporting sample and blood, vaccines, medicines from one place to another. drones are also very useful in the surveillance and epidemiology of the infectious diseases. The use of drones. The use of drones in the field of clinical microbiology is very vast. Drones may help to increase the access of people in remote areas to benefit the appropriate care which they may have not received due to the non-availability of these drones in healthcare .But there are many factors that are not allowing these drones to be used widely. The reasons being national airspace legislation and legal medical issues, differences in climates, cost- effectiveness, and community attitudes. Drones being more cost effective than the traditional ways of transportation, speed and convenience of the delivery. Hence in the coming years drone technologies will be vastly implemented in the field of healthcare.

Bill Read (2017): Recently drones have often received criticism due to their use by the military as killer drones. Also over the years drones have been involved in some safety operations as well.

Drones are now helping people to finish their tasks efficiently and also at a faster rate. For firefighters, search operations and for the rescue teams, drone provide huge amount of help. Drones help to quickly locate the people with their cameras that are fitted with thermal image scanning devices. Also drones help to deliver essential items like food and water to these people. Drones also provide an aerial view of the site at the time of forest fires, without exposing the firefighter to the dangerous areas. also by doing this the time of the rescue operations are speeded up and also there is no loss of lives of the firefighters. There are many areas where drones are used but the drones are mostly used in searching for lost people or delivering essential items to people in trouble. In the following ears to come there is a possibility that helicopters and manned planes be discarded from being used rescue operations, but it has to be noted t6hat drones cannot do each and every thing that the helicopters and manned planes can do. Drones have been very successful for private as well as public usage .They are being used by the organizations that are linked with the police personnel to ensure safety. Private drones have also been very successful in situations where the there is a known objective.

Jack Karsten and Darrell M West (2018): drones are increasingly used for law enforcements. Due to this there is a fear of constant surveillance all the time. Drones are being used rescue and search operations to simulation of the accidents. Also drones are increasing the efficiency of the law related task. Drones also result in faster search and rescue operations as well. According to the conventional metho9id of carrying out search and rescue operation they would require a lot of time and manpower, but with the help of drones this task has become very much easier.

Drones use high definition video and thermal imaging to search for the people trapped in various areas. Also by doing so the time for the operation is also reduced. Drones not only save time of the operations but they can also be used by the police forces to carry out searches of fleeing criminals. Drones can also be used to prevent the number of crimes taking place in particular areas. These drone be made to fly over places that have high density of crimes. It is also seen that by doing so the drone have found out about man criminal activities as well. By

doing so the number of crime also has reduced in the areas where these methods implemented. The ability of drones to survey large amount of area in less time has led to their use in investigating crimes and accidents as well. Also these drones are used to survey the destructions that are caused the natural disasters like flood, earthquakes and forest fires

Advantages

1. One of the biggest advantage of using drones in life saving activities is that they can be used to carry out rescue operations by locating the victims easily in the disaster hit areas.
2. They can also be used to deliver essential items like food and water to the individuals that are affected due to the disasters like earthquakes, floods etc. .
3. In places that are very prone to disasters like forest fires these drones can be effectively used to put off the fires and also to rescue the victims. By doing so the lives of the fire fighters will also be saved.
4. When a disaster takes places it leaves behind large scale destruction and drones can be used very much effectively to access the destruction caused by the disaster without even stepping out of the shelter.
5. Drones can also be used to carry causalities to accidents. These drones are special drones that are equipped with basic medical aids and can hence be used in such cases.
6. Drones can also be used as surveillance devices to monitor the activities taking place at the international border as well. They can be used by military and other defence related firms to ensure safety.
7. Due to their small size and light weight they can be used any types of terrain and also they do not require any special runway or take off spot that are required by planes and helicopters.
8. Another advantage of the usage of drones is that they are very precise in the task they are supposed to do and hence the margin of error is very small as compared to that of humans.
9. Drones can also be used in highly hazardous situations like radiation monitoring, inspection of high voltage lines etc. where there is a lot of danger to the humans.
10. With the increasing use of drones in the various other activities their price has also come down and will become healthier on the pocket in the coming years as well.

Conclusion

According to me drone systems are the future of advanced systems being used in day to day lives. Drones are so useful to us humans and can be used to by us in any circumstances keeping in mind about the restrictions that they have. As we all know that everything on this planet comes with some or the other short comings we should understand that we should not entirely become dependent on these modern machines for our day today activities or for any activity for that matter. Drones have really become really useful to everyone these days. They are used for performing many tasks. In the future the drones should be used only when there is a demand for their use. For example drones should be used in adverse situations like for transportation of patients from one place to the other, but they should not be used for any task that can be done without their use. In countries like India drones can be of immense help. As we all know that there are many accidents taking place throughout our country, in such cases drones can be used to transport the casualties to the nearest hospitals, hence by doing so we will be able to save the some of the casualties as well. Also they can be used by our military forces to safeguard our international borders. Our country also faces natural as well as manmade disasters, in such scenarios drones can be used to their fullest capabilities as well.

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IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

ARJUN RAJESH NAIR
20BDS0137
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Davenport, T., & Kalakota, R. (2019). In this current world, automation is something that the human race is aiming to achieve. The increasing popularity and potential of Artificial Intelligence and Machine Learning has led it to make its way into almost every field, like education, the industrial field, businesses and also healthcare. Now, to define Artificial Intelligence, it refers to the development of systems to perform tasks that are associated with human intelligence such as decision making, audio and visual recognition, etc. The increasing application of AI in businesses shows its high potential in the field of healthcare. Even though AI can outperform the human intelligence at many instances, its implementation will lead to scarcity of professional jobs and also prevent the automation of the industry. Demand for Artificial intelligence in the healthcare department increases with the increasing complexity of healthcare solutions. For instance, algorithms these days are able to spot tumors much more easily and also guide researchers to perform costly clinical trials.

Goldberg, D. E., & Holland, J. H. (1988). Artificial Intelligence already has a huge relevance in the field of health care, such as Neural Networks, deep learning, automation, robots and also expert systems. Artificial Intelligence is surely a major tool which will speed up the development of this industry. Every Industry has its own problems to deal with. The increasing cost pressure and patient data management has been few of the most prevailing issues faced by the healthcare department. Many technologies that are already in place such as neural networks already play a huge role in the field. Neural networks have been used to categorize the order of the tests to determine whether the patients will get infected by a disease. Deep learning and neural networks are few main concepts of machine learning that are used mainly to predict an outcome. Using Machine learning algorithms can help take fast appointments and prioritise the appointments, hence reducing waiting time. Audio recognition can also help taking notes allowing the doctors to spend more time with the patients.

Wen, A. et.al (2019). Artificial Intelligence can help decide treatment for patients based on dataofpreviouscasesthatwouldhavehadanykindofcomplications.Increasingtechnological developments like smart watches, help monitor patient in terms of blood pressure, heart rate, sleep pattern. Drug development using AI will surely increase the pace of development. AI is being used even for prediction of disease outbreaks, eliminating tests to reduce the cost to be paid by the patients. Voice recognition software can be used for preparing patient reports for instance radiology reports. Artificial Intelligence was being used for accurate diagnosis of blood related bacterial infections and better treatment but wasn't being implemented for clinical application. Many applications such as IBMW at sonal ready focuses on specific cancer diagnosis and treatment. Patients not following their treatment regime is a huge problem to their health. Hence, Artificial Intelligence algorithms can be used to monitor patients and follow up with them. These algorithms can be used to develop a care plan to improve the patient's health. Chatbots also can help patients in terms of mental health and wellness and thereby preventing any kind of unwanted circumstances.

Literary Survey

Reddy, S.et.al (2019). This article talks about how Artificial Intelligence can be used to counter problems in the healthcare field like shortage of workforce, administrative requirements and much more. A machine is said to be artificially intelligent if it can pass the Turing test. It has to show features that are similar to human intelligence like visual and audio identification, decision making skills and also perform complex tasks in the most efficient way. According to this article, there are four really important areas in the healthcare field that could benefit from AI: administration, monitoring patients, decision making clinical support and healthcare interventions. Using AI for data logging and analyzing laboratory reports will help clinicians providemoredirecttreatmentforthepatients.Byanalyzingpreviousdata, better decisions can be made to improve consistency, reduce errors, faster efficient diagnosis and also put the medical equipments to complete use. AI can be used to monitors interpret many vital signs from electrocardiographs, electromyographs and much more. Using AI programs in hospital servers that analyses patient queries can help reduce waiting time in emergency department.

Panch, T. et.al (2019) This article talks about the downside/negatives of Artificial intelligence being implemented in the healthcare industry. According to the article, the current Artificial Intelligence algorithms are not suitable for implementation in the Healthcare Industry due to current systems already in place. There are many factors which determine the way healthcare is delivered. The blind addition of Artificial Intelligence and its tools in this field will not cause much change due to its fragmented change. Algorithms require huge amounts of data which many healthcare organisations and establishments fail to provide. Endemic or rare care category of humans need to be kept under constant observation to observe patterns and their development over time which is crucial for the algorithm. Due to the lack of spread of information, the data sets are scarce which stuns the growth of Artificial Intelligence development. Due to the recent developments in cloud computing the necessary infrastructure is already in play, which provides hope of secure, scalable and readily available data. Many people consider Artificial Intelligence to be a boon but according to this author it has many downsides.

Bali, J. et.al (2019). This article focuses mainly on the importance of a strong framework fora more efficient Artificial Intelligent system. There is no specification about what comes under AI, hence many people believe that Artificial Intelligence is anything that hasn't been done yet. Any system that devices strategy, uses logic uses common sense to solve problems, has the ability to communicate, can learn from past experiences and soon, is said to be intelligent. For strong framework, there are many steps that have to be followed for the right implementation of AI. The care providers must be careful while sharing data to the third party so that the data doesn't end up in the hands of any unwanted individual. The consent of the patient in care has to be taken, or else, in case no consent is needed, these data has to be handled by a statutory body, hence preventing illegal exploitation of the data. A strong bioethical framework is really necessary for the self-improvement of machines. Ethics is an integral part of any framework, whether it is for a person or a machine.

Meskó, B.et.al (2018). This article focuses on the realities of using Artificial Intelligence. The human resources crisis in the healthcare industry can be reduced by enabling AI features such as decision making, administration, diagnostics and so on. Subsequently, ethical and technological obstacles must be overcome. There are many important roles that cannot be replaced by Artificial Intelligence such as empathetical support, human touch and communication. Hence, AI cannot completely replace human workforce, alternatively can be used as a valuable assistant to the physicians. Instead of using simple tools like stethoscopes or blood pressure cuffs, physicians can use cost effective technology like sensors based on AI to make their profession more efficient by removing time

consuming tasks allowing them to concentrate more on the important aspects of treatment. The purpose of Artificial Intelligence is not to replace healthcare personnel, but the ones who don't use it will be at a disadvantage. Artificial Intelligence proves to be a helping hand for humans but is not advanced enough to completely replace humans in the near future.

Micah Castelo (2020). This report gives us evidence on the advantages of Artificial Intelligence implementation. The memory of a computer is much more superior than that of a human brain, hence Artificial Intelligence can be used to look for deeper and more accurate associations to previous, similar cases. According to the author, Artificial Intelligence has the potential to even save lives through its applications in robotics, recognition of patterns and NLP (Natural Language Processing). For specific examples, Artificial Intelligence can used as Virtual Assistants to help patients with Alzheimer's disease remember their daily routines. Artificial Intelligence and robotics can be used together to help patients recover from strokes. There are many aspects that have to be considered by the Healthcare professionals before implementing Artificial Intelligence such as the privacy and security of patients. According to the author, Artificial Intelligence should not be a technology that substitutes human contact but instead, should be used only as an assistant. The AI algorithms in use today are suitable for use only as an assistant and still need to be improved for it to replace a human doctor.

Sandeep Reddy (2018). Artificial Intelligence aims ten abling machines to process in form like humans, which opens up opportunities for healthcare personals that were previously unavailable. To improve efficiency, Healthcare delivery uses Artificial Intelligence. AI is also used to cure health problems that were previously not traceable. Medical Artificial Intelligence algorithms analyze patient symptoms with symbolic models of diseases rather than statistical analysis. AI algorithms still need to be updated for patient monitoring, developments of drugs and so on. The old algorithms are suitable only for simple medical reasoning which cannot solve complex clinical problems. The current AI algorithms are focused mainly on diagnosis which includes, observation and collection of data, which is then analyzed by the physician to create an accurate treatment regime for the patient. To be precise, a technique known as the fuzzy logic technique has been used for the diagnosis of different cancers and analyze CT scans to guess the chances of survival of the patient and determine the medication accordingly.

Advantages

1. Artificial Intelligence once improved, can surely replace or assist doctors.
2. Efficiency of Disease diagnostics will surely improve, thereby reducing the mortality rates.
3. It has the potential to improve healthcare standards, thereby cutting treatment costs in half.
4. Some technologies such as Text to speech can save a lot of time and hence making more time for frontline healthcare work.
5. Patients will need to visit the hospital only when direct care is needed and won't have to come for regular visits.
6. Increased security of Patient Data by the use of AI.
7. AI can be trained well to even assist in drug discovery.
8. Some functions such as Medical diagnosis and Surgery are being completed faster by the use of AI.
9. Use of AI can also improve the customer service provided to the patients.
10. AI implementation increases employee efficiency, demands lesser labour and reduced workload on the frontline workers.

Conclusion

In developing countries like India with high population density, implementation of AI will surely improve the healthcare standards by reducing wait time and also providing services to much more patients as compared to the time before AI. Patients will be easily able to afford good healthcare at cheaper costs. It helps newer physicians provide accurate diagnosis and treatment. AI helps in Drug

discovery which could be cheaper alternatives to the current drugs in the market. Data collection and analysis helps improve treatment for all kinds of ailments. Implementation of AI is surely a big leap towards advancement in any field. Its application in Healthcare would be really beneficial in all the aspects.

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ARTIFICIAL INTELLIGENCE: FUTURE OF HEALTHCARE

M. ATHISH
20BDS0139
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Reddy, S., Fox, J et.al (2019) Artificial intelligence is one of the best fields of engineering. It is an art of making intelligent machines to make human lives easy and more efficient. In older times the potential of AI was not much realised because of the data limitations and computing powers. But at present with computational power AI has taken full force. It is used in almost every aspects of one's life.AI has features of human intelligence like language, knowledge, communication and decision making. Thus AI is getting close to passing the Tuning Test (a method of inquiry in artificial intelligence (AI) for determining whether or not a computer is capable of thinking like a human being).

Narejo, G. B. (2020) Artificial intelligence is used in every aspect of life. Likewise the use of AI in healthcare and medicinal field is very much important and is progressing in a very good pace.AI systems help in managing medical emergencies and patient reminders. With the help of AI systems many routines which were carried out manually like medical scans and lab tests have made lives easy and fast. There were difficult times when people were not able to detect cancer. But now there is technology to find and fight cancer. Technology has been spread over the globe and almost all developing countries have access to the latest AI technology. Today some hospitals have robots that assist doctors and nurses. AI has a huge impact in medical field though they are not used in full. They need human assist. This is why AI has not passed the Turning Test.Yet artificial intelligence has had a huge impact in medical field today and this impact is improving with every passing second.

Yu, K., Beam, A.Let.al (2018)Artificial intelligence (AI) is changing the methods of medical practice. With progress in machine learning, computing infrastructure and digitalized data acquisition, AI is entering the areas where it was only thought to be the province of human beings.

Literary Survey

Tran, V. T., et.al (2019) Today, AI can outperform many medical practitioners in the analysis of skin, pathology slides and medical imaging data. Many AI algorithms using data from BMDs are used to detect many unknown diseases. AI based tools are rapidly increasing in the medical field. Despite many good results, the real world effectiveness that occur outside hospitals is still uncertain. One study says that of a few people with chronic conditions on the use of AI in healthcare only 50% of the patients felt that AI in healthcare was important and 11% considered it dangerous. Although the challenges of quality and safety of the use of AI in healthcare has been taken into consideration, the perspective of the patients has often been neglected. There are a few patients who are not ready for fully automated care.

Panch, T., Mattie, H *et.al (2019)*.The 21st Century, is being considered as the age of big data and artificial intelligence (AI). It is being used in almost every field including healthcare. Each healthcare organizations have built their own data infrastructure to support their own needs involving computing and storage. The situations have evolved where now every individual organizations have to buy and maintain high cost hardware and software essential for healthcare. However the inconvenient truth is that the present algorithms are not in frontline clinical practice because these AI innovations do not re-engineer by themselves. Moreover most of the

healthcare organizations in the world do not have enough data infrastructure essential to collect required to train algorithms for various purposes. The ability of artificial intelligence is well described, but in healthcare it is faced with choices: either to downgrade the enthusiasm on the potential of AI or to resolve the issued regarding data ownership and make people trust in it. If this issue is not solved then artificial intelligence in healthcare will remain just as an opportunity.

Casey Bennett (2016) With the help of AI in healthcare we can improve the quality of health care and simultaneously reduce the cost in other word make healthcare better and do it more cheaply at the same time. But people are not ready for full automation in healthcare. They are scared because artificial intelligence is a lot different from natural intelligence. AI cannot think the way normal people think. People change decisions in the middle of something but AI is programmed and does only that. But just like computers, notepads, cars AI is also just another chapter in that story, the story of mankind. It is all about helping us do what we do better. In general people know better about their car ride via Uber, or table reservation via a table me or what's most likely to buy on Amazon than they do about whether the treatment they've been prescribed is actually going to work. AI is just not about simply creating cars that drive themselves. It is also about saving lives to a 100% impact.

Kaur, J., & Mann, K. S. (2017) One of the uses of AI based healthcare system is to optimize the clinical methods. AI base mobile app ask the patients about their body state and provides an easy understandable information about their health. In hospitals, nurses do rounds and visit each patient at regular times to check on the patients. But there are chances that the patient's conditions may drop between the times of planned visits. In these situations AI can be used to monitor patients and can alert the doctor in case of an emergency. In certain cases early diagnosis can result in complete cure. A late or wrong diagnosis can have damaging results. It is difficult for humans to make reliable decisions.AI algorithms can ingest lots of samples in short order and collect useful patterns. Thus AI can be useful to patients and doctors also.

Jiang F,Jiang Y, et.al (2017)The advantages of AI have been extensively discussed in the medical literature. AI can use sophisticated algorithms to 'learn' features from a large volume of healthcare data, and then use those obtained data to assist clinical practice. It can also be equipped with learning and self-correcting abilities to improve its accuracy. An AI system can assist the doctors by providing medical information from journals, textbooks and clinical practices to inform proper patient care that are up to date. Also AI system can help to reduce diagnostic and therapeutic errors which are very difficult for human practice. AI system extracts useful information from a many patient to assist in making real-time inferences for health risk alert and health outcome prediction. AI systems can be used in health-care applications, but first they need to be trained through data that are obtained from past clinical activities, such as screening, diagnosis andtreatment assignment so that they can learn to do similar treatment. These clinical data often exist but are limited to the form of demographics, medical notes, and electronic recordings from medical devicesand images. Thus AI technology can be used in medical field with properly teaching the AI technologies.

Advantages

1. Using Artificial Intelligence in medicine reduces manual tasks and free up the physician's time.
2. AI reduced human error by increasing the efficiency and productivity.
3. Huge amount of medical data can be collected and analysed very quickly.
4. AI can help doctors with diagnoses,
5. They tell when patients deteriorate and thus medical assistance can be provided quickly.
6. AI improves reliability, predictability, and consistency along with safety and quality.

7. Detection of tumour's and cancer quickly and easily is possible with the help of Artificial Intelligence.
8. AI can save expenditure at both sides (hospital and patients).
9. AI can identify mistakes in treatments, workflow inefficiencies and helps avoid unnecessary patient hospitalisations.
10. AI can help in developing new drugs, personalised treatments, and edit genes.

Conclusion

India being such a highly populated country does require the help of Artificial Intelligence in the medical field. Since India is a data rich country because of the large population count AI will help in quick access of data and analysing them as well. According to a journal, India had only 4.8 practising doctors per 10,000 population (September 2017). With such low number AI would definitely be helpful in India. India being a developing country AI would help in its economic growth as well.

Thus, AI in health care is necessary to not only India but also the entire world. The world is growing fast and medical assistance should not only be efficient but also fast, and with the help of artificial Intelligence it is possible at large scales.

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DRONE TECHNOLOGY IN OUR DAY-TO-DAY LIVES

AYUSHI GUPTA
20BDS0147
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Restas, A. (2015). A Drone is a common name for an unmanned aerial system (UAS). Other common names of a drone are Unmanned Aerial Vehicle (UAV), Remotely Piloted Aircraft Systems (RPAS). Drones are aircrafts without any pilots or passengers on-board. Drones can prove to be helpful in various kinds of disasters that occur all around the world like earthquakes, forest fires, nuclear accidents, floods, etc. Balasingam, M. (2017). They are manufactured in all shapes and sizes both small and big.

Balasingam, M. (2017). Drones have been proven to be very helpful in delivering first-aid packages during catastrophic disasters including the 2010 earthquake in Haiti, the 2012 hurricane which affected the USA, Canada and the Caribbean, the 2015 category 5 cyclone in Vanuatu, and the 2015 earthquake in Nepal. Restas, A. (2015) A drone can support the prevention or supply early detection of a disaster. Even after the disaster, drones can help in the quick damage assessment and recovery. In case of accidents involving hazardous materials the primal task of drones will be to identify the direction of the spread of dangerous materials. With the help of drones, three-dimensional images, rheological curves can be obtained quickly and equitably. A search for trapped people may also take place in these circumstances where drone flights become key factors in saving lives. In case of nuclear accidents usually the radioactivity is higher than the allowed limit for a human, thus any man-on-board task is not only risky but also useless for a human if drones can prove to be much more efficient. Earthquakes are disasters that break out without any warning and cause not just infrastructural damage but also loss of human lives. The chance of survival of humans trapped inside collapsed buildings depends upon the type of affected buildings. Therefore a quick survey of the damaged area is important for analyzing the damages and to improve our rescue sources. A small drone can easily roam around the area without any complications at a faster rate than man. Floods are also dangerous calamities which although slowly developing and predictable can cause innumerable people to be trapped. As a pre-disaster activity, drones can follow the stream of rivers and control the state of dams and the responsible authority can take action in case of any unusual activity. With the help of drones we can predict how flooded the area is, find trapped citizens, where to evacuate the citizens and what buildings are at risk beforehand. Forest Fires are one of the most life threatening disasters not only for humans but also plants and animals. When there is a forest fire it is very difficult to put out the fire in time, save trapped animals and find all areas of damage. Drones can help in detecting hotspots earlier than civilians reporting about it which will help the fire managers in limiting the fire. However, this method is not very popular due to huge costs of drones. Balasingam, M. (2017).Besides helping in these life-saving activities drones also play a big role in medicine. Common drone applications in medicine include delivering medicine, food, blood, vaccines, and first-aid kits to remote areas where other means of access are severely restricted. Drones are also showing potential in mobility assistance for people having difficulty in moving around. In Papua New Guinea, the 'Doctors Without Borders' Organization used drones to transport dummy tuberculosis(TB) test samples to a remote city. The United Nations Children's Fund

delivered HIV testing kits using drones in Malawi, Africa- a country which had one of the highest rates of HIV infections in the world which reduced the time required to test infants in rural areas. Rwanda- another country in Africa used drones to transport medical supplements to hospitals in remote areas. The hospitals ordered blood and medicines through text messages and drones navigated using Rwanda's cellular network and the GPS system and reached the destination within 30 minutes.

As a personal opinion, I think that drones will be our future. If used in the right way they can help us and make our life easy in various ways. However, if this kind of technology falls into wrong hands it can cause chaos all over. Drones will make rescue missions easy and decrease the threats that the rescuers themselves face. Since drones can fly over any kind of area, the search and rescue missions will be a lot faster and easier. Since drones do not need an on-board pilot there will be no fatal injuries if the drone malfunctions or crashes. These UAVs can be used not only in life-saving activities but also in daily routine activities. Farmers work hard every day to make sure their crops are healthy. Drones can make their life easier and work faster it modifies according to their needs. Although introducing drones to help in our normal routine can be dangerous, it will be a risk worth taking.

Literal Survey

Washington, A. N. (2018). UAVs can be classified into different categories based on size range and capacity. Small UAVs (mini/micro UAVs) have a limited range of sight of about 100 kilometers. These micro UAVs are further classified into rotatory or fixed wing. The fixed wing UAVs are similar to airplanes where a pair of wings creates a lift. Fixed wing UAVs can sustain longer flight times and are also less impacted by environmental factors. Rotatory wing UAVs have a lift generated by the wings rotating around its mast. They have a limited travel distance and are more prone to environmental factors. Fixed wing UAVs are more suitable for aerial surveys over large areas or delivering packages over long distances whereas rotatory wing UAVs are appropriate for operations that involve precision, focusing on a particular target for a long time or inspections. Drones are being used in numerous place to solve problems all over the globe. They are used for providing critical lifesaving supplements to remote areas. To put an end to poaching of endangered Rhinos and elephants in South Africa rangers fly eco-drones which provide them with satellite images which help them locate and track suspected poachers. Since drones can easily provide aerial views land, they are used for detecting the archeological sites in the Yoruba civilization of Nigeria. These UAVs can also be used to remove the human genocide that still exists in countries like Sudan, Nigeria, and Kenya etc. Drones have provided us with the ease of accessibility to remote areas. They can travel faster in air then we can through land which has increased survival rates of patients. They are also less expensive than manned airplanes which allows easier deployment in remote areas. Even though drones have various advantages, there are some challenges that we need to address as well. There are concerns that due to the launch of drone projects the accountability for looking after the citizens' needs will reduce. Due to the varying weather conditions equipment loss and malfunctioning is inevitable which will also reduce the efficiency of the work thus these operations must be properly planned beforehand. There are various privacy concerns and weight restrictions that need to be solved as well. Hence with the consideration of the limitations we must ensure how to use this technology while minimizing the privacy and safety risks.

Truog, S., (2020)et.al. Medical delivery drones can easily resolve the transportation challenges we face in ensuring trustworthy access to medicines in areas where travelling through land is difficult. Medical delivery drones have on-going operations in various places including Ghana, Rwanda and Malawi. Village Reach is a non-governmental organization which intends to provide health-care to all areas has provided assistance to the Center for

Drone Innovations in projects related to introducing drones. Drones were drafted to Malawi, Mozambique and the DR during the project execution in the DRC. The drones tested were fixed wing, powered by battery, capable of vertical take-off and landing and had 2-3 kilograms of load attached to it. A number of people which included stake holders, health workers, general public, and community leaders were asked questions related to drones and what they thought about using drones to help with lifesaving activities. Overall, most of the respondents agreed that drones could help in lifesaving actions. Some suggestions from these participants included carrying food items, clothes, and seeds for farmers with the help of drones. They also agreed that drones have certain risks like the drone could crash or not reach the destination on time. However most respondents had a positive attitude towards the use of drones in transporting health products. Stake holder and community insights in different countries have shownmajor areas of agreement. The Government is encouraged to initiate drone activities by also taking the common man's view into consideration in order to create and efficient and beneficial strategy regardless of whether drones will transport health products or have a different purpose.

Konert, A., (2019) et.al. Although air transport is broadly used in military due to lack of restrictions, ability to reach remote areas and travel at a fast rate, it also has limitations which include its dependence on weather conditions, high cost and less load capacity. An alternative to this is drones which are although small in size can carry up to 5000kg of load which includes weapons and people. Studies have shown that when red blood cell, platelet, plasma units were attached to a drone and flown for around half an hour with temperatures ranging from -1 to 18□C, there was no negative effect on the units which shows that drone can be a good alternative to transport blood products. Drones can also be used in cloudy conditions unlike helicopters, they can be used for monitoring using cameras. In 2015 people were trapped on rocks in the Middle of the Little Androscoggin River in Maine when the search and rescue services delivered life jackets to these people using drones. Two hospitals in Sweden used a drone to transport blood samples. This drone carries light loads and in case of a breakdown safely returns to the ground with the help of parachutes. Karolinska Institute in Sweden connected a defibrillator to a drone and sent it to a place 10 kilometers away where there were reports of heart attacks. The drone only took 5 minutes and 22 seconds whereas an ambulance would have taken 22 minutes. The Polish Air Force Institute has a drone named AtraxM which is designed for rescue operations and transport facilities. This drone can identify the place of disaster, number of victims and the scale of event with utmost precision even before the arrival of emergency services. The use of drones has many benefits in medical purposes like faster and safe transport of equipment and also transporting necessities to remote areas. However, this also has limitations like safety and privacy concerns which needs to be resolved as well.

Euchi, J. (2020). Drones are used in several countries for various purposes. However, the corona virus pandemic has encouraged the use of UAVs to distribute food and other necessary items. The Chinese Government has built UAVs to distribute food to the needy in only under 10 minutes. Disinfection plays a major role in preventing the spread of the corona virus but is difficult to do so in large areas. Drones can be used to spray disinfectant in public places where it is dangerous for a lot of people to be around. To detect an ill person from a health one, drones have a thermal camera which detects each person with the help of high precision infrared. These drones read the body temperature of each individual and determines those who have an abnormal temperature so that necessary safety measures can be taken. Drones are also needed to give us real time videos and information to ensure that people are adhering to the rules and regulations of the covid-19 virus. China, for example uses pigeon drones to monitor the people. These drones mimic the actions of a pigeon and are almost indistinguishable from a real bird. A drone with

speaker helped the Madrid police in informing the residents about the emergency formulas. Drones can provide with a quick response during a medical emergency and bring the most suitable equipment on site. The most promising areas where drones can prove to be helpful include mapping, assess damage, delivery to remote areas and spreading awareness. During this pandemic it is important to deliver samples more quickly to labs for testing so that the doctors can make treatment decisions. Drones will be able help in reducing the spread of this virus with the help of surveillance, thermal detectors, aerial spray and disinfectants.

Silvagni, M., (2017) et.al. One of the major hazards while carrying of winter sports activities in mountainous regions are avalanches. Most of the deaths caused by avalanches are due to asphyxia which is being buried under the snow for a long time. So, to increase the survival rate it is important to minimize the time for which the victim remains buried. UAVs can easily carry out such rescue tasks accurately without exposing the rescuers to threats and secondary avalanches. Avalanche survival time is a vital aspect to be considered. A study of avalanche survival rate shows than survivability drops below 80% after only 10 minutes of being buried. For carrying out such rescue tasks the UAV should be a full autonomous flight, capable of flying without ground station, a good load capability, good flight performance and endurance. Avalanche prone areas have plenty of irregular slopes that hardly have any plane surfaces so it is very important to avoid collisions with the terrain and maintain the antenna at a constant distance from the snow. The UAV for this purpose is equipped with a micro pilot autopilot. Avalanche beacon systems (ARTVA) include a transmitter and receiver which can be activated during the search. After take-off the drone climbs and the beacon antenna is deployed. The cross-flight starts when the first signal is detected from transmitter. The UAV lands of the burying point or it can communicate with the rescue team or carry out the search. This automatic landing is performed using the laser altimeter. Several tests were carried out ant testing facilities as well as in a real mountain environment. The results showed that the distance to ground when flying is usually within 1m, the navigation accuracy is about 2m and the localization accuracy is less than 1m. Compared to the traditional methods this will provide with a quick search and increase chances of rescuing the victim. This also reduces the threat to the rescue team of secondary avalanches.

Restas, A. (2018). Drones can prove to be useful in various disasters related to water. In case of forest fires, we can use meteorological data models to predict the fire risk. In case of a high fire risk drones can be used for the fire detection and the fire service can control it before it spreads, thus preventing greater damage and loss. Drones can also be used to put out fire from air. In case of floods, as a pre disaster activity drones can be used to keep an eye on the river basins or flood barriers and help us find dam cracks, deformations, hair lines or corrosion even at hidden places which might cause floods. During floods drones can help in surveying the flooded area. They can also be used to find people and animals who are trapped during these floods. Even after the floods have descended, the area still remains wet for a long time. Drones can re-map the affected area by taking photos and experts can then evaluate accordingly. These drones can also help the guard on duty to keep the area under high safety. With the help of drones we can detect the hotspots in a much faster way. This reduces the response time and a large area of forests is saved in case of forest fires.

Advantages

1. Drones can be used in the film industry for photography and film making.
2. Drones can be used in rescue operations and damage analysis during natural disasters like fire, earthquakes, hurricanes etc.
3. Drones can be used for agricultural purposes by carrying fertilizers and pesticides and get the work done faster,

4. UAVs can help in creating a safer environment for people to live in. They can warn people of the upcoming dangers to prevent casualties,
5. Drones can take high definition images and videos which can later be used to make 3-D Models and Images.
6. Pilots can launch or deploy a drone within a very short time during emergency situations unlike airplanes.
7. Drones can be used for marketing and advertising.
8. Drones can capture images and videos of places that humans themselves can't reach.
9. Due to the rapid advancement in drone technology, drones have become inexpensive and affordable.
10. Using drones can save both time and money since drones minimize the cost of various equipments which may be necessary if humans were carrying out the task.

Conclusion

To conclude, in countries like India where poverty prevails drones can prove to be very helpful. Drones can be used to transport food and water in places which experience less rainfall and drought. Drones can take a quick survey and analyze all the faults in construction and provide a detailed report on what requires immediate attention, for example fixing canals, roads or bridges. Due to large traffic jams in India it becomes especially difficult for the medical facilities to transport blood samples or organs from one place to another. This can be handled by drones as they can transport these materials in a quicker and safer way. To eradicate water-borne disease drones can also be used to detect leakage or mosquito breeding grounds to prevent diseases like malaria and dengue. Taking the current pandemic situation into consideration drones can transfer different kinds of packages to the required destination without needing any human contact. Drones can also be used to sanitize and disinfect public places where it is not safe for humans. In my point of view drones are the future of this world. They can be helpful to us in numerousways and also save us the time and effort. Although they can prove to be dangerous if fallen into the wrong hands we must take this leap of faith. They can make life easier for everyone so that people have time to follow their dreams and do what they love. While there are apparent disadvantages of drones regarding privacy and security concerns we cannot ignore the advantages and benefits that drone technology can provide. Thus taking the drawbacks into consideration and working around them I believe we can make a much safer and happier environment to live in with the help of drone technology.

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POTENTIAL APPLICATIONS OF DRONES

B. VENKATA MOUNISH REDDY
20BDS0149
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Dennis Shio, et.al., (2019) Drones are pilotless aircrafts, more precisely drones are called unmanned aerial vehicles (UAV's) and also called unmanned aircraft systems (UAS's). With onboard GPS and sensors drones can be remotely controlled or else controlled through software-based controls. These pilotless aircrafts were first created by the military as a flying bomb but was never used in any of the battles. These flying robots carry and contain battery, electronic speed controllers (ESC), cameras, antenna, GPS module, altimeter and accelerometer and last but not least sensors along with them. The operator uses radio signals to command and communicate with drone. The drones weigh to a maximum of 10 pounds. The drones have been categorized into different types and have different additions on it to serve different purposes.

Drones have varied applications and purposes. They were initially used only by military but due to their flight and navigation abilities they were able to broaden their use. They are used for photography, recreational activities and few commercial purposes, drones can help farmers by measuring the height of crops and also recording them and they are also used by television companies to record live sports without any hassle. Drones land with the help of visual-positioning systems and down facing cameras. Drones can fly to unsafe areas and with the help of sensors they can measure the purity of air and check for the presence of any specific micro-organisms or elements. Drones can also survey the areas of wildfire and calculate the rate at which the fire is spreading, the damage can be determined from the photos captured by the drone. Different countries have different rules and regulations for drones and their use is also different and varied.

We humans might face emergencies in our day-to-day life like fire related disasters like fire accident or a wildfire, and might need to rescue and to record the conditions at the crime scene. Disaster management and relief, we must analyse the situation and act appropriately. To manage large crowds or traffics and to monitor them to check for any emergencies and unintended activities. To analyse the damage of infrastructures and report the recovery plans. We might need to come back to the disaster sight to see the condition of our house and belongings. We might have the need to continuously monitor something or someone. We might need to stop a theft and retrieve the belongings of an individual. We might see an accident where an individual is severely hurt and we might have the need to call the ambulance and take the victim to hospital as soon as possible.

Clement Decrop, Cognitive Solutions Consultant, et.at., (2019) Drones can assist us during emergencies, they can be deployed in fire departments as drones with thermal imaging cameras can provide us with a clear view and insights of the fire and this will help the fire officers to see beyond smoke. Drones can be used to monitor traffic and crime scene and provide a clear idea of what is happening in and around to the officials. In search and rescue operations and also surveying the conditions drones are the best option and they are lot more economical than doing the same thing conventionally. With drones we can watch better as drones can fly over huge crowds with ease and they can have a clear vision even in dark. The use of

drones will be cost-effective and their use will surely improve the response time.

I think drones will be used extensively used in the future, many companies are spending a handsome amount for the research and development of drones and they are innovating and patenting unique designs of drones. As drones are cost-effective alternatives in many departments they will be employed in wide variety of applications. Artificial intelligence will surely make drones more useful and reduce the use of an operator. One thing is sure that drones will have a vast and varied use in the future.

Literary Survey

Balasingam, M. (2017) Drones have many applications even though many applications at present but drones have the potential to be put in a wider use. Drones can examine the disasters and deliver medicines, vaccines and aid-kits to remote and restricted areas. Regulatory commissions have restricted the usage of drones and they can transform the medical and health-care industry in the upcoming years. The drone transportation is economical and probably it can replace the current medicinal transportation systems to make them cheaper. Research conveys that drones are safe to deliver automated external defibrillator (AED) and the use of drones will save a lot of time. Drones can upgrade their capabilities or add new ones to extend their use, combing drones with latest developments will lead way for new break throughs. Drones will improve its diagnostic capabilities with new advancements this will help to deliver a better care and assist people in remote areas. Drones can start assisting old people by getting their timely medication and water. GPS and distorted communications are a threat for drones, safer and better navigation improvements are to be done as drones have capabilities to provide door-to-door delivers without a pilot and at an affordable price. Drones have helped fight infections in the past thanks to their capabilities to fly over tough terrains effortlessly and their storage facilities.

Truog, S.,et.al.,(2020) Drones can solve the problems faced by ground transportation and reliably and consistently reach all locations including the remote areas. Medicinal deliveries by drones are increasing particularly and it has gained momentum in sub-Saharan Africa. After the promising tests and assessments of drones they started making their drone regulations better. Drones have been put in use for blood transfusion service which will help in emergencies and the use of drones will make the process of transport much easy. The biggest risk the people fear about drones is its chances to crash which might harm people, properties etc and leave its work undue, the crash may happen due heavy rains, wind or due to an amateur's control. Drones have to be to help the public and people should decide where drones must function. Drones are very well free to be used in the delivery of health-care products and usage of drones in this case provides a chance to save time, many people were consented for health-care deliveries and they doubted the drone's storage abilities but were satisfied by the results and agreed for medicinal deliveries by drones. Many people feared that drones might not reach the destination and couldn't be trusted upon, but by the use qualified operators they lost their fear and were absolutely fine with the use of remote operated aircrafts.

Restas, A. (2018) During disasters like floods, forest-fires there is a high necessity to plan and react quickly. For floods we can take preventive measures and examine the river beds with the help of drones as they can easily fly over rivers and record what they see and during floods drones can quickly provide the 360-degree view of the situation for the officials to appropriately react and for the rescue team to get a clear overview. Post floods drones can survey the amount of damage done for the damage control to react accordingly and to search if anything is to be recovered. The advantage drones have is that they can report the most affected area faster than any conventional method. Drones can help deliver medical kits and food packages during floods which can be life-saving. When a vegetation loses its moisture content then it has chances of catching fire. Drone patrols will help monitoring the forests and drones have really fast response time and ability to

capture images in hot temperatures, timely response of drones will make it easier for the fire management to locate the hotspot and arrive at the location quickly. After the disaster it's important for the experts to examine the situation and mapping and re-mapping is to be to done and the damages are to be identified, drones are the best the best option for this as they can comfortably capture high resolution images and travel at high altitudes.

Washington, A.N. (2018) Many countries are researching for the better the use of drones. The use of drones in social issues is successful in African countries. In areas of Africa where there is a lack of facilities drones have been deployed and used for transporting required medicines and daily essentials on time. Blood transportation is another area in which drones are used and it has been successful in doing so. Nowadays drones are being used to identify the cholera hotspots in Africa. Loss of agricultural land is another major issue for Africa to counteract this, drones were designed to plant Acacia seeds and examine the plants. Drones are deployed in wildlife monitoring as there is a risk of poaching endangered animals and drones are also used to monitor the weather. Drones can be used to patrol and identify the places where atrocities are happening and warn them against it. The biggest advantage of a drone is its reach, it can travel and record places where one can't even think of going, usage of drones is lot has lot faster response time to report the situation. The usage of drones might pose a privacy issues for people which might make people feel restricted and unfree. As governments are slowly lifting the restrictions of use of drones, it is to be hoped that many countries become successful in the implementation of drones just like Africa, this would in turn benefit the country a lot.

Prince, W.F. (2019) Drones are more convenient to be used in dangerous situations as they have good reach and there is no risk of the operator's life. The Public safety agencies should consider law enforcement drone as it has a great potential to be put in good use. The risk can be measured at the hotspots using the drones as they are unmanned and safe to use. Drones can be used for crime scene photography as drones can document the crime scene faster and they also have bird's view which may be very useful and they can take high resolution photos. This will decrease the human effort and time on the crime scene and obviously more economical, and the roadblocks due to investigation will significantly reduce. Despite drone's great applications and capabilities people might drones due to their ability to monitor people, they feel this will affect their privacy. Drones in free air are expected to enormously increase in no time, this might make pose an issue to airplanes and helicopters and also safety of the civilians if the drone's crash. Drones are also used in search and rescue operations as drones can fly at great height's they can have a clear look at the problem and give a clear idea to the rescue team about the situation they are going to handle. Drones have been successful in the search and rescue operations in the past and are definitely reliable for these operations.

Lippi, G., & Mattiuzzi, C. (2016). Studies convincingly tell that drones are suitable for the transportation of laboratory specimen, but there is need for betterment and standardization in the drone delivery system. The 19th century development: pneumatic transport system (PTS) was redesigned to handle lab samples, medicines and blood bags was highly useful for the d transportation. The issue was that there would be a damage of elements of the corpuscular blood reason being high acceleration and retardation forces, but modern developments have overthrown these issues. The proper use of drones would make it a faster and lot more economical method of transportation of biological samples than the conventional transport system using PTS. Drones can carry a load of around 5 pounds for 30 to 60 minutes time and for a range of 20 to 60 miles. But the fear of using drones for transportation is that there quite a number of events were malfunctioning of drones have been reported. The drones have been getting an increased demand and their popularity for civilian use and even for disaster managements. The precautions to be taken while we transport biological

samples through drones are to try to reduce the amount of light exposure to avoid damage of photosensitive molecules and the blood-containers should be carefully packaged. It's important to have safe landing and proper take off for the drones as containers carrying biological samples are delicate, so at most care must be taken.

Advantages

1. Drones can enhance surveillance and give a sense of security to the public.
2. Drones can reach inaccessible places with ease.
3. Drones have the capability to monitor and inspect people and their work.
4. They can capture photos and record videos with an aerial view.
5. Drones can store items and can deliver packages to remote locations.
6. Drones can be used for advertisement and promotions.
7. Drones can be used to survey extreme locations.
8. Drones are easy to operate and we can live stream with drones.
9. Drones can minimize human efforts at economical rates for several activities.
10. Drones can be utilized for creating 3D maps.

Conclusion

Subhan, I., et.al., (2019)Drones are pilotless flyers with inbuilt cameras and GPS technology. Their portability and ease of operation help them to be put for innumerable applications. Drones can be helpful for a country like India for expanding health-care industry as drones don't commit human errors and they can be put in use to give immediate response in medical field, drones can also be used for intra hospital transportation as drones are faster and cheaper. Drones can also be used for transportation of human organs from various places. Drones will be very helpful for dealing with multi-casualty incidents like accidents or disasters. Drones have the potential to be put in disaster assessment as they can update real-time information and give an aerial view and also reach the affected region quickly and they can provide food and aid packages. Drones should be put in use for pre-hospital care and also for the supervision of the patients who need constant care. Drones can largely reduce the money spent on the health-care industry. A cardiac arrest victim has very chances to survive, here we can put drones in use for bystander-led CPR to save lives. Cohn, P., et.al., (2017) Drones have innumerable commercial applications, common people can use it for security surveillance and for capturing photos, recording videos and many other recreational activities. Drones can assist farmers by monitoring crops and collecting soil data. Drones have the capability to commercially deliver packages. Investments are being made on the construction-technology by the use of drones, this will significantly help in construction of buildings in the future. Drones can be used for transportation of items and even drugs and medical equipment. Drones will soon have the capability to emit radio signals and video signals which will aid in strengthening the connectivity in remote and densely populated areas. Drones can be used for the small-scale movement of items and reduce the human labour. Drones are expected to transport 10-15 people from one place to the other which will really be beneficial to the people and reduce traffic on roads. Drones have great applications as they are pilotless, they can fly high and cover long distances and can also record whatever they see with a bird's eye. Drones are limited to use due to restrictions but have been put to a great potential in few countries and proved highly useful in aid in the disaster management. Drones are used for transportation due to their storage abilities and their capabilities to reach remote areas with ease. Drones can be used for carrying medicines as they are faster and cheaper than the normal transport. Drones can be used in the medical field to do intra-hospital deliveries of blood samples. Drones can be used in disasters like floods, earthquakes, forest-fires etc. They can provide a clear overview of the hotspot and can measure the amount of damage. Drones have also found its use in search and rescue operations as they can locate the rescue site quickly. Drones have been used in farming to save the field from becoming uncultivatable and to seed and track the growth of

plants. Drones can be used in the transfusion of blood and are used for the same in Africa. I think drones have the calibre to be deployed in almost every industry and aid people. Drones can replace the conventional methods at much cheaper rates and perform more efficiently. There are many innovations on the drone technology which can potentially expand the uses and applications of drones but will take time to be certified and tested. Drones are limited by rules and regulations once the barriers are lifted drones can be put for commercial use and aid people in their daily life. The only concern with use of drones is safety and privacy, the ever-developing world will surely enhance and ensure the safety of drones and make them human friendly but the privacy of people will surely be affected. Drones will surely become fully automated in the near future with the help of artificial intelligence and won't even need an operator, there is still room for improving the battery technology and navigation capabilities of a drone.

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ARTIFICIAL INTELLIGENCE AT HEALTH CARE INDUSTRY

ANISH RAGHAVENDRA
20BDS0154
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Alpaydin, E. (2020). In this age of rapidly developing technology, AI and machine learning have gathered significant interest due to their potential applications in today's world. But what is Artificial Intelligence? Many describe it as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. At the most basic level, Artificial Intelligence is the imitation of human intelligence by machines and computers. For the last 15 years, programmers and mathematicians alike have been working to advance further into this ever deepening field. Artificial Intelligence has millions of applications in every field of almost all business.

Davenport, T., &Kalakota, R. (2019).Healthcare, along with many other fields, is majorly a data driven field. Artificial Intelligence and Machine Learning can radically change the shape of healthcare, as data is the primary aspect required for the application of Artificial Intelligence and Machine Learning. AI and its resulting technologies like neural networks, deep learning, Natural Language Processing, expert systems, robots, and automation, all have their own uses in the field of healthcare, and many applications are already in place, solving issues involving accurate diagnosing and treatment (with examples like IBM Watson), doctor - patient interaction, management and administrative applications. Healthcare is a vast field and is already benefitting from the implementation of artificial intelligence.

Meskó, B. et.al. (2018). Healthcare is one field that is struggling with many problems like human resource crisis, easy and far reaching financial aid, handling of massive amounts of data, predicting treatments and diagnosis etc. There are a shortage of doctors worldwide, and older and more experienced physicians suffer from burnout and aging due to high demand and stress. A larger demand for critical care has arisen, causing lack of facilities and trained healthcare professionals. An application of artificial intelligence and its technologies could help solve a few of these problems to an extent, but some questions arise. Will physicians be assisted by the technology, or replaced by them? How can the medical curriculum train the next generation of medical professionals to be adept in using technology to their advantage? Once these questions are answered, the technologies can be usefully implemented in this field.

Panch, T. et.al (2019). Artificial Intelligence has already been a part of this field from a long time now, but it hasn't been used to its fullest potential. There are a few problems in reaching that stage. The field of healthcare is fragmented. Every organization has its own technologies and formats that are followed. A patient would have a hard time getting services from multiple departments of the same organization, or by different organizations, as there is no standard that is followed to maintain uniformity and inter-operability. Fragmentation can be easily solved if all the data is brought together, and a standard format is formed. This hasn't been implemented so far because of many issues like, who owns the data? Who is responsible for it? Can a commercial business use this data for their financial gain? If these ethical problems are solved, and a common understanding can be reached, AI in healthcare can soar to heights that hasn't been before.

Literary Survey

Ramesh, A. N. et.al (2004). This article starts by describing what Artificial intelligence is, how its popularity, application, and importance has grown over the last few years due to the rise in digital data. It talks about how artificial intelligence is equipped to solve complex problems that modern medicine is facing, like accurate diagnosis of the disease by acquiring, applying, and scrutinizing large amount of knowledge and arriving at a conclusion or diagnosis. It describes, in detail, the working of Artificial Neural Networks, the use of ANNs, and where they have been applied in the field of medicine. ANNs have seen great rates of success in diagnosing problems using a method called the fuzzy method, which operates based on rules and conditions. Analysis of many reports have led to many applications of ANNs in diagnosis of an illness. Prognosis is also a very big application of ANNs, as machines can detect nonlinear correlations between features easily. The paper also talks about the functioning of Fuzzy expert systems, Evolutionary computation, and Hybrid intelligent systems. This article is important as it describes the definition of what artificial intelligence is. It talks about the uses of Artificial Neural Networks and the problems that can be solved with it. It's unique as it talks about fuzzy systems and their implementation in this field.

Gilvary, C. et.al (2019). The involvement of artificial intelligence in the field of healthcare has increased dramatically over the years. All technologies of Artificial intelligence include the application of some sort of Machine Learning and Deep Learning. The paper describes the complete functioning of deep learning and how it may be applied to the healthcare field to increase its efficiency and functioning manifold. It describes computer driven drug identification and how it has helped mankind over the recent years. The paper goes into details of how one can build models that can be implemented in a project. Specific instructions and guidelines have been given to select a model, interpreting the model (linear and non-linear), and for feature extraction. Diversity in data types and samples is also mentioned as an important point. While diversity is a key point in building a predictive model, it needs to be carefully to avoid common known issues. It is evident that AI will be playing a major role in the future of medicine, but to reach its true potential, interpretability is a must. This paper is unique as it talks about the problems in implementing Artificial intelligence being implemented in this field. It also talks about how to select a model and implement it correctly in a project in high detail. It stresses on the fact that all discoveries and inventions must be interpretable by others.

Rogozea, L. (2009). This article talks about the ethical questions that arise from the implementation of artificial intelligence in projects where major decisions will be taken by an AI, as AI hasn't advanced enough to appreciate all aspects of the situation. Issues that are required to be implemented are honesty, selflessness, serenity, the right to be useful in a peaceful way, respect and a decent "death". The paper introduces the concept of AI as "new" and underdeveloped. There is no way to implement a pattern for every emotion. The paper talks about how and where AI should be implemented, so as to not break the ethics of the project. The paper considers many critical questions on how artificial intelligence must be implemented in the healthcare field. The AI should follow certain guidelines, like respecting the patient's rights, undiscriminating in granting access to patients to critical care, and how much the budget of the health sector must be spent to develop and maintain these projects. This is a very unique paper as it talks about a very important issue of how to implement Artificial Intelligence into projects without violating the ethics of mankind. It talks about major problems that have to be addressed and the proper way to implement the AI in a project.

Pande, V. (2010). This webpage talks about the software called folding at home. Finding a cure for a disease or a virus takes a very long time, as the proteins that need to be developed to make a vaccine are very complex, and finding the right combination

could take a decade to find by research. Brute forcing the combination of the vaccine could take centuries to decode. But with the advent of new technologies like distributed computing, folding protein structures at home has been made possible. Everyone can contribute to this cause by downloading the software and contributing their computer's resources into this cause. Recently, with the addition of PS3's participation, the speed of processing has increased rapidly. The paper talks about how the software can be installed, and the resources that are used when the software is running. This method is working on cures for Alzeimers's disease, Huntington's disease, cancer, Osteogenesis imperfecta, and viruses like coronavirus too. Folding at home is a unique solution to the problem of finding cures and vaccines for many life threatening and serious diseases. This paper is important as it talks about its history, its application, and its importance.

Tomar, D., & Agarwal, S. (2013). This paper talks about the methods by which data can be mined from the healthcare industry so as to be implemented into machine learning and artificial intelligence. It defines data mining, and how it may be useful in many fields. It explains, in very high detail, the mathematical workings of how many of the most common algorithms in machine learning works. Some examples that have been talked about are SVMs, K-Nearest Neighbour, decision trees, neural networks, Bayesian Methods, clustering and their pros and cons. Some examples of recognition of cancer, and occurrences of diseases using the Apriori algorithm are shown. A few applications of data mining in health are effective management of resources of the hospital, better customer relations, infection control, health policy planning, insurance fraud detection, and smarter treatment techniques. Some points on challenges faced and future issues are also stated. The paper states that there is no single algorithm that gives the best answer, and careful research needs to be done to choose the correct model.This paper is a very technical paper that has mathematical proofs and workings of many of the most common machine learning algorithms, and can be used as a reference for studying the inner workings of a machine learning algorithm.

Durairaj, M., &Ranjani, V. (2013).Starting with the definition, development, and the history of data mining, applications of data mining and data mining tasks, the paper talks about the applications of data mining, machine learning and artificial intelligence in the field of healthcare. The data obtained from this field can be used to compute the effectiveness of a treatment, management of healthcare systems, customer relationships, insurance fraud and abuse, medical devices, pharmaceutical and hospital management, and system biology. The author made a comparative study of multiple diseases for which data mining was conducted and the accuracy of the predictions were monitored. The accuracy of all models were all high. The author also conducted tests on neural networks and tabulated the results. The author concludes by saying that although data mining is challenging in healthcare, it drastically reduces the work done by humans, and the obtained data is very valuable and can be used for further research.This paper is very unique as the author has conducted tests on many specific models of data mining and specific diseases and tabulated the findings. The paper shows that the data obtained using these calculations, though time consuming and complex, provides a lot of useful information that can be used for further development.

Advantages

1. Artificial Intelligence is a powerful tool, which when implemented properly in the healthcare industry could bring about many positive changes in the industry. It can make healthcare more easily accessible to many people.
2. Machine learning algorithms applied to given data can help predict and prevent many diseases. Systems are already in place, which can predict the onset of cancer with just a few picture.
3. AI and its technologies can link multiple departments of the healthcare industry, saving lot of resources and time to transfer data. This data can also be analysed to give a more wholesome

picture of the patient, and they can be diagnosed appropriately

4. AI and its robotic technologies are invaluable in the field of surgery, as its precision is unparalleled. Nano particles can even help heart patients without even requiring surgery to perform complex procedures.
5. AI can assist people who are recovering from surgery. They can even assist people with poor mental health, if they are advanced enough to have a full-fledged conversation with the patient.
6. The healthcare industry is currently suffering a human resource problem. There are too less experienced doctors, and too many patients requiring assistance. Although AI isn't advanced enough to replace doctors, it can be implemented to assist doctors with the influx of patients.
7. AI can use x-rays to build 3D models of a body part of a patient, which can be analysed without making a single intrusive incision on the patient. This 3D model can also be printed, and can be looked at in its actual size.
8. AI can be used to control the spread of information in the field of medicine. For example, during the coronavirus pandemic, fake news was identified by AI and was removed from the internet.
9. Medical research for vaccines, cures or diagnosis of new virus strains can be sped up greatly by the implementation of Artificial intelligence and Machine learning, as its predictive capabilities far exceed that of a human.
10. There have been recent discoveries of new strains of virus, which have the ability to change their composition in such a way that some drugs are rendered useless against it. Machine learning can easily predict the changes in the composition of the virus, and can also find the respective drug that can destroy the virus.

Conclusion

Technology in this age is evolving at a faster pace than anyone ever expected. Today, the world is trying to teach machines how to think for themselves. Even though that isn't possible in the near future, the progress made so far can make many peoples' lives more comfortable. AI is one such technology that can revolutionize many industries. One of the industries that can benefit greatly from these technologies is healthcare. Countries like India currently have the problem of very low numbers of experienced doctors, but too many patients. Machine learning, Artificial intelligence, and its accompanying technologies can solve this problem if implemented properly. Healthcare can be made more effective, time efficient, cost efficient, and a lot more accessible to every single person in the country. I personally think that AI a basic requirement to the healthcare field. If the ethical implications are taken care of, AI can prove to be a very useful tool to improve the healthcare industry, and improve people's lives.

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REVOLUTIONARY EMBEDDED SYSTEMS IN HEALTHCARE

ANSHITA BALA
20BEC0613
School of Electronics and Engineering
Vellore Institute of Technology, Vellore, India

Introduction

Margaret Rouse, Embedded technology is a system which consists of hardware, software and firmware and is designed for specific tasks in a complex, big system. They are computing systems. They have a range of interfaces—from no user interface to multi user interface.

The main function of embedded systems is to perform the function given to them i.e., they are task-specific. They perform dedicated tasks in a complex system

Characteristics of an embedded system are:

1. It consists of hardware, software and firmware.
2. They are either microcontroller based or microprocessor based
3. They perform their task quickly for smooth functioning of the system

Hardware

The hardware is either microprocessor or microcontroller based. Microcontrollers are one-man army i.e.; they are self-contained system whereas for microprocessor requires other components as well.

Microcontrollers also have memory and peripherals such as RAM. They are used in robots, medical devices and home appliances.

Software

They have operating systems specially designed for them specially where real-life tasks come into the scene. Major operating systems used are lower versions of Linux, embedded Linux, windows IoT.

Firmware

Acts as the ROM of the system but can be updated easily. They can be stored in non-volatile memory devices and are used to operate many devices.

Applications of embedded systems

1. Automobiles- cars nowadays contain up to 100 embedded systems. These include backup sensors, air bag and navigation systems.
2. Mobile phones-they contain many embedded systems including GUI software, hardware, software, cameras, microphones.
3. Medical apparatus-apparatus in hospital may contain embedded systems like sensors. But the systems are very user friendly
4. 10 Biggest Technological Advancements for Healthcare in the Last Decade. Technologies that can be integrated in hospitals are:
5. Electronic health record-This will help the hospitals to keep records in their databases. Rather than the huge amount of paper and files used for storing the information, keeping electronic health record is more efficient and reliable. It is also more secure.
6. Sensors and wearable technology-Nowadays, usage of sensors in watches, sunglasseshave become quite famous. Sensor based technology used in hospitals consists from a small device which sends alert to nurse or doctor when a patient falls down to a bandage that can detect the pH of the skin which will indicate us whether the cut is infected or not.
7. Wireless communication-Even though wireless has become common but it is still very new in the health sector. Systems such as Vocera messaging is used to send messages. Beds are also connected now using wireless technology.
8. Locating services- Tracking devices are used in hospitals now. From instruments to even medical staff. This is helpful when we need the instruments or the faculty urgently.

9. Portal technology-This is a one stop destination for both patients and doctors. It allows both the patients and doctors to interact online. It gives the patient more power of the doctor. The patient can detect the error if any.

Embedded technology has been a boon for the healthcare. It has lessened the burden of the medical workers. Nowadays watches and even sunglasses have embedded systems which provide the user with his/her pulse rate, blood pressure etc.

Literary survey

Bansal, A., & Joshi, R. (2018).Cardiovascular diseases are nowadays the major cause of deaths. These diseases can be recognized by symptoms such as angina, palpitationetc. So, to battle this, electro cardio graphy (ECG) is used to detect early symptoms. Development in technology has helped in recording electric impulses from the heart when the Main ECG machines are not available. The electric impulses can be recorded by wearing the technology as a watch for e.g. These sensors are small in size, wearable and can help in detecting heart impulses for a long time.

Methods

Devices were classified into 2 different categories –

1. Single limb lead ECG recording device-if they require usage of fingers or hands. They usually use the sensation of fingers, thumbs, palms to capture signals.
2. Multiple led ECG recording device-they capture 2 or more impulses using the sensors placed on the chest.

Some single limb lead ECG recording devices:

1. Alivecor kardia- it is a smartphone device which consists of a case as well. It displays ECG recording values and has additional features as well. It has thought to detect arial fibrillation in some studies and in detection of prolonged QT interval in the other.
2. Omron heart scan- it is port less, compact in size.it can help in detection of arial fibrillation

Multiple limb ECG devices

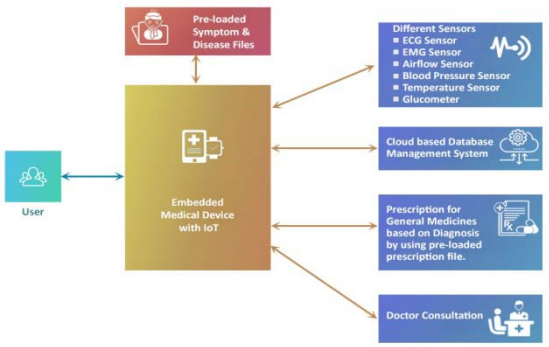
Ziopatch-it is a 14-day patch which is applied over left pectoral region of the chest. It is water resistant, wireless and doesn't require battery. After wearing the patch for some time, the data can be analyzed. Another is the hot topic of blood pressure. ssphygmo manometers and glucometers devices, allow individuals to check blood pressure (SMBP) and blood glucose (SMBG) themselves.

DARSHAN TALATI Healthcare facilities have started making the use of embedded systems to make up the lack of availability of doctor.

How Embedded IoT medical devices work:

They work by connecting different hardwares for detecting the disease. The user inputs data, then the system looks into the data that is provided to it and tries to match the symptoms. If the system finds the symptoms then it shows the disease and medicine for it.

In case, the system doesn't identify the symptoms. It goes into another test and tries to match the symptoms and tries to figure out the disease. And if, the system is still not able to determine the disease, it finally contacts the doctor. Then the doctor will give prescription to the patient and will also update the database of the system regarding the disease.



The user also needs to input his/her details such as name, age etc. All the information related to the patient is stored in cloud of the embedded system.

Aziz, K., et.al, (2016), Smart Real-Time Healthcare Monitoring and Tracking System using GSM/GPS Technologies

GSM technology is used for communication at any place and GPS technology is used to determine the place.

Now onto the working of the system. First the system starts by reading heartbeat and body temperature with the help of certain sensors which are called pulse sensor and temperature sensor respectively. Therecorded data is then compared using microcontroller which is Arduino. The micro controller also keeps checking the position every 20 mins. The data is recorded so that when the observed data goes beyond or less than the normal-acceptable value for the person, an SMS is sent immediately to the person responsible for him/her. The SMS contains name, heart rate, body temperature, and the position of the patient as well.

The system contains of 2 parts- one that accumulates the data i.e., the sensors and the second is to store and show the recorded data to the person responsible for the patient.

The system contains the following components:

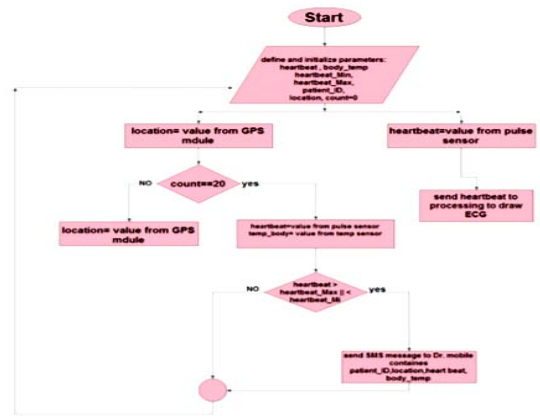
1. Microcontroller- It is the main component of the system. It acts as brain of the system.
2. GPS/GSM module V3.0-It is a shield which is quad band GSM/GPRS engine. The design of this shield allows any GSM/GPS to support the computer and the Arduino board.
3. Heart beat pulse sensor-As the name suggests, this component is used to measure the heartbeat of a person.
4. Human body temperature sensor-Again as the name suggests, this records the temperature of the body. It works on the principle of physical touch based on body temperature.

Result

For the doctors to get precise information, the developers work with Steinhart equation which is for the resistor of the semiconductor at different temperatures. Such devices reduce the workload of the doctors and is in the process of being used.

Collins Jr, et.al, (2016), Nowadays, Hospital beds are also connected to the main system of the hospital for the safety of the patient. It also comes in use during emergencies. Some hospital beds are arranged in a way that they connect to the head nurse's computer. On the computer the nurses can see the information of the bed which is connecting with them. Nurse call buttons are also provided which may be present along the side rails of the bed. By pressing the button, the patient can speak to the nurse. Moreover, they can also communicate over audio. In the nurse room as well as on the patient beds or walls speakers as well as microphones are attached.

The hospital beds are connected using wireless communication. The wireless technology can send the bed status as well as receive information from the other side. This shows where the bed is located as well because of the unit mounted beside the bed on the wall.



Chen, et.al, (2017), With the increase in chronic diseases among the people nowadays, it is becoming difficult for health care workers to manage on their own. Also, as face to face human interaction has stopped and people mostly communicate using social networking sites, it has also increased the chronic disease among people.

Now, there has risen up a challenge to have a check on chronic diseases. So, for that wearable 2.0 has been put into discussion. It is a smart clothing which is washable and consists of sensors, electrode and wires. It collects user's data and receives the data of user's health and emotional status provided by the cloud. Wearable 2.0 is connected to many cloud

services and multiple devices which help the people living a healthy life.

Working

The front side of wearable contains many sensors and is the main area from where most of the information is collected. It also works as a user interface. For better user experience, healthcare robots can be fixed on the front side.

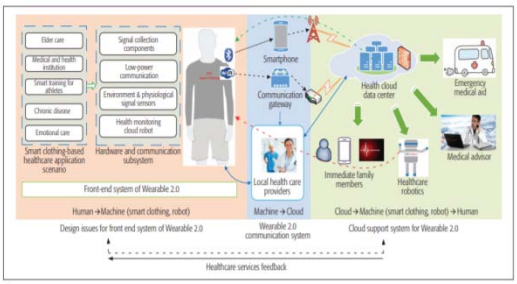
With the support of the cloud, healthcare data can be stored for a long time.

A wireless communication system is also important to achieve human cloud integration.

So, for normal users who use smartphones on daily basis, their information can be sent to the cloud with their phone being the gateway for the same. Smartphones will also help the users to keep a track of their health. For special users like elderly people who don't use smartphones that much or have difficulty using it, access points can be arranged for them. These points can be set up where they are active the most.

Functional components of smart wear:

1. Sensory Integration-pulse sensor is situated near the wrist, body temperature sensor in the underarm seam, ECG sensors are fixed near the chest region.
2. Electrical cable-based network-elastic textile cloth material is used to make the t-shirt. Flexible electric cables are embedded into the stitching cloth for extra comfort. This makes the cloth durable as well.
3. Digital Modules-Even though they do not belong to the cloth, these are attached to the clothing.



Li,et.al, (2016), In hospitals, the safety of the patient is one of the major responsibilities. Indoor positioning service can help the hospital is carrying out that responsibility. A new technology has been introduced specially for the new borns. In this, the new born can be easily found in the nursery. In this a tag is attached to the leg or wrist of the baby and then RFID to identify them.

RFID is short from for radio frequency identification. Electromagnetic fields are used to identify and track tags attached to the person/object. It consists of a small radio transporter, radio receiver and transmitter.

One such technology is iBeacon. It is a type of BLE devices that send unique information to the nearby device. It is like the traditional Bluetooth, having same coverage the only difference is that it consumes less power.

By attaching an iBeacon to every child's leg, it can be used for supervising the baby. It can be used to even identify the baby on the user's device. A predefined distribution map of all the iBeacon devices in the nursery room can help the users to take them to their baby easily according to the RSSI analysis.

Advantages

1. Health care workers such as doctors can use equipment to deduce if the patient has any disease or problem without having to perform an exploratory surgery.
2. The above-mentioned tools also help in monitoring the progress of the patients.
3. With the help of these technologies, patients can manage through home, they don't have to go to the hospital for every checkup effectively lowering the cost.
4. It increases the accuracy with which the doctors work and assess the patient.
5. The patient's engagement in the treatment also increases.

6. This technology reduces the room for error as well as waste. It cuts down on system cost and reduces waste.
7. Results have improved in operations and treatment since the introduction of embedded technology.
8. These technologies have helped chronic patients in improving their quality of living in the long run.
9. Doctors can access the patient records while checking up on him//her. He doesn't have to go out or ask someone to get the records of the patient.
10. And lastly, the development of complex embedded systems such as MRI, CT and ECG machines has made the job of healthcare easier.

Conclusion

The healthcare industry has excelled and improved since the embedded technologies have come into the picture. For developing countries like India, these technologies have played a major role in modernizing and increasing the pace of development. In developing countries where funds are tight, these systems help in the long run. They have not only made the job of doctors easier but also more accurate and hassle free. Diagnosis of diseases has become easier. Surgeries these days are more precise and tend to have much less room for error. Room for improvement and growth has also emerged since embedded systems were introduced. The patients have also benefitted from them. Frequency of hospital visits have decreased, it has been easy on their pockets as well.

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Posted by**:** Margaret Rouse

THE BUSINESS INTELLIGENCE SYSTEMS (BIS)

ADDANKI. KEERTHAN
20BEC0620
School of Electronics Engineering
VIT, Vellore, India

Introduction

Negash, S. and Gray, P., (2008).The Demand for Business Intelligence is growing since a very long time. The term Business Intelligence might be a new term, but the computer based business intelligence had appeared nearly a forty years ago. Business Intelligence systems will combine data gathering, data storage and knowledge management with analytical tools to present complex internal and competitive, information to planers and decision making. In this way Business Intelligence can be defined in a practical way. Perhaps the ideal definition of Business Intelligence system is that makes the actionable information at the right time, at the right place (or) right location and in the right form to assist the decision makers. This ensures the improvement in timeliness and quality of inputs to the decision process. At times this Business Intelligence systems also refers to online decision making, which is an instant response. This helps the decision makers to take decisions when the decision time comes, as BI helps in shrinking of time frame for decision makers. In every case BI is viewed as pro active. The business intelligence usually gathers the data from a data war house or from a data mart. Business Intelligence is defined by scholars and scholars in a similar way.

Dedić, N. and Stanier, C. (2016).Business Intelligence system plays a crucial role in for business in terms of development of the organization by providing competitive advantage in the framework of achieving positive info asymmetry, and it contributes to developing business processes and resources, maximization of profits and improving pro activeness, and also strategic decision making.BI is also used at operational level. Business Intelligence systems helps various types of users to spot emerging trends, to make faster decisions, to take necessary actions and cope up with the organizational problems as soon as they get raised. Its main aim is to help the stake holders for better understanding of their organization's operations, to make wiser, more informed decisions, and manage the operational performance. We can also use Business Intelligence to extract meaningful information from operational data produced on a daily basis, this might help the business stake holders in making wise decisions, predictions, calculations and analysis.

Conventional Business Intelligence used to focus on activities such as ETL, data war housing and reporting, thus it covers research areas such as data manipulation, propagating and visualization. But however, the new Business Intelligence also covers additional research areas like data exploration.

Literary Survey

Larson, et al (2016). The Business Intelligence has many uniqueness. The Business Intelligence plays an role of an enabler, It helps the organizations in enable to think smartly, work smartly, to become smartly and to make better decisions through the use of information or Technology. The primary use of Business Intelligence is to enable the use of information. The uniqueness of Business Intelligence is that it provides the useful information to the stake holders specially at the time when they need to take quick decisions. Business Intelligence systems have the similar characteristics to enterprise or infrastructure projects. Business Intelligence system implementation is a complex process involving hardware, software and resources over the life of the

systems. The complexity of this Business Intelligence increases with the scope of the BI. Business Intelligence project focuses on turning in data into information. Turning the data into information is not an easy task. Business Intelligence begins with some key questions like, What are the business questions that are to be answered? How will the data be used? What Data sources qualify as the system of records? , These questions are addressed through a discovery process which examines how data is transformed or created and how data becomes information Business Intelligence need a frame work of expectations which allow refinement and change. This objective is to focus more on collaboration versus spending time completing a detailed plan. This collaboration helps resolve this through determining what are the expections and needs and increasing the communication between the stake holders.

Eidizadeh, et al (2017). The methodology of the present study is descriptive i.e, non-experimental and correlational research design with SEM. In present studies, the questionnaires of Business Intelligence, knowledge sharing, organizational innovation and competitive are used to measure the constructs. The Confirmatory Cranach's alpha were used to evaluate the reliability and the validity of constructs. Confirmatory factor analysis is actually a theorical test model in which the researcher starts his analysis with a former or previous hypothesis. This model is based on an experimental and solid theoretical fundamental diagnose that which builds with which factors and also which factors are connected with each other . It also provides the researcher with a valid and useful method to correct the reliability of the constructs so that he or she can obviously test a number of hypotheses about the factor structure of the data that to caused by a predetermined model with a specific numbers and combination or mixture of factors. Following the identifying process of pre-experimental factors, confirmationary method tests the most favorable and best consistency of observed and theoretical factor structures for total data through determining and assuming the fitness of the predetermined factor model. Business Intelligence questionnaire of Popovicˇ et al. (2012) was used to measure Business Intelligence . This questionnaire will consists of 31 questions and 6 dimensions.

Farzaneh, et al (2018). The findings were classified into three areas: suppliers ares, customers areas and their relationships. With respect to the supplier area side, some of the themes were identified, including knowledge about customers, the knowledge sharing, the knowledge integration, knowledge protection, communication in a involving manner, project management knowledge, structuring around multi-disciplinary teams, technical knowledge about it, assessment of customer processes maturity and motivation for knowledge sharing etc. Regarding to the customer side, some other themes were also recognized, they are, team members' commitment and quality, quality of existing data, project members' job rotation, integration with the legacy system, top management support, clear project scope and goals with correct or appropriate deadlines, project managers' leadership role and resistance on system usage and utilization . Finally, considering customers and suppliers relationship, the perception of customers toward Business Intelligence Sysytems was identified as an independent theme. Since the goal of current research was to investigate the most influential factors of Business Intelligence Systems development at the team level, the identified themes at organizational and individual level were removed from further analysis. In this regard, the knowledge about customers, the knowledge sharing, the knowledge integration, the knowledge protection, communication in a collaborative manner, structuring around multi-disciplinary teams and technical knowledge etc were the most identified themes at team level which were divided on supplier side. In addition, team members' commitment was determined at the team level but on the customer side.

Rajhardja.U and Harahap (2019). There can be found three problems in improving the Business Intelligence. The existing and at the present container

cannot be able to collect, gather and coordinate activities throughout Indonesia because of the official site aptisi.org is not updated, not informed and cannot display the 0ongoing activities. The existing container cannot and could not display the user's overall activity, in such this case closely related to the activity dashboard to support business intelligence's performance. As well as the last whether the website can transformation aptisi can be in line with industry-based technology 4.0 which actually adopts business intelligence. From the problems exsisting, there are mainly three objectives of this study. The first one is that, creating an association or organization of Indonesian private universities that have a place and help to collect and coordinate activities throughout the whole Indonesia. Secondly, the objective is that building an existing containers to display the user's overall activities and such that problem will be resolved. Third, the objective is that produce the transformation of aptisi.or.id website which is in theline with industry-based technology 4.0 based on the Business Intelligence. These were the problems regarding the improvement of Business Intelligence which were actually found in Indonesia. Which were found as problems.

K.Bozic and Dimovski (2019). Over the past decade, a humongous spread of interest of researchers and academia have stimulated a remarkable body of the research to determine the value added for investion in Business Intelligence &A technology. Many studies have been contributing to this knowledge in many different ways. A general idea on basis of probability from the extant literature is that Business Intelligence &A use leads to improvement in efficiency of the decision making process. Thus, a common theory of this view is that Business Intelligence &A allow the identification, capturing, and the producing of the new insights and the knowledge, later used for decision making process (Acharya, Singh, Pereira, & Singh, 2018; Hou, 2012; Kowalczyk, Buxmann, & Besier, 2013). For instance, Popovič, Turk, and Jaklič, (2010) gave an idea of research model for deriving business value from the Business Intelligence &A and found the maturity of Business Intelligence &A and absorbable capabilities that help to facilitate the use of the quality of the information enabled by Business Intelligence &A in business processes and decision making processes. Similar to , Elbashir et al. (2008) in their survey based on the study, found that Business Intelligence &A to deliver a value through improved business processes (business partner relations, internal process efficiency, and customer intelligence benefits).

Dedić, N. and Stanier, C., (2016). DeLone and McLean proposed the well-known D&M IS Success Model which helps to measure the success of Information Systems. This D&M model is based on the literature survey but was not empirically tested. In their starting model, which was slightly changed later, In that model DeLone and McLean wanted to use the previous research on Information Systems and business intelligence success into coherent clusters. The D&M model, which was widely accepted and considers the dimensions of information quality, the system quality, Its use, the user satisfaction, organisational and individual aspect as relevant to IS success. The most current D&M model provides a list of the success variable of IS, categories in identifying some examples of key measures to be used in each category, For example: the variable category system quality could use the measurements such as the ease of using and learning, system flexibility and reliability, flexibility and response time; information quality could use measures such as relevance, intelligibility, accuracy, usability and completeness; service quality measures such as responsiveness, accuracy, reliability and technical competence; system use could use measurements such as amount, frequency, nature, extend and purpose of use; user satisfaction could be measured by single item or via multi-attribute scales; and net benefits could be measured through increased sales, cost reductions.

Advantages of Business Intelligence

1. Business Intelligence Systems provide accurate and fast reporting for the users
2. The BIS provides Valuable business insights, they constantly collect and analyze the data
3. It provides Better Data quality to the companies
4. It helps the Companies to stay ahead in the game, by providing data in terms of forecasting, budgeting, planning and staying top of things
5. Business Intelligence Systems also helps the companies to improve the customer satisfaction. Because it provides the customer's behavior and feedback and this helps them to find their drawbacks
6. Its also helps to make faster decisions and reduce the time to deal with a situation
7. BIS helps the companies to grow bigger profits
8. Business Intelligence systems helps to find out the areas which are waste or loss and helps the users to eliminate the waste
9. This Business Intelligence systems analyzes the data based on both qualitative and quantitative metrics, and helps in understanding what happened and why it happened
10. It also helps to track the performance and help to enhance the performance

Conclusion

Business Intelligence Systems are the future for every company or investors in any country even India. They provide the required information to take the right and accurate decision in this competitive world we should be able to take the right decision at the right time, the customer satisfaction and surviving in the game by finding the drawbacks in us. This BIS is useful to any kind of people who are aspiring to become an Entrepreneur and helps them to increase their chances. This Business Intelligence Systems will completely change the way of approaching a problem for companies and I feel that it is difficult by human brain to monitor all sections of a company to analyze the drawbacks and this is why BIS plays an important role.

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BUSINESS INTELLIGENCE AND ITS PRACTICALITY

ANNA MERIL JOY
20BID0008
VIT School of Design
VIT, Vellore, India

Introduction

(Guru99) What is BI? Business Intelligence (BI, for short) is a set of processes, structures, and technologies that convert raw data into comprehensible information that can help make profitable business actions. It uses historical data and fact-based decision making rather than relying on gut feeling and assumptions.

(Negash S., Gray P. (2008)) Business Intelligence is a data-driven DSS (Decision Support System) that is used to provide input to the decision making process. It combines data storage, data gathering and knowledge management and analysis to effectively evaluate the corporate's and its competitors' information. The origin of the term dates back to 1989, when it was first used by Howard Dressner, a research fellow at Gartner Group. He used it as an umbrella term to describe concept and methods of using fact-based support to improve decision making in business. This term gained wide acceptance and eventually replaced terms like executive information systems. BI focuses on analysis of huge amounts of structured (and also some unstructured) data about the enterprise and its operations. Competitive intelligence, which refers to the monitoring of competitive environment, is also included as a subset of business intelligence.

The usage of Business Intelligence has led to tremendous growth in many companies due to being able to assess their situation in a timely and efficient manner and take decisions based on that.(Bergen Adair) As a result, the market shares of BI has risen sharply in the recent decades. According to Gartner, BI's global revenue is expected to rise to $22.8 billion by 2020. An additional growth of $29.48 billion by 2022 is foreseen by Reuters.

Literary Survey

I. Why is BI relevant?

(Cindi Howson (2008)) BI, when used effectively can improve the performance of organisations. Margin, revenue, profitability, expenditure etc. can all be improved by adopting better business models and pinpointing your most suitable market, which is where BI can help. BI allows effective compilation of data and makes it possible to have the least cost expenditure to gain the most profit when used correctly. Of course, like everything else BI can also create inefficiency when it is not used properly or without the proper knowledge.

While early BI was used to monitor the market competition, it has become increasingly used in daily life. For e.g., airports and flights use BI to monitor flight delays, hospitals use BI to determine the optimum working hours and staff count, etc. BI has become a useful tool in daily life to get access to real time information whenever you want, wherever you want.

II. Why should you use BI?

(Nooshin Yazhari (2020)) Disparate data sources and multiple systems of recording data has been the biggest problem in BI. The challenges BI aims to solve are consolidating multiple reports into one, most accurate report. To get trustworthy data, you need to get the most reliable information, and this is where BI's capabilities come in. BI helps you get accurate and fast data in this modern fast paced world. Today's times are all about fast data, and the latest BI tools can help quickly develop and release user friendly reports to their users. As BI is automated, you require less human resources, and

therefore you incur less expenditure in your business. BI can generate quality data in very less time, compared to a human worker whose information is limited and who can't analyse multiple sources at once.

(Kascelan, Ljiljana (2011)) One of the ain technologies involved in BI is data warehouse. DW collects and integrates data of the company's operations, and enables the company to get important information for decision making from this data. DW uses intelligent algorithms to identify the clientele, trends, the market preferences, discover potential frauds, detect stolen credit cards, predict trends etc. An example of BI helping a company is that of the Royal bank in Canada; after implementing the BI system, they discovered credit card abuse and prevented losses of millions of dollars that they suffered every year.

Here are some of the benefits of BI:

1. BI system provides knowledge on the users and products on both the macro and micro levels. This helps the company effectively target the most profitable market and increases income while avoiding losses. It can also increase the client's loyalty.
2. BI can help companies find the causes and trends that cause the loss of clients and thus helps the company react properly.
3. It can also detect changes in key indicators and thus alert the company to problems and prevent facing its consequences. For e.g. when a company is about to go into a financial crisis, BI can help detect it.
4. BI offers higher operational efficiency, for e.g. it can discover the abuse of company credit cards, and as it functions on rigid rules, it can quickly and efficiently determine if a decision needs to be made regarding transactions.

III. Skills

Since BI as a profession has become highly sought after, a specific skillset is also needed for it. (A. Shirani& Maria Malu H. Roldan (2009)) Some of the most sought after skills for a BI analyst are:

1. OLAP (Online Analytical Processing) querying and reporting, (Wikipedia (2020)) which, in computing, is an approach to answer multi-dimensional analytical (MDA) queries swiftly.
2. ETL (extract, transform, load) (Vangie Beal) which are three database functions merged into one single tool used to extract data from one database and insert it into another database.
3. Knowledge of user requirements and project management.
4. Proficiency in use of dashboards, scorecards and metrics.
5. Dimensional modelling and DW (data warehouse) architecture.
6. Skill in analytics and data mining.
7. Familiarity with systems such as Linux and UNIX, and programming languages such as SQL, PL/SQL, and others.
8. Experience in security and metadata management.

IV. Usage in Small and Medium Enterprises (SMEs)

Teresa Guarda, Manuel Santos, et al (2013) Some people say that BI is not for SMEs, and that it is only applicable for large companies. But it can be argued that the same principles of BI can also be applied to smaller companies. With BI, SMEs can explore more of the market, adjusting to the preferences of its customers and hooking in other markets too. With BI, it can become more competitive compared to its competitors. The challenge faced by SMEs is to manage the huge amounts of data and convert it into useful information. One of the viable options for SMEs could be to use Software-as-a-Service (SaaS), which can help companies to improve their systems and IT current, and increase its quality. As BI allows and enjoys the advances in technology, and deploys software to match the new restrictions, it can help smaller businesses to integrate and redesign their data systems effectively. Usage of BI doesn't guarantee success, but an adequate and proper BI can create an edge for the company in the competitive market.

Antoniadis I., Tsiakiris T. et. al (2014) ERP is a business management system that integrates routine

business and operations through software, including marketing and sales with CRM subsystems, inventory management, manufacturing, planning, financial accounting and human resource management. When integrating the modules between BI and ERP, the operational and organisational advantages include improved productivity, decreased costs, dependable performance, reductions in paperwork, improved time management etc. SMEs have only recently been using ERP in their daily operations. An examined sample of firms have used ERP systems for an average of 6 years. The main advantages found were data integration, activity control, flexibility in decision making. Cost reduction was surprisingly the less important benefit. The main disadvantages were that of the costs of initial setup and support, and the time and funding for training personnel required to handle the new system.

Limitations in BI

1. The process of implementing BI can take between 6 months to several years, and the funding required for it is also very heavy, it can even reach a million euros.
2. Small businesses would find it difficult to implement BI because of the costs and small target market.
3. Data mining tools are complicated algorithms which requires extra personnel training to use them. This would usually require external consultants, and this adds to the cost.
4. It is not certain that implementing BI would lead to success. Research shows that out of 2000 projects that implemented BI, only 20% of them were successful to the end.
5. BI is not flexible enough to support the old methods of data collection, which contain many inaccuracies. This limits the data which can be compiled because of the lack of integration.
6. BI's data mining may use many terms which are unfamiliar to a user without some experience, and thus it may be hard to understand and comprehend.
7. Data mining require interaction with a user. This is not possible without some knowledge of the system's algorithms. As the algorithms are very complicated, this is not feasible for the average business.
8. There are many different types and methods of data mining in BI, so it can become very confusing and difficult to choose a method and navigate through the options.

Conclusion

From what we've recorded so far, we can see that there are clearly many advantages to BI. But, along with it, there are lots of limitations and prerequisites required so that the venture is successful. Large corporations, if they decide to effectively implement BI, can derive many huge benefits with little sacrifice. It is a riskier venture for SMEs, who don't have much capital or personnel. It may not be feasible for those without adequate funding or resources to use BI. The world of BI is already here for large companies, but it may not be the time yet for smaller ones. You also have to keep in mind that despite implementing BI, if it is not properly utilised, a company can quickly go to ruin, especially after investing so much into the costs of applying BI. And not all enterprises that implement BI would succeed. We've found that actually only a minority of the companies that use BI have succeeded. Therefore, whether or not to use BI completely depends on whether the enterprise is ready or not to accept and integrate BI.

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PROMINENCE OF DRONE TECHNOLOGY

ARIYAN DAS
20BME0169
School of Mechanical Engineering
VIT, Vellore, India

Introduction

A drone is an unmanned flying vehicle. In many countries it is also known as UAV or unmanned aerial vehicle. Drones were first invented in 1903 & the US has been a leading the race of weaponized drones from a century ago. Drones were mainly used for battlefield purpose. But now drones are now being used for a variety of purposes. Balasingram: Drones are a major game changer because of it's concept and innovation in upcoming years .In the US trials are run for the transportation of delicate organs through drones. In Africa the drones are used for the transfer of HIV test kits from a hospital to the required areas.

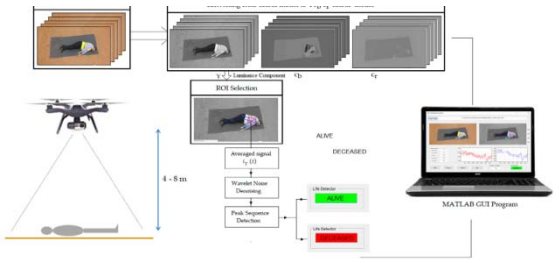
Restas: Drones are very fast to deploy , need low maintenance, highly versatile better flight time & low reaction time. By low flight time ,I mean without air refueling ,how much time it can be airborne. By low reaction time I mean how much time is needs to get in the air from the hangar when a threat is reported. So because of all this characteristics drones can be a viable tool to map a terrain continuously after a place is hit by any kind of disaster be it man made or natural. It provides very accurate data at the shortest period of time which will help the rescue teams to act promptly & at the earliest so that more lives can be saved.

Enmark: In the last decade we saw a rise in drone operation especially in anti terror operation. Be it NATO on ISIS, Russia on Chechneya or Israel on Hamas, drones have become more important for execution of anti terror operations. It is so because it saves the life of soldiers &is cost effective .According to the latest data the USAF trains more drone pilots than fighter pilots. Even the 6th generation fighter jets are also supposed to be pilotless which is also based on the drone concept. So this way drone is changing the entire aviation industry forever.

Literary Survey

Dronels-1

Al-Najiet. al:Drones can be used for search and rescue missions. If we can install some more systems on board then it can also be used to check the vitals like heartbeat, rate of respiration can also be detected. On existing technology this feature can be utilized when the drone is atleast 3metre away from the subject. We can reinforce the technology more so that the efficiency of the systems are increased and the drone systems can easily detect vitals of a person be it in any position and in any weather.



Pic-1 shows the integration of drones with other software for the given purpose

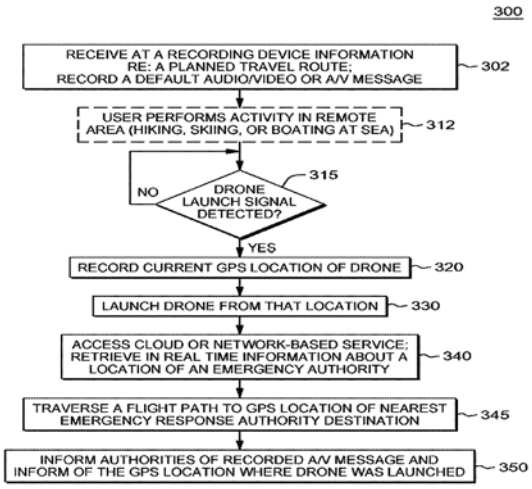
For these type of operations a quad copter would be suitable because it can hover over places unlike the fixed winged ones which are meant to survey the entire area. The drone should consist of a resolution camera & good sensors so that it can record good quality video. A conversion software to convert realtime frames to RGB models and a high performance laptop and related high end software to detect vitals of a subject from the realtime footage.

This software should also be enough capable to silence the noise from the rotor of the drone. The drone should have both satellite as well as radio communication and it should be durable enough to carry out operations in bad weather along with the sophisticated equipment and should be robust enough for repeated sorties in a day. The mobilisaiton of drones in search and rescue operations would be a great game changer. In traditional ways the reports are submitted by local authorities to relief teams, then only the relief teams would arrive for rescue. But now due to drone technology the authorities will get an indepth analysis of the damage caused and intensity of the calamity. This would help in faster decision making process and early deployment of relief workers and may even help to save many lives.

Infact these drones can also be used in military fields where they can be sent to check the damage caused by an attack from their side and to get an idea about the intensity of the strike.

Dronels-2

Fox, et.al: Drones can also be used for rescue of hikers, bikers, trekkers or people indulged in any adventurous sport activities. For this the person has to carry a transmitter which will help the rescue workers to track his location. And he should also carry it in such a way that it remains connected to his body. Preferably he should wear it along with the jacket.

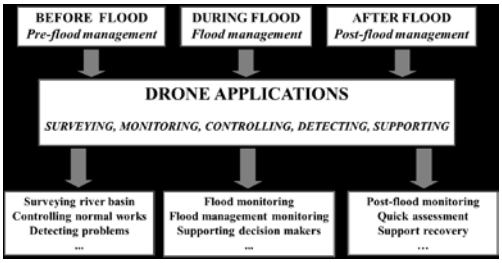


Pic-2 is the algorithm required for a drones effective operation in response to a threat

Another idea can be that hikers, bikers can plan their routes well ahead and give detailed information about it to the required authorities so that they can keep a track of their movement and if they are deviated from their route they can be guided so that they are not lost and even if they meet an accident they can be tracked down easily and will be rescued hence ensuring safety of the person's life. The UAV used should be a very durable quad copter which is enough competent to carry sophisticated instruments, perform evasive manouevres when the situation calls for it along with having a good flight time , low maintenance and reaction time. By sophisticated instruments, it means it should have good camera with very good depth sensors, heat sensor, chemical sensor, bio sensor, barometer, smoke sensor and accelerometer. It should also have satellite communication system and radio transmission for dual communication with the ground team and the headquarter. And it also provides an alternate routes of communication in a bad weather. It should have inertial systems on board so that navigation can be done even when GPS systems are down. These drones can help the rescue workers to plan their rescue attempts carefully so that more lives are saved in the moment of crisis. These drones can be programmed such a way that they will automatically respond to an SOS call. For e.g. there is a shipwreck and the captain of the ship launches an SOS then the drone will be deployed automatically and it will be navigated to the location of the ship t o take a closer look at the situation and also help in the faster deployment of the rescue services so that the people can be rescued in proper time and medical attention can be given to the needy people in proper time. Even the service of SOS is also available in the recent cars like MG Gloster, so this facility can also be implemented for ground transport as well. While the drones are travelling to their destination they can also give information about the connectivity of the area and help the rescue workers to make up plan for transport in that area in the most suitable and fastest way. These drones can also be used to study the contours of the hill effectively at a very low cost.

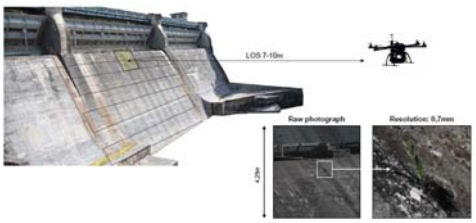
Drones-3

Restas,A et. al: Drones can be used for early detection of fires such as forest fires etc. Early detection means saving more lives and also expenditure of less resources to suppress it and take reconstruction work. By the use of drones it can help to detect the fire hotspot at much early than the traditional methods where either some people who had went over there convey the message of fire to the authorities or the authorities find it when the fire has taken it's most violent form. But through the regular surveillance by drone feeds by the authorities the fire can be detected much ahead which can result in saving of many lives and less deforestation and environmental pollution.



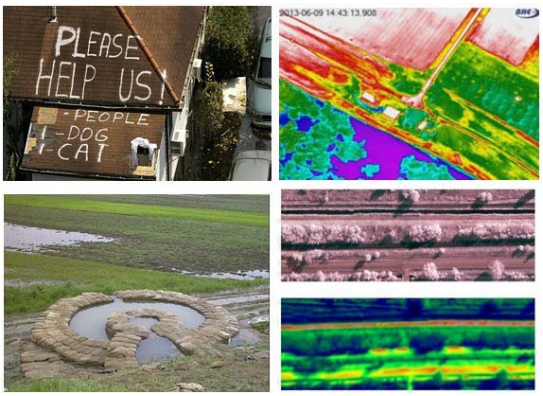
Pic-3 is a flowchart to describe the drone application in natural disaster

Due to this the reaction time of authorities to act is reduced. It can also be used to increase surveillance in the forest so that illegal activities can be controlled for e.g. poaching. In floods, drones can provide the live feed of the situation which can help the authorities to get better idea of the situation. By this the rescue workers can be able to react faster and will be able to save more lives. These drones can also be used to track the river basin's flow and judge the basin condition. By this type of uses the authorities will be able to predict the upcoming threats and can be prepared about it on time. Also these data can be used to prepare for the flood so that the area is well prepared for the next flood. Drones can also be used to survey superstructures like dams, bridges etc. . The drones will be able to detect cracks in the superstructures within no time.



Pic-4 shows the operation of drones to detect faults in dams

This will bring down the maintenance cost of the superstructures as well as avert many threats. It can be used to survey the overheated engines in a petrol pump so that a violent fire accidents can be avoided by the thermal sensors aboard the drone. Drones can also be used to map a area by the civil authorities.



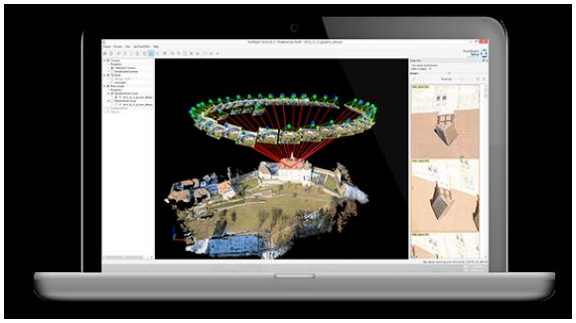
Pic-5 shows the various operations of drones with different systems aboard

Drones used in varied purpose. It can also be used by the insurance companies after a natural calamity so that it can sanction funds to it's clients. Even drones can also be used in policing duties to keep concerned area on high security & avert criminal activities. Even drones are also used in border patrolling these days in the areas where land team or armed personnel cannot go.

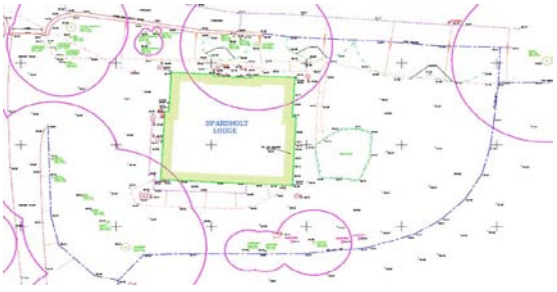
Dronels - 4

Lucero et al: Drones when equipped with high resolution sensors, auto navigation & other cutting edge technologies are in great demand today. Drones along with integrated high calibre software can be used to survey the landfills. For this purpose fixed wing drones are suitable because landfills are

extended over a large area and fixed winged drones can tread it effortlessly. In landfills these drones can help higher officials to keep a track on the activities of their juniors. These supervision can be very beneficial to avoid accident like landfill slide, landfill fire etc. . This will also ensure that landfill fires are detected at the earliest so that they are controlled properly. Drones can also be deployed for mapping purpose so that the separation of different types of wastes are possible and proper utilization of landfill areas can be done.

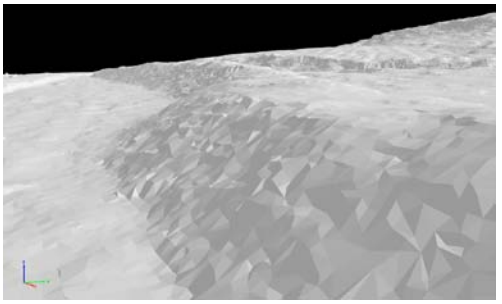


Pic -6 shows the compatibility of drone operation as it can be operated from a laptop as well!!



Pic-7 shows the mapping of an area by the use of drones

These drones also play a very vital role to avoid landfill slides which snatch away a lot of lives of people who work in the landfills. By the uses of drones the authorities can take up a proactive approach to manage the landfills. Also the interface of the drone s are so easy that it can be operated by any technician. These drones can help to cut down the costs of surveying to several folds.



Pic-7 shows the countours and 3D mapping of a place

It will provide the detailed video feed so that the officials can take up a prompt and accurate decision in a very short time saving the financial resources of the company. This way drones can be of very use in the landfills.

Dronesls-5

Corcoran et.al :Drones have become a vital part of journalism these days where the journalists are increasingly relying on it to cover stories in the violent areas. According to International Federation of Journalist more than 2000+ journalist and media workers have died during reporting or covering stories in the frontline.

Pic-8 & 9 shows that drone journalism is gaining momentum these days

Now in this era the journalists are using the drones extensively to report in the war zones or conflict stricken zones. By using drones journalists can report from a safe distance. It will improve the journalism in the conflict stricken zones. The introduction of drones in journalism also opens up the window of following and spying on their issue of interest. By the introduction of drones, the reporting would be very cost effective. This is so because the operating and maintenance cost of drones is very less. It also saves the media houses to call for a helicopter where the journalist cannot report from the ground. This also saves time of the media house or journalist as well as save the financial resources of the company. Even while reporting drone feed will be able to warn the journalist about incoming threats. This feature is very useful when the journalist are covering some conflicted zones or war stricken zones. But it also has some counter products. In US and Australia, the journalism through drones has picked up a rapid pace. In the skies there are more drones than birds. So although drones are playing a vital role in saving life of journalists in one field but also it is producing some problems in the other. The issue of dependency on drones is quite alarming and the same issue has been raised by the Times magazine.

Pic-10 shows the cover page of time magazine showing concerns of drone operation

Dronels 6

Marin et. al, Problems with heavy migration area gaining momentum in Europe. Due to heavy migration the European authorities are worried about illegal activities like trafficking of women and drug smuggling. Drones are used to map human flow from land and sea into their countries. These uses are gaining momentum because of the growing migration from Africa, Syria, Chechnya in Europe also increases threats of terror activities and other illegeal works. But there are problems with the uses of drones as well. An authority in the US the FRONTEX has demanded that the drones have to prove that they can fly consistently can survey a large part of the area consistently. The drones can be used for detecting suspicious vehicle but with infrared & thermal sensors the drones become versatile enough to deal with variety of problems. To utilize cost effectiveness rules and regulations have to be set. Also the framing of rules is demanded by both, the government and the private. Drones greatly cuts the manpower costs of a firm. But the most complication comes when the talk comes about data security and protection. So, the data should be managed properly by them so the data should be managed properly by them so the data are not leaked. Drones can also be used to locate migrants & other boats when they are in distress. To ensure proper, massive and safe uses of drones the; law of protection of personal information and data should be enacted There are also limitation in this process. Proper infrastructure has to be created for ensuring storage of data within the servers of the country. Strong laws has to be passed has to be passed so that the stored public information are not sold to anyone and the government would not use it for spying on us and the government should ensure that it protects right to privacy of citizens.

Advantage

1. The primary advantage that drones provide is the ability for quick action at a very short span of notice. This ability gives it the advantage to be

extensively deployed in rescue works, mapping of an area, surveillance or warfare.

2. Drones have shown a notable performance in warfare. Now every country is set to acquire armed drones as it saves life of soldiers and it can take out valued assets like air defence system etc. at a very low cost. We have seen this in the recent conflict of Nagorno-Karabakh region in the war between Azerbaijan and Armenia.
3. Drones are a very versatile platform. It can be deployed over a multiple domains if they are designed appropriately for it.
4. Drones are a new concept and it is booming at a very high rate. This also involves setting up drone industries and creation of job oppurtunities as it is a very bright concept and will be bright for upcoming 50 years or more.
5. Drones can be implanted with more and more sophisticated instruments as it has long servicing hours, that is , it has high durability or hours of flight . It can conduct a given task for a longer period of time.
6. Drones are a kind of expendable thing since it causes no life loss to the one who operates it. So the drones have once again revived the concept of Kamikaze drones and self loitering ammunition.
7. Drones are able to carry more weight as they do not have cockpit or pilot. This makes drone a very useful platform.
8. It can be deployed to dangerous areas such as radiation sites, flood hit areas etc. extensively as it can be deployed easily and there is no risk of life of the operators' side.
9. Drones are extensively developed. It has found it's used in development of 6-Generation aircraft where it will be pilotless and it will be able to operate swarm drones.
10. Drones are excellent for imaging an area and collecting large amount of data from an area.

Conclusion

Drones are a very versatile platform. Although it was introduced in the Second world war but in recent times, it's use has been extended to various fields. Drones are a simple in design, cheap aerial vehicle which can be deployed extensively. It is blessed with long flight hours, can carry heavy loads and has high endurance and serviceability. Drones are a very key to the future. Even 6-Generation aircrafts are also designed after drones. Drones are an efficient war machine. It has proved it's mettle in the recent conflict of Nagorno-Karabakh region between Armenia and Azerbaijan. Drones can be used as a testbed for testing multiple new inventions in the near future. It is cost efficient so it can be affordable to the required organization. It can be used to map an area, survey an area and it has lot more advantages. But it has it's disadvantages as well. Laws should be enforced to regulate drone related issues. To manufacture drone for civilian purpose, recycled plastic should be used so that there is no increment in the plastic usage. But drones have always saved lives of it's operator as he is never near the area of operation. Drone is a very new technology which has picked up a very rapid pace. It can be extensively used to supply medical products in areas where transportation connectivity is very poor. Well today a term drone diplomacy is under limelight as strong countries like the US sells it's Predator drones to other countries. This term is sufficient to indicate the importance of drones in this era. But we still have to be careful with the advantages and implications of drones because we don't want any more Chernobyl like incidents to happen again.

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Note: In this research I have read all those papers whom I have mentioned in the reference section. I guarantee that I have not copied any of their contents. This full research is solely written by me and the images used were mentioned in their respective research papers only.

BI: BUSINESS INTELLIGENCE

P.B. AMAL
20BME0171
School of Mechanical Engineering
VIT, Vellore, India

Introduction

Negash. et.al.(2008) Business intelligence is all about collecting data and converting them into useful information using the available technologies. Business Intelligence facilitates managerial works which is one of the main objectives is to improve timelines and quality of inputs. As the enterprise grows the need for data management and business analytics increases. With the developing technologies it is possible to make online decision making with instant response. The idea of business intelligence is that it provides the required information to the required group or organization at the right time, at the right place and in the right form. Business intelligence helps in strategic as well as operational decision making. It is the outgrowth of various decision- making systems that existed in the past. Business intelligence is a system that combines data gathering, data storage, and knowledge management. The term business intelligence was first used by Howard Dressner in 1989. It was widely adopted and replaced terms like executive information systems. It is the result of a series of innovations taken place over the years. It is continually progressing for better outcomes in various fields.

Leat, Vince. (2007) The process of collection and conversion of data into information, information into knowledge and knowledge into plans which benefits the organisation to make profits is achieved using business intelligence. It is the knowledge attained through various technologies to convert data into information. Its main purpose is to use data for financial gain. Since data is growing at a rapid rate, various enterprises are making use of business intelligence technologies to get useful information from these collected data. Some of the crucial steps in business intelligence involve understanding customer needs, revenue creation, optimization of cost, transformation of enterprise and transformation of technology. In order for a business to grow it is necessary to understand, identify and satisfy the customer needs. Depending upon the business requirements new data sources need to be added incrementally. There is also increasing complexity with the adoption of analytical tools. For a start-up company it is better to start small and expand gradually. Sufficient amount of funding and guidance is required to ensure long term growth. For a successful outcome it is necessary to establish vision, prioritize initiatives, measure and track Return on Investment and build trust in the system. Business intelligence could change the way we do business for the better.

Herschel. et.al. (2005) Along with business intelligence, proper knowledge management is also required for its smooth functioning. Data warehousing and online analytical processing techniques (OLAP) are used for decision making. The data is collected into a repositor where it gets processed and can be used for decision making objectives. In order for a company to offer satisfactory services to its customers they require information about their needs and collecting data solves the issue. They can use these data to get solutions. The extent of success that a firm makes using business intelligence depends upon the amount of investment made in business intelligence technologies. Business intelligence systems provide competitive advantages for those who make use of it. Since most of these systems are managed by IT people who do not sufficient power for controlling the business, leaders should supervise them to make better decisions to ensure that they are heading int the right direction.

Literary Survey

Aruldoss. et.al(2014) Since business intelligence provides necessary information to the stake holders it has been used in different domains to take better decisions. Knowledge, information and data are necessary to understand the needs of a customer and to make necessary decisions to keep them satisfied. The motive of this paper is to present a review on the works of business intelligence. Business intelligence is divided into seven different categories according to the requirements necessary for proper functioning. Each of these divisions are determined using parameters such as domain, purpose, problems identified, solutions applied, benefits and the outcomes. However more research on the topic is necessary for its growth and for it to be applied flawlessly. More attention should be given in its practical contributions. Further exploration in various subjects regarding business information is required since several methodologies were absent during its initial research.

Hawking, Paul. et. al (2010) The impact of business intelligence on the performance of the company is very high and hence it has a very important role in the business field. Even though it has a lot of benefits certain number of companies fails to recognise the use of business intelligence and considers it as a failure. A survey of 142 companies using the business intelligence systems was conducted among which 41 percent of the companies had to face at least one project failure and 15 percent considers it led to a major success. Business intelligence failed to provide necessary successes to those companies where proper planning and management were not implemented. Business intelligence systems are now used as an extension of the Enterprise Resource Planning (ERP) systems as they both can be combine to make more useful and required solutions. The ERP provides the information related to various processes involved in business which can be used by the business intelligence systems to make necessary solutions.

Azvine, Behnam, Zheng Cui. et. al (2005) Even though business intelligence is of great use for the enterprises it is expensive to build a proper fully developed system. It still lags behind in a lot of ways and its implementation is quite difficult initially. They still require people with adequate skills to run statistical analysis. The real time business data is not readily available because business activities are monitored outside the domain of business intelligence. The end business users also do not have access to real time information. The conversion of data into information can be hindered if there is a lack of experts who run the software. There are several technical challenges that can hinder the working of business intelligence systems. Further research needs to be conducted to ensure its proper and seamless performance. Although many technologies exist to execute this vision, many challenges still remain. The technologies to reduce manual intervention and automate the flow of information are necessary for easier usage. If any problem persists in converting data to information manual intervention is required and hence it can consume a lot of time.

Obeidat, Muhammad. et.al(2015) The main goal of this research report is to explore business intelligence and mention its uses. The data required for computing is acquired from data warehousing. With growing technologies acquiring has become easier and cheaper. A comparison between business intelligence systems and traditional methods were taken into consideration and the working gap was not much seen except that the business intelligence systems provided solutions faster and more accurately compared to the human alternatives. These systems have become cheaper compared to the previous years since the companies require increasing amount of data and the competition involved is very high. The success of an organization depends on the quality of their human resources. Business helps organizations to make data driven decisions. The business system technologies are very complex and extensive. Business intelligence is widely used and has become prominent in various fields. Enterprises should consider several factors before implementing business intelligence systems.

Advantages

1. Business intelligence provide timely and relevant information to support and simplify managerial tasks. These include knowledge intensive activities.
2. Since the impact of business intelligence systems is long term special care is necessary to be given to achieve a good outcome. To get the benefits of

business intelligence we should first have a broader concept of knowledge intensive activities.

3. The implementation of business intelligence systems would make the work less complicated and faster.
4. The quality of business intelligence can be determined by observing the information gap. The more the gap the less quality it has. Research is being conducted in order to ensure that maximum information is obtained for its working.
5. The more data it acquires the more information it can process. In short the availability of data determines how good the business intelligence system performs
6. Compared to the older techniques, business intelligence systems make use of artificial intelligence and other analytical capabilities. Hence the human errors such as inconsistency, incompleteness, unreliable information and wrong decision makings can be avoided to a great extent.
7. By combining both organizational and technical views business intelligence provide sufficient information to support their processes and decisions. In present days the business life cycle is shorter and hence companies need to come up with faster decision-making tactics and solutions to thrive better in the competitive business field which can be achieved using BI systems.
8. Business intelligence has grown faster in the recent years due to more collection of data and improving technologies.
9. A large number of companies spend its IT budgets on business intelligence technologies. The more amount the company invests in their business intelligence systems, the more better outcome they will get.
10. The quality of business intelligence can be determined by observing the information gap. The more the gap, the less quality it has.Since business intelligence shows the gaps where the company is lagging, they can avoid wasting time and efforts.

Conclusion

Making use of technologies like Business Intelligence systems in India willhelp the small-scale and large-scale businesses. The losses incurred to the company due to human errors can be reduced to a great extent by making use of these systems. Implementing these technologies will help make the work less complicated and hence they will be able to run smoother. This will help the companies to grow financially which will in turn help the Indian economy. With developing technologies, Business Intelligence systems are becoming cheaper and more accessible to a large number of companies at affordable rates. By obtaining large number of data related to the business context, the Business Intelligence systems will help companies to make better decisions and hence they will be able to run more efficiently. The government should take initiations to support start-up companies and hence help to bring more people to do business related activities. As these organizations grow by making use of BI systems, they will also provide jobs to many people and hence results in rising employment.

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BUSINESS INTELLIGENCE IN COMPANIES

ARYAN RANA
20BME0174
School of Mechanical Engineering
VIT, Vellore, India

Introduction

Margaret Rouse. Business Intelligence is a collection of processes which is used for analyzing and transforming data into information that can help businesses and employees to make right decisions. Business Intelligence process include intake of data from the external sources, analyzing the data and creating queries regarding it. It is used to make reports of analyzed data that helps in strategizing and good decision making. The main goal of acquiring Business Intelligence by a business is to increase profits and have an advantage over other companies in competition. The usage of Business Intelligence application differs from business to business, some may require only few of the capabilities and tools of Business Intelligence.

Durcevic, San. (2019). Various set of skills are needed for business intelligence of which some are technical and some are individual's own characteristics. One should be good at inspecting the collected and available data resources and make correction conclusion about it. Problem Solving Skills is the most important skill needed as it requires finding solution to real world business problems and making strategic plan for the benefit of the company. Business intelligence requires various tools and methods for finding the solution to problems or analyzing the data, therefore computer related skills and knowledge of programming is a must skill. For a business to be successful the employees of that company should possess good communication skills for influencing and convincing the consumers to use their services. It's very important to come up with new business ideas and different approach of implementing tasks and finding solutions to the problem can be very useful.

Negash, S., Gray, P. (2008). In today's world a single business organization is linked with large number of consumers which has resulted in creating a new data management challenge. BI system is required by the company as it helps them to learn from their past mistakes and create a strategic plan for success. Customers nowadays need faster and efficient services. All companies are in this race to fulfill customer's needs. Due to which they are heavily dependent on Business Intelligence System to stand out in this competitive world. With the help of tools of Business Intelligence employees can find solution of various issues and can implement their business ideas through analytical intelligence. The communication with the customer becomes faster using email, telephone and Internet. It helps in detecting various scams over internet and protects customer's phone and card details. Accurate data analysis and helps in better decision making but also enhances the performance of the company. Business Intelligence helps in planning e- commerce strategies for the benefit of the company. Transaction based powerful systems are already been used by various companies but in today's world of competition, the company which is able to use the available resources to the fullest through analytical oriented system wins the race. The companies nowadays want faster responses and results. They analyze the results and find ways to improve their business performances.

Literary Survey

Olszak., et.al., (2007). The perspective of viewing and using Business Intelligence varies with organizations. It depends on the company's objectives, philosophy and goals. Business Intelligence System is used to find a problem,

understand it and then convert the data in the form of information and knowledge. Various businesses start experiencing change and growth after adopting Business Intelligence. It helps them in making impactful and right decisions. The company should form a strategic vision in order have a successful project because they have to compete with the other companies as well. Business Intelligence not only helps the company in achieving its objectives but also help in making correct choices within company expenses, marketing, sales, company funding, etc. It monitors the customers in terms of their requirement, their expectation with the company, being in regular contact with them and ensuring customer satisfaction. Business Intelligence comprises of tools which help in solving various issues. The analytical tools in Business Intelligence allow the customer in a user friendly manner to analyze the data provided and share information with the businesses. The ultimate objective is to improve and keep a check on the performances of different organizations and sectors within a company and also taking care of whether a company is meeting all the needs of a customer or not.

Rouhani., et.al., (2016). In today's world a company's main tasks is the management of available data and convert them into valuable information which helps in effective decision making. In present time technology is continuously improving due to which business intelligence analytics software is also upgrading. As a result it is helping faster decision making processes. It has reduced the decision making time, not only that it has also reduced decision making cost. Better decision making along with advantageous opportunities is also necessary. The companies adopting Business Intelligence have an advantage over other companies. With the effective use of all the tools and functions of Business Intelligence, an enterprise can easily defeat its competitive companies due to better decision making. Business Intelligence can provide a complete analysis of the areas which a company is lacking and can help in the growth and improvement in the performance of the company. Customer satisfaction is important for a company but it is not worth until a business is making profit out of it. Therefore it is important that a business meets the expectations and goals of its investors, employees, directors and owners. Thus the satisfaction of stakeholders is equally important for the growth of the company as it can act as a censorious benefit. This can be easily achieved by a business by adopting Business Intelligence System.

Linstedt, D. (2002). Data Warehousing is done to collect and manage the data for the purpose of various business functioning. Most of the businesses today collect huge amount of data for several business operations. These data mostly consist of consumer data, product data, cost data, etc. This data is collected from variety of resources such as multiple websites, ERP (Enterprise Resource Planning) system and CRM (Customer Relationship Management) system. Most of the businesses have setup large warehouses to store such valuable data which helps in the decision making choices of the company. The data is passed through several stages where respective execution process is done. A data warehouse team is also present which is responsible for the intake of data from the user. The data which is useless or which do not meet the company's requirement is removed instantly. The useful data which can help in decision making of the company is stored safely. These data warehouses require maintenance as well to improve their performance as there are many issues associated with data storing such as- out of date data, useless and harmful data, lack of data storage, etc. These problems can be easily eradicated by practicing some specific methodologies. A data warehouse with proper design, architecture and with a reliable and efficient system should be build by the company.

Adamala, et.al., (2011). Business Intelligence provides various facilities to an organization but the execution of these capabilities come with various problems. Numbers of projects fail and number of projects succeed. The main aim is to find the factors responsible for making a business intelligence project successful. Due to globalization all the major

companies are dependent on Business Intelligence System. Considering all the Business Intelligence initiatives across the other countries it has been found that Business Intelligence projects are facing both technological and non-technological issues. The non-technological issues are more difficult to solve and time consuming as well. Therefore the main focus should be to work on the non- technological aspects of Business Intelligence System in order for the project to be successful. A successful business project use particular factor very often for higher success rate. The organization should make sure that the Business Intelligence System is user friendly, closely tied to the vision of the company, grab and give first priority to the opportunities which are best.

Scholz, P., et.al., (2016). Its difficult for small enterprises to adopt Business Intelligence System. A business intelligence needs high amount of investment as it requires hardware resources and huge data warehouse. In case they have all the arrangements and requirements needed for Business Intelligence System but still it requires specialization and most of the people in such small enterprises don't know much about data administration. The enterprises should understand the need for training their employees in this area to make complete usage of Business Intelligence System which can help them in the growth of their business. Business Intelligence is time consuming as well, though the execution by the software must be faster but analyzing the huge amount of data available and making a report on it takes a lot of time. Sometimes a business may not be able to see any growth even after adopting Business Intelligence System, this is because the enterprise may not be practicing Business Intelligence System correctly. For a company to make profit from Business Intelligence System a company should define the preconditions and objectives of the project and strategize accordingly. Lack of funding by the company is also one of the main reason for the project to be unsuccessful. To improve, a business should analyze its previous numbers, identify its past mistakes and hence make correct business choices. Business Intelligence tools can be used to find solutions to various problems.

Isik, O., et.al., (2011). Results have been found among various industries that people with higher Business Intelligence experience are more satisfied than less experienced users. The major reason for this is that people with more experience are aware of the advanced capabilities and functions of Business Intelligence. According to an assessment 70% of the respondents were satisfied users while 12% of them were dissatisfied with it. This assessment clearly explained that many users of Business Intelligence are not able to take complete benefit of it. It is also found that in terms of data reliability and risk management system users were highly satisfied. In terms of data quality present internally users are satisfied but they are dissatisfied with the data present in external resources. The greatest function of Business Intelligence that the user find is the integration of one system and the other within a same company or enterprise which helps in sharing the data or information with others. If we overall assess Business Intelligence it is found that users are greatly satisfied with it. Findings tell us that Business Intelligence capabilities such as reliability, management of data, risk supporting system, flexibility, data analysis, interaction with other systems, etc are well performed by users whereas the advanced qualities are not performed so well because it requires more experience and knowledge.

Conclusion

It's very important for the companies in India to adopt and install Business Intelligence System as it can help them to find solutions to various business-related problems and increase their profits. Increases profits of companies will help in the industrialization process of India which directly affects the GDP of the country. Adopting this system can be helpful for common men and women as it will increase job or employment opportunities. Business Intelligence system give immense power to employees which help them in better decision making. According to me this technology is very helpful and beneficial for businesses because of its ability to store large amount of consumer data which can help the company to work efficiently and fulfill all customer needs.

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RFID IN HOSPITALS

ANSHUMAN SINGH
20MIC0026
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Clare Hopping, (2020) Embedded Technology or System is basically a microcontroller, which has been assigned to accomplish a particular task multiple time. It's like a mini computer designed to do a particular task. Examples include Refrigerators, washing machines, DVD players, etc. Embedded systems should be fault proof i.e. highly reliable. As Embedded Systems are a part of larger systems, any fault in them could trigger serious issues in the larger system. Embedded Systems can be of various types, like: Standalone systems, Real-time embedded systems, Mobile embedded systems, Network embedded systems, etc. These systems are called 'Embedded' because they soldered / fixed components. They require a specific set of instructions, for any other instruction, they will take it as wrong input and will not perform any task. Also, Embedded Systems are very small, consume very less power, are relatively cheap, are highly efficient and have a very low maintenance cost.

Donna Marbury, (2019) Hospitals can be integrated with a lot of current and upcoming technologies, like Cloud integration, use of AI (Artificial Intelligence), Machine Learning, Blockchain Technology, E-Meetings, etc. AI can help better interpret complex data, can give real time insights of data from equipment and sensors, can allow use of voice commands, detailed and more informative medical reports and images and use of bots, pre-trained with clinical knowledge, in virtual consultations. Also, the integration of Virtual meetings with doctors, will allow patients at larger distances to easily connect with their doctor. The data from smart devices like wrist watches, smartphones, etc, can be of great help for both the patient and doctor, if shared on a non- local network i.e. sharing it with the hospital. The smart devices can help the patients with their medication and can help the doctor to monitor the patient's health.

Guinard, P. F. D., (2006) Embedded Technology can help deal with a lot of problems and help eliminate the chaos. Mis-identification between two patients, surgery at wrong spot, theft/mis-placement of equipment/medicines and wastage of time in searching & ordering the stolen/lost item are some of the major problems which can be eliminated via the help of Embedded technologies like RFID and IoT (Internet of Things). Each equipment, medicine, tool, etc can be equipped with a RFID tag. Every Doctor, Nurse, Patient and staff member can be given a RFID equipped bracelet. These RFID can help identify, track and improving the overall efficient working of hospital.

Literary Survey

Yu, L., et. al., (2012)

1. Uniqueness: This paper discusses the problems as well as possible and feasible solution to it. Keeping the suggested solution easy and comfortable to use, and also providing relevant backend details.
2. Problem: Lack of communication between different departments of hospital. The data feeding and storage techniques are old and it can be accessed only at certain points in hospital.
3. Solution: Building a smart hospital via the use of IOT (Internet of Things), which include use of Internet; RFID equipped products and other objects; wireless communication methods like Wi-Fi, Bluetooth, etc; Chips inside devices with sensors like accelerometer, temperature sensor, etc.

4. Short Summary: Hospitals now require to be upgraded with technology to work more efficiently. The upgrade includes making use of IOT (Internet of Things) network. The system should be built using Network and Data Standards to remove compatibility issues. Also, the focus should be on wireless methods of communication to allow mobile access. Unified platform and security are also the important aspects. Architecture, Structure and Framework of system is also discussed.

Guinard, P. F. D. (2006)

1. Uniqueness: There are a lot examples of Surveys, Pilot projects and on-going applications. It has presented an idea of use of RFID chips, and for the same they have developed an open source application 'RFID Locator'. And an emphasis on use of EPC Network Standards.
2. Problem: Mis-identification between two patients, surgery at wrong spot, theft/mis-placement of equipment/medicines and wastage of time in searching & ordering the stolen/lost item.
3. Solution: There is an idea to build a smart hospital using the RFID chips i.e. building a hospital with IoT (Internet of Things) Standards.
4. Short Summary: The paper describes the methods to build a smart hospital using RFID technology i.e. building a hospital with IoT standards. The Doctors, Nurses, Patients, Medicines, Equipment and other staff, should be given a RFID tag to ensure efficient working without any error such as mis-identification, theft, loss, etc. RFID reader should be installed at multiple places, especially at all the exit spots from the Hospital premises (to prevent theft) and at the entry gate of operation theatres (to prevent mis-identification of patient).

Kavitha, C., et.al., (2012)

1. Uniqueness: The paper presents a detailed information on working and construction of a digital Out Patient Department (OPD) system using embedded devices.
2. Problem: In a hospital with large number of doctors, having specialization in a particular field, it is very difficult for the out patients to locate the doctor's cabin to whom they want to consult.
3. Solution: The author has presented an Out-Patient Department (OPD) system using embedded devices to reduce the efforts made by the patients in searching the Doctor's cabin and to keep a proper track of patient order.
4. Short Summary: The paper defines what is an embedded system, i.e. a device which can be programmed to perform a particular job multiple time. The paper then presents the design and working of an Out-Patient Department (OPD) system, to reduce the efforts made by patients. The Block diagrams of the Master OPD unit, OPD Slave unit and Display unit system is given. These units are the part of the main system. The system also contains a LCD (Liquid Crystal Display, to display data at reception), MAX-485 (to establish communication), Keyboard (to input data), Memory card (to store data), RTC (to store date and time of events) and a TFT screen (to display names of patient outside the doctor's cabin). Some preconditions are also need to be checked to ensure proper functioning of the system. The system can also be made wireless.

Jegan, R. (2014)

1. Uniqueness: The paper discusses the different parts of the proposed system, providing the model name of the devices and protocols to be used. It also gives a comparison between Zig Bee and Bluetooth (both are method of wireless data transfer.
2. Problem: People with health risks, especially elderly people, who are leaving alone or are alone at a particular point of time. For them the proposed system can be a life saver.
3. Solution: A wearable device is been proposed, equipped with sensors like accelerometer, temperature monitor, etc. to monitor the health of the person, and alert the hospital in case of an emergency.
4. Short Summary: A wearable device is proposed, designed to read the vitals of a person like temperature, movement, heart rate, etc, continuously. This device will specially be useful

for elder people living alone. If in case a health risk arises, the device can alert the hospital. The device also logs the vitals at regular intervals, so that the data could be used for diagnosis. The device is low cost, comfortable and reliable. The sensors and processor used should use low power and have high accuracy/performance. The wire networking methods used are ZigBee and Bluetooth, each having their own advantages and disadvantages. The collected data is shown in a Graphical User Interface (GUI) in the host computer.

Aminian, M., & Naji, H. R. (2013)

1. Uniqueness: The paper proposed an upgrade to already existing system, providing detailed instructions of the new system's construction and working mechanism. The author also tested its system in a simulator to test its effectiveness and efficiency.
2. Problem: The patient's body vitals need to monitored continuously to avoid any risky situation. But the current sensors are attached to an im-mobile bedside monitor because of which the patient can't leave the bed.
3. Solution: The proposed system eliminates the im-mobility problem by the use of Multi-Patient Body Sensor Network System Design.
4. Short Summary: The proposed system will have four parts: the WSBN (Wireless Sensor Body Network), WMHRN (Wireless Multi-Hop Relay Node), BS (base Station) and a GUI (Graphical User Interface). The WSBN will be equipped with sensors like Accelerometer, Blood Pressure monitor, Heart Rate monitor, GPS etc. The data will be collected and stored in real-time, and will be monitored for any abnormality. If in case an emergency situation arises, the hospital staff and the patient's family will be alerted. This system can be of very useful to serious patients and pregnant ladies. Indigenous methods are used to decrease end-to-end delay & energy consumption and to increase the coverage range. The proposed system is also simulated in OMNet++ simulator and is found to be more efficient than the existing WSBN systems.

Pappu, M., et.al., (2004)

1. Uniqueness: The paper discusses the implementation of RFiD (Radio Frequency Identification) for the purpose of identification and tracking, it gives proper reason for every tagged person or item. It also gave examples of on-going trials and researches.
2. Problem: There is a huge crowd in hospitals, and locating a particular doctor is a tough job and can even prove to be fatal to the patient, especially in case of emergency. Also, mis-identification of medicines, patients, test samples, etc, is a huge problem that needs to be fixed.
3. Solution: The problems can be minimised or even eliminated by the use of RFiD tags. Every doctor, nurse, patient, visitor, new born baby, test samples, drugs and equipment should be tagged.
4. Short Summary: RFiD is an electronic circuit, which is capable of transmitting data wirelessly. The tags work on the principle of Mutual Induction. Each and every component of the hospital has its own need to be tagged. Doctors should be tracked to ensure their availability at the time of need. Nurses should be tracked to prevent their contamination with the disease of the patient, and also keep track of the who and which nurse gave medicine to the patient. Patients need to be tracked to prevent mis-identification errors. New born babies should be tagged to prevent their theft and matching error. Other items should be tagged to prevent their theft, loss, mis-placement, matching error, use of contamination equipment and items and proper disposal of medical waste. Also, the use of RFiD will eliminate the growth of fake drugs. Some of the on-going researches or projects are Agility Healthcare's AgileTrac, Exavera Technologies' eShepherd, Maxell's RFid equipped Test tubes, etc. The future of RFiD in Healthcare is very promising, even if one life is saved, it will justify the cost of system.

Advantages

1. Embedded Systems, being highly reliable, require less maintenance and thus reducing the

maintenance downtimes, inconveniences and the financial expenditure of hospitals.

2. Embedded systems require very fewer physical connections, making then mobile and easy to install and use.
3. Being small in size, embedded systems can be fitted into bracelets, anklets, etc for convenient use.
4. Embedded systems are very inexpensive reducing the implementation expenditure as well as maintenance.
5. Embedded systems make the functioning of the hospitals fast and efficient. Wireless systems add more the fast operation.
6. Embedded systems require very low power.
7. Use of embedded systems improves the overall patient experience.
8. Use of embedded systems help the hospital staff keep track of medicines, equipment and the treatment plan of patients.
9. Embedded systems help keep track of patient's body vitals, and alerting the staff or doctor if needed.
10. Being small in size and capable of wireless communication, they allow the patient to be at their home, being monitored at the comfort of their home.
11. Embedded systems can be used in the existing medical equipment, like stethoscope, increasing the equipment's efficiency and capability.

Conclusion

For a developing country like India, use of Embedded technologies like RFID can prove to be beneficial in many aspects. The Financial savings that can be made using these technologies can be used for the upgradation of the hospital infrastructure and quality, this will boost the development rate of country as more work can be done from same budget. Implementation of these technologies will help the country in few more ways too, as this will require mass production of embedded devices, helping the manufacturing industry, and creating new job opportunities. This way common people will also be benefited. The current situation of many government hospitals is not good. So, by its use, the patients and their relatives will face less difficulties. Also, the malpractices going on by the hospital staff can be reduced. Like a coin, these technologies too have a bad affect, but the advantages out-weighs them.

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ARTIFICIAL INTELLIGENCE IN HEALTH CARE INDUSTRY

S. ADITYA
20MIC0037
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

Reddy, S., Fox, J., & Purohit, M. P. (2019). Artificial intelligence (AI) can be defined as the science and engineering of making intelligent machines which would be able to demonstrate behaviour similar to that of human intelligence. Turing test is a methodology to ascertain whether the AI is capable of thinking and making decisions like humans do. Earlier the development of AI was difficult since it required enormous processing power and financial support, but now with technological advancement, Computer engineering provides necessary tools that makes AI applications conceivable.

Stuart J. Russell and Peter Norvig (1995). AI programs tend to be huge and needs high speed and memory. But now with emerging new technologies and increase in processing capabilities AI looks promising. Lately, there has been massive advancement in artificial intelligence (AI) with the development of natural language processing, deep neural networks (DNN),computer vision (CV) and robotics. Ideally the Artificial intelligence should be able to possess knowledge representation, automated reasoning, machine learning and perceptional abilities such as computer vision and object recognition. There have been several cycles of development which has resulted in refinement and birth of better AI systems.

Innes G (2015).Challenges faced in healthcare industry includes inequality, overcrowding, patient assessment and treatment, demographic distribution, accountability zones and funding. It is often found in developed and developing countries that all do not get proper medical attention either due to affordability or overuse of medical facilities by those who are covered by public health care schemes. Inefficient assessment of patients easily leads to uncontrollable queue and overcrowding in health care system. For example, emergency trauma centers will be dealing with managing injured patients. Hence it can be seen that specific departments deal with specific types of patients (accountability zones) and requires efficient management which is currently problematic due to shortage of specialized workforce. Demographical study is relevant in space utilization and is very important in managing the overall resources.

Reddy, S., Fox, J., & Purohit, M. P. (2019). By using AI in health care doctors can spend quality time with patients while AI can assist in healthcare administration such as recording of patient history and its transcription, compiling of health record and cataloguing of information. Based on the success of medical treatments recorded earlier, AI can assist in making clinical decisions on newer cases. Machine learning has been able to identify cases of malignancy to a great degree of accuracy. There might be a rare chance that due to minor data imperfections clinical decision by AI can adversely affect the patients 'well being and hence such processes should be supervised by medical professionals. AI can further be utilized in monitoring the health parameters such as blood pressure, oxygen level, heart rate etc, of in-patients and provide alerts to the health care workers in case of emergency. AI can further be enhanced to monitor patients remotely. With further advancements in robotics, machine learning AI can be used effectively in surgeries. In my view, Artificial intelligence can add face recognition, object recognition, image classification which can help health care industry. Implementing Artificial Intelligence in health care

industry can save the funding and will be a one - time investment.

Literary Survey

Challen, R., et.al., (2019)The author has said that there is a rapid growth in the Artificial Intelligence (AI) field and also said that there is more to be researched about this technology. The value of AI in healthcare has not yet been realized. In this research, the author has explained about the benefits of machine learning (ML). Clinical decision support systems (DSS) has been used in many fields of healthcare industry. Different applications of ML require different calculations. The machine learning performance is frequently dependent on the accurate arrangement of training data. Machine learning can be poor at perceiving a change in context or information. He explains about three issues: Short term, middle term, long term. As with all clinical safety discussions, we require to keep up a practical viewpoint. Problematic decision making will occur with or without machine learning support and we should adjust the potential for development against the danger of negative outcomes. Developing Artificial intelligence in health care through the use of machine learning is a rich area of research but a quick pace of change, variety of various strategies of parameters make it hard to get a clear picture of how precise these frameworks may be in clinical practice.

Shinners, L., et.al., (2020) Many countries of the world like United States, China have started investing huge amounts of money into artificial intelligence research. Australia's leadership in Artificial intelligence promises collaboration between doctors, researches, industry. Australian medical services labor force is needed to turn out to be carefully educated to deal with the critical changes in the medical care scene. Universally, Artificial intelligence is being built into the establishments of society with at least 19 countries distributing National strategies on AI and planning to become worldwide pioneers in its application and use including Australia. Machine Learning programs are capable to utilize algorithms to extract highlights from information, make relationships and offer future modeling to patients and doctors. Russell and Norvig describe that artificial intelligence has been related with capabilities, for example, arranging, observation, thinking, decision-making etc. According to the author, healthcare experts were less likely to use artificial intelligence in healthcare industries as they did not have any trust in technology. Some studies suggest that the healthcare experts were frightful that the technology would replace them. World Health Organization (WHO) addressed digital health at the Seventy -First World Assembly and perceived that 'while technology and advancements can upgrade the health services, human interaction should not be compromised '.The expanding integration in artificial intelligence into worldwide medical systems is inevitable as medical care costs rises with our population.

Meskó, B., et.al., (2018) The author classifies AI into three: Artificial narrow intelligence (ANI) which does well at executing a single task, Artificial general intelligence (AGI) which can comprehend its environment as same as human being, Artificial super intelligence (ASI) which thinks smarter than human beings. Supercomputers is high level computers used for executing tasks like machine learning (ML) and deep learning. Machine learning is a software which includes large set of data. The author also finds that using supercomputers in healthcare industry can save time and huge amount of money. Artificial intelligence bases administrations could encourage more exact diagnoses, decision making etc. Some of the limitations faced by healthcare industry are shortage of doctors and growing demand for chronic care. Many people in the world cannot afford health services. Physicians are being overloaded because for increase in number of patients. Artificial intelligence does not cover empathy, human touch and proper communication. Artificial intelligence implies a change in doctor - patient relationship. Then, who is responsible if artificial intelligence makes some harm to patient? Finally, we can't say about the use of artificial intelligence in health care

as there are no trails done. We think the technology will lessen the cost, making it quicker and more effective which can lead in a change in medical profession. Artificial intelligence shows critical possibilities in improving diagnostics it will probably not unravel the HR emergency in medical care. There are even more questions to address, our stand is that AI is not meant to replace medical professionals.

Murali¹, N., & Sivakumaran, N. (2018). In this research, the author emphasizes about the digital technology which has been liberating doctors and nurses to focus on mental energy on more significant-level analytical tasks and patient concern. Artificial intelligence (AI) has the ability to expand the energy of an individual in three regions: computation, factual examination and hypothesis generation. Doctors and nurses should utilize artificial intelligence to make their diagnosis fast and accurate. Artificial intelligence can do repetitive jobs quicker and more precisely. The most evident use of artificial intelligence in healthcare industry is to manage the information (or) data. Artificial intelligence can be used to give alarms if a patient faces any issues. Wearable gadgets such as FITBITS will monitor the data associated to health of patients such as pulse rate, heart beat per minute etc. Artificial intelligence has the capability to recognize symptoms more precisely, for example: MRI, USG scan and hence allows quicker diagnosis. Robot assisted surgeries can be done perfectly by improving the technology like machine learning and deep learning. Medical care bots which are found in mobile apps can connect to the patients via messaging and can provide support to the patients by assisting the medications and doses. The AI technology can image the various problems in patient's body like tumors, infections etc. Finally, the author conveys that if artificial intelligence is correctly applied in health care industry, it can lead to a significant development in the field of healthcare.

Desai, P., & Shah, S. (2019).Artificial intelligence (AI) is an innovation which is very apt in the present advancing world and it will most likely have an incredible effect not only on health care but also on other fields. The author has also said about the role of artificial intelligence in health care such as: Finding DNA mutations in tumors, AI systems in ICU, curing health related issues using artificial intelligence, maintaining health records electronically in health care systems, use of virtual health assistance in health care systems. In the future AI systems will be more progressed to complete a more extensive scope of undertakings without human control. This is a subject of philosophical discussion, bringing up issues and whether duties that apply to human can or should apply to machines or whether new moral standards may be needed to change the face of AI. The author analyzed that the main issue of health care is every single day more than 500 people are losing their lives just because of errors and manipulation of data. Nowadays 500-600 people are dying alone due to errors, accidents and infections in hospital alone. People cannot afford the cost in the hospitals which is also a big challenge in healthcare industry. The future holds extraordinary potential for applying artificial intelligence in health care. Artificial intelligence is not only helping the doctors but it is also helping the patients. There are many challenges but the benefits exceed them.

Nadikattu, R. R. (2017). In this research, the author particularly focuses on the help of Artificial intelligence in cardiac management. Artificial intelligence (AI) provides a multi observing feature which permits us monitor more than one individual having an alternate sort of issues. A doctor who uses the technology will utilize the system as a clinical instrument which can treat a high-risk patient at a time. Numerous alternatives are given by numerous Artificial intelligences assembled organizations like some give to associate 48 remote patients at a time to treat them at a single time with the help of multi-inserted artificial intelligence system. Cardiology plans to utilize artificial intelligence to do more development and focus on fitness with the assistance of medical practice of AI. In the treatment of cardiac patients AI can be used to give artificial respiration

to who are not able to breathe. Some of Artificial intelligence-based tools are: Support vector machine (SVM) and genetic algorithms etc which can help in the medication of cardiac patients. Cardiovascular medicine application on AI can help find any patients disorder and lead to treatment with better and accurate outcomes. AI system have been used in many clinics to monitor patients more accurately and doctors can try to understand their health more properly. This type of way can help clinicians reduce their cost and can try to analyze their health more properly by giving them best treatment. Artificial intelligence should pick the correct data of their problem otherwise it will fail to treat that person. As AI treats a greater number of patients at a single time, it should be good computation and thinking else, you will lose the correct performance of the method. Finally, the author is making his best in explaining the use artificial intelligence in cardiac treatment which makes the doctors to treat the patients well and get the benefits at a low cost.

Advantages

1. Artificial Intelligence (AI) tools like smart watches and FIT bits can study the health history of the patients and can easily predict their future risks accurately.
2. Involvement of Artificial intelligence in healthcare is cost productive.
3. Artificial intelligence can assist doctors by giving patient's vital information in the course of surgeries.
4. Artificial intelligence saves precious time for the medical industry.
5. AI software programming can be modeled to precisely spot indications of specific illness in medical scans like MRI, CT scan etc.
6. Artificial intelligence being a machine does not get tired and can give precisely the precision result multiple times, whereas a health worker's decision may be affected due to fatigue or other causes.
7. Use of AI in surgery can produce high precision cuts and sutures, and deep level corrections with minimal incision.
8. Artificial intelligence systems can help in reduction of unnecessary hospital visits.
9. AI can reduce time spent on administration services.
10. Limb replacement with prosthetic limbs with AI sensors help handicapped patients to carry out their daily chores effectively.

Conclusion

In a highly populated country like India, Artificial Intelligence (AI) can be useful in tracking quick-spreading diseases like flu,Covid-19 etc. Although Indian healthcare industry is cheap when compared to other developed countries, majority of the Indians are not able to afford these services. On one hand rural India is facing many problems, such as lack of doctors and rural mass are not able to afford costly health care system. On the other hand, India is rich in talent and have capability to build advanced equipments in field of science. Many engineers from computer and mechanical fields can be given employment in the field of artificial intelligence, machine learning and robotics. The poor will be able to avail cheaper healthcare services. Indian people consume more tobacco which causes mouth cancer. AI can help in identifying the risks of this disease and provide insight to the common people and in surgical therapies. Current day lifestyle causes diseases like diabetes, cholesterol, high blood pressure etc. In India, more than 77 million people are affected with diabetes but come to know about it at a very later stage. AI can be effectively utilized in improving the health scenario and precautionary stances. Artificial Intelligence has a bright future and has high potential not only in healthcare field but in various fields. There are some disadvantages of artificial intelligence, but the advantages overrule them. From my point of view, AI should not replace doctors whereas AI should be medium in between doctors and patients as the doctor-patient relationship which has an emotional attachment should not be compromised.

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Stuart J. Russell and Peter Norvig (1995).Artificial Intelligence: A Modern Approach

ARTIFICIAL INTELLIGENCE IN BRINGING ABOUT A REVOLUTION IN THE HEALTHCARE INDUSTRY

ANANYA GHOSH
20MIC0063
School of Computer Science and Engineering
VIT, Vellore, India

Introduction

The Royal Society, (2018), The intelligence that is demonstrated by machines, which is not their natural intelligence like humans, the way of making computers, robots or software think intelligently, the science of making machines smart, using algorithms to allow computers to solve problems is called Artificial Intelligence. AI makes it possible for machines to learn from previous experience, perceive its surrounding environment, adjust to new inputs, rationalize and perform human-like tasks while exhibiting cognitive feature like learning and problem-solving that maximize its chances of succeeding in achieving its goals.

Nick Heath, (2018),The official definition and term AI was first coined by John Mccarthy in 1955.Disciplines such as Computer Science, Engineering, Linguistics, Mathematics, Psychology and Biology contribute to AI development. The main subfields of AI are Machine Learning, Natural Language Processing, Artificial Neural Networks and Computer Vision. The goal of AI is to create systems that portray intelligent behaviour, learn, demonstrate, solve problems and advice their user.

SAS India, (2020), AI can automate repetitive learning and discovery through the data and adds intelligence to existing products for example, bots, smart machines, automation and conversational platforms can be blended with huge quantity of data to improve technologies on several walks of life, from investment analysis to security intelligence. AI analyses data more deeply with neural networks. For example, building a fraud detection system with five hidden layers. Ai adapts through progressive learning algorithms. Ai is immensely accurate using deep neural networks, for example, interaction with Google, Alexa and in medical field, image classification and object recognition, which can be used to detect cancer. The data processed through AI can get intellectual properties. Ai has evolved to provide many benefits in all types of industries, one major being the Healthcare industry.

Jennifer Bresnick, (2018), Healthcare industry is the most demanded with consumers expecting high level of care and service irrespective of cost. But unfortunately it has not yet achieved the expectations of the society due to lack of proper implementation of modern technologies. The major challenges that healthcare industries face are the huge amount of data processing, lack of solution for the neurologically or trauma attacked patients, diagnostic results depend on tissue collection and pathological tests increasing risk of infection, shortage of trained healthcare staffs, time consumption in clinical documentation, production of drug resistant bugs, findings in images may escape human eye, costs related to hospital acquired condition penalties and only small number of people respond to current immunotherapy options and clinicians have no clear solution for this.

Davenport T. & Kalakota, R. (2019), There are endless opportunities to implement AI technologies in the healthcare industries. It seems to me that gradually with time, AI with its aides like robotics, ML, neural networks, deep learning, block chain technology, big data analysis, data structuring and mechatronics, is getting deeply consolidated with the most significant industry in the world- the healthcare industry. This has given birth to innumerable

opportunity for the industry to serve the population in a better way, and create immense improvement in the medical facilities provided.

Jennifer Bresnick , (2018), There are a number of chronic diseases, like cancer, where there are endless opportunities to leverage AI technologies to adopt more efficient, accurate and precise in patient care. The algorithms help in analytics and clinical decision making while interacting with training data and lets the clinicians to gain unforeseen insights about care processes, variability in treatment, diagnostics and patient caring along with creating a kind of direct interface between the technology and human mind.There are many patients who have lost their ability to move, speak or interact with the environment after facing some trauma or neurological problem. The condition of these patients, with stroke or locked-in syndrome, can be drastically improved by Brain computer Interfaces (BCI) which can be backed by AI which can help restore the fundamental experiences and incidents of these patients hence reducing the mental stress. AI can also equip the various diagnostic tools to reduce the need for tissue sample collection and hence reduction of risk of infection. The each-pixel level imaging, virtual biopsies, advanced radiomics helps medical experts to develop a deeper understanding about the various diseases and tumours, cancer cells and their behaviour, aggressiveness and target treatments and also depict the phenotypic and genotypic properties of tumours. EHR technology is now incorporating AI to create more instinctual edges and automation in the routine procedures that may save time and money and this is also helping in identifying infection patterns and people at high risk.Voice recognition, dictation and video recordings of a clinical encounter can be fed into AI and ML algorithms to index them for future reference. Just like we have Alexa at home, one day we may also have virtual medical assistants and care at the service of the clinicians which will be implanted with AI or data entry and analysis. AI enhances the capability to identify deterioration of condition of patients, suggesting whether sepsis is taking place or complications are arising, hence improving the medical care outcomes and hospital acquired penalties. AI and ML algorithms have the ability to analyse highly complicated datasets and hence generate new targeting therapies to each unique genetic makeup. Even cell phone cameras now can produce images that can remain viable for future analysis by AI for research, diagnosis and treatment.

Literature Reviews

1. Artificial Intelligence in Healthcare: Past, Present and Future

Jiang F,….et.al., (2017)Artificial Intelligence has immense potential to bring a powerful transformation in healthcare systems through its advanced algorithms designed to process huge volume of data with accuracy. Thus, assist physicians extract timely useful information from various literatures and patient population survey, to obtain health risk alert and outcome prediction. The work explains the flow of the processes from clinical data generation to Natural Language Processing (NLP) data enhancement, to Machine Learning (ML) and clinical decision making. It deals with both approaches of AI, that is, ML and NLP.

The research mainly concentrates around a few diseases, diagnosis and treatment:

- **Cancer** – IBM Watson Diagnosis
- **Neurology** – AI in Quadriplegia
- **Cardiology** – Arteries Cardio DL
- **Ophthalmology** – Convolution Neural network in congenital cataract
- **Psychiatry** – Support Vector Machine biomarkers of neurological disease
- **Stroke & Parkinson's** – Neural Networks
- **Stroke** - ML Algorithms for on-set detection
- **Chest X-Ray-** NLP for reading reports.

The paper is a survey of the past, present and future applications of AI, ML, Deep Learning, Support vector Machine, Neural networks and NLP, in the healthcare industry. This helps in producing advanced medical information, reducing diagnostic and therapeutic errors. While investigating the

current status and future of AI in healthcare, the various tools of AI implemented in diagnosis, treatment and future prediction of several diseases like cancer, cardiology, neurology and stroke and advanced applications like IBM Watson, a pioneer AI system and various challenges for real life implementations of AI, have been highlighted.

2. Artificial Intelligence And Machine Learning In Clinical Development: A Translational Perspective

Shah P.,…et.al., (2019), Paramount transfiguration in the healthcare industry and clinical development has taken place in subsequent years due to confluence of AI and Machine Learning. Significant application of AI, ML and computer vision in clinical development along with involvement of variety of other sectors like academic, technology, corporation, biotechnology along with the challenges faced, has been important matter of discussion and application.

The problems include sluggish development of the clinical field due to precariousness in regulatory needs, risk, lack of knowledge and lack of actionable data source to uplift existing diagnostic and therapeutic technologies which only worked for a minute portion of the population.

AI and ML have introduced next-generation sequencing, helping us understand diseases in larger populations. It has helped formed effective drugs by co-developing diagnostic precision and therapeutic solutions along with digital clinical results, minimal cost imaging, sensor and treatment with response biomarkers assisting in monitoring and enabling safety against toxicity. ML has helped to predict pharmaceutical properties of compounds and targets for drug discovery based on bones, organs, pathology slides and retinal scans while deep learning has help predict new models for multimodal data hence enabling faster diagnosis and progress of health of patient.

3. Artificial Intelligent Technologies for Mobile Health of Stroke Monitoring and Rehabilitation Robotics Control

B.M. Elbagoury,…et.al, (2018), Stroke is a very urgent and sensitive scenario that may severely affect the brain, locomotion, nerves and emotions is an adverse way and may also result into hemiplegic conditions in patients leading to life-long disability. The development and implementation of a new intelligent mobile telephone technology and wireless communication system based on Artificial Intelligence, in the field of stroke for early detection, better diagnostic decision and fast response and rehabilitation of patient care, can create significant scientific advancement in the healthcare industry to mitigate the sufferings of the patients and contribute positively towards the society.

To fulfil the objective, there are few steps that are needed to be taken. First, it is important to build a real-time mobile computing for emergency state of patient by using advanced medical sensors like Electromyography sensors (EMG), which can provide immense source of information and for identification of neuromuscular disorders, nerve injury and muscle degeneration. Secondly, the development of an innovative Rehabilitation Robotics system for post-stroke treatment of patients, in which the robots interact physically with patients to assist in movement therapy hence helping to improve mobility and ensuring independent life of the patient by applying proprioceptive neuromuscular facilitation method or behaviour based control, while being cost effective as well. These technologies can help patients keep track of their own treatment during lack of access to healthcare facilities. Implementing ANN on mobile devices along with sensors, developing a home alert system (health system) can significantly improve lives of elderly by ensuring their safety and preventing accidents. Telemedication helps in enabling real-time interactive assimilation of medical information in wireless environment.

Hence the main objective is to develop a Hybrid Intelligent Remote Diagnosis Technique for Mobile Health Application for Brain Stroke Diagnosis and monitoring human health conditions using sensors and post- stroke medical care using Rehabilitation Robot Systems.

4. Artificial Intelligence In Surgery: Promises and Perils

Hashimoto,…et.al,(2018), Artificial Intelligence, with its subfields, is creating new horizons in surgery while assisting the surgeons in critical surgeries using robotics and machine learning. Pathologists, surgeons and radiologists are using AI to reduce errors in identifying cancer positive lymph nodes, lumpectomy and to take intra-operative decisions. The various data, such as blood pressure, temperature, glucose, weight, meals, can be tracked by mobile sensors and can be fed into EMR, of a patient, before undergoing a surgery. Considering the various subfields of AI and their contribution towards medical surgery and limitations:-

Machine Learning: Supervised Learning teaches the computer functions like recognizing a gallbladder in an image. Unsupervised Learning looks for any unseen structure such as identifying bleeding from non-bleeding tissue. Reinforcement learning helps control an artificial pancreas system to accurately measure and deliver the insulin to diabetic patient. This helped in prediction of surgical site infections and studying diagnostic, therapeutic and surgical aspects of any medical problem like predicting lung cancer.

Natural Language Processing: It helps in huge scale analysis of data as in the Electronic Medical Record(EMR) and physician's narrative documentations and prescriptions. Its application in medical surgery can progress through the data and can also read patients emotions like irritated, tired etc. The algorithms have a self -correcting capability as well hence appropriate for representing variety populations.

Artificial Neural Networks: These process the signals and maps the corresponding tasks as in image recognition and data classification function. It can be tremendously accurate in risk prediction like prediction of pancreatitis acuteness six hours after admission to hospital. Accepting inputs like patient history, blood pressure, medications etc, ANN can predict in-hospital mortality, after doing the abdominal aortic aneurysm repair, with high accuracy.

Computer Vision: Healthcare surgery utilises computer vision for image acquisition and analysis of patients during surgery, computer aided diagnosis, virtual colonoscopy, image guided surgery, decision making in surgery by use of videos that are interpreted and analysed by computer vision to suggest solutions and methods to be followed.

Limitations: In many cases traditional techniques can outperform AI. Faults may occur in AI analysis based on systematic biases and incorrect input. Risk prevails in lack of interpretability of AI in few instances, as it cannot yet determine casual connections in data and hand in an automated clinical analysis.

5. Deep Learning Technology For Improving Cancer Care In Society: New Directions In Cancer Imaging Driven By Artificial Intelligence

Coccia M, (2020), Deep Learning Technology (or DELT), can be applied to cancer in, early detection, interpretation of cancer by image classification and transfer learning as in lung and breast cancer detection, identifying cancer subtypes by integrating gene expression and transcriptome alternative splicing of data, identifying stages of cancer, volumetric demarcation of tumours, cell mutations, development of metastasis and possible anti-cancer treatments. This can significantly ensure appropriate and timely treatment that can increase the patients' survival rate. This can also benefit poor regions where there is lack of proper health facility.

Current technology is based on molecular biomarkers, biopsy and blood test which is time taking, costly, may turn out faulty and hence causes life risk for the patient. Hence Deep learning can bring about a revolutionary improvement in this field.

Application in Lung Cancer: Deep Convolutional Neural Networks(CNN) are capable of establishing complex visual recognition work, provide appropriate result for sorting lung patterns. These have been accepted in skin cancers, hepatocarcinoma, diabetic retinopathy, gastric cancer and colorectal cancer. These can automate analysis

of tumors, cancerous vs normal cells and lung adenocarcinoma vs. lung squamous cell carcinoma.

Application in Carcinomas: Deep Learning Algorithms can be used in whole slide pathology images to identify metastasis in sentinel axillary lymph node in Carcinomas.

Limitations: DELT may be costly initially and may lead to workflow in hospitals. Furthermore, there is not enough human capital and education to take up this huge challenge.

6. 10 Promising AI Applications In Health Care

Kalis B.,…et.al.,(2018),Clinical healthcare and administrative sectors have merged with AI technologies. There is huge potential for profits and annual savings due to this confluence in the long run. Although AI applications in clinical judgement and diagnosis has not yet developed fully, AI is creating marvels in other areas.

AI assisted Robotic Surgery: AI assisted Robotic orthopaedic surgery can analyse data and physically guide surgeon's instruments causing huge reduction in surgical complications and reduction in duration of patient's stay in hospital after surgery, saving $40 billion annually.

Image analysis: AI in image analysis for diagnosis and treatment saves $3 billion.

Medical Dosage Estimation: A trial in California concluded that a mathematical formula developed with AI can accurately determine the correct dose of immunosuppressant drugs for organ transplant patients.AI as solution to costly problem of dosage errors saves $16 billion.

Virtual Nurse assistance: Virtual Nurse Assistants not only provide most effective care, but also saves time for nurses while saving $20 billion.

Voice-to-text transcription: Voice to text transcription can smoothen administrative workflow and help save time while saving $18 billion.

Fraud Detection: AI application to improve speed and accuracy in Fraud Detection in Medicare claims saves $17 billion.

Monitor Cybercrime: AI to monitor cybercrime in medical field saves $2 billion.

Advantages of Artificial Intelligence in Healthcare Industry

1. Requirement of Work Force in Healthcare

The population is increasing at an unprecedented manner and aging simultaneously as well, and the fact that this is causing high demand for more healthcare workers, cannot be overlooked. Robotic revolution, like **Nursing Robots**, based on AI technology can prevent this deficiency of healthcare workers.

2. Disease Diagnosis and Test Recommendations

AI can analyse vast medical data of physiology, laboratory, behaviour, medical images etc and can combine these using ML to identify specific diseases and provide more assistance to healthcare workers. For example, distinguish between benign and malignant tumours and hence help doctors to quickly obtain the information, provide accurate diagnosis and saving time for disease treatment. Oncologists are using **IBM Watson** (AI/ Deep learning/ NLP based system) to treat cancer patients efficiently at low costs as well. **Care Trio,** using IBM Watson has suggested a three step process to give proper care to cancer patients:

- **Care Edit**: tools that creates best practice guidelines and tells the doctor the best possible treatment options for various forms of cancer.
- **Care Guide**: Uses the above information to assist doctor to come out with the best treatment solution through a clinical decision support system.
- **Care View**: Analytical tool to evaluate results of implemented treatment

MYCIN is one of the most earliest expert systems using AI that can help in diagnosis of infectious blood diseases and also provides recommendations for treatment of it.

3. Disease Prevention

AI and its analysis models combined with social media can help in utilising human behavioural data to identify risk of mental health illnesses and it can also be used to figure out risk of suicide among patients with psychiatric problem or people like solders and prisoners. **Ginger.io** is a mobile app that

treats psychiatric diseases. It helps in analysing the patient's mood and understands what instigates the emotions in the patient like anger and analyses their behaviour changes and lays down strategies suggested by doctors to recover from this condition.

4. Nursing Assessment

AI used for patient monitoring, can help nurses easily collect more real time information about patient like blood pressure, sleep quality, oxygen saturation, pulse an blood glucose. This improves accuracy, healthcare quality and patient satisfaction. This can be beneficial to maternal and child care as well in medical resource lacking country. Antenatal records are also highly improved by **cloud-based electronic medical record system**, which also helps in efficient sharing and circulation of information, hence helping in decision making as well. It also assists HIV patients to receive treatment early and reduces HIV care gaps.

5. Reduction of Workload

AI operations will help nurses in multitasking environment, collection of samples, patient reports, checking vital signs, medication managing, infectious illness supervision etc. Hence nurses with AI technology support will be able to deliver their job efficiently.

6. Healthcare Data Management

Electronic Health Record System based on artificial intelligence can be effectively used to keep track of the clinical health data by doctors and hospital management systems. It helps in organisation and efficient handling of medical data. This will also prevent patient harm related to misdiagnosis or wrong medication or administrative errors. For example, patients are allowed to review their own notes after a meet with a doctor and due to this, they understand what kind of healthcare plan has or is going to be implemented on him and will get a better understanding of the treatment, medications and conditions which increases patient's confidence in taking control of his own health.

7. Decision Making

AI based **nursing data system** helps to form a nursing diagnosis guideline to assist nurses in taking a clinical decision. All the above points help in effective decision making in healthcare system. An AI application saves money as well. **E-health Telemedicine platform** encourages homecare assists and discourages hospitalization resources as it transmits the patient's analysed data from home to clinic by using **cloud transport or medical smart sensor** to understand the patient's current status.

8. Nursing Assistance

Intelligent carrier robots can function like nurses by helping patients move from bed to wheelchair or to move from one place to the other through a command received by it from the user through a smart touchpad. Various types of **flexible e-skins** using AI technology has been developed which exhibit excellent sensing abilities. **Interactive robots** having AI and complaint pressure sensing devices with computer control and information processing and analysing algorithms have extremely advanced sensing capabilities that can be used to perform tasks like taking care of the old people and nursing patients.

9. Individual environment Virtual assistance and Disease Self-management

AI wearable device/sensor can be used to get self-health conditions in real- time. Some AI systems are used for giving reminders and guidance to a person like a **virtual assistant reminds** to take medicine or informs about health alert conditions. Company like **AiCure** has developed a **face-recognition app** which helps doctors ensure that the patients are taking correct medicines on time and if that does not happen, an alarm message is sent to the doctor. Similarly company like **NextIT** has come up with a AI based **Health Coach Application**.AI based **nurse chatbots** or **mental health chatbots** has positive effects on the user as it helps in reducing depression symptoms. **Companion robots** are used to give company to old people with dementia. These gives emotional support while reducing loneliness and uplifting confidence of a patient. Assistive robots help patients perform tasks like a **smart walker** that can detect the obstacles on the way and also make a visual map of the environment surrounding the

patient so that the user gets a more convenient and safer walking route.

10. Innovative solutions to clinical problems and Research about drugs

AI assisted care programs that are conducted, can give rise to innovative solutions like an **intelligent hand hygiene system** for the healthcare professionals and hence avoid infection. AI is used to predict reactions and interactions between drugs and harmful side-effects of drugs and hence helping in clinical research as well.

Conclusion

United Nations had emphasised that incorporation of AI in healthcare industry can help achieve sustainable development goals on good health and well-being. India has immense capacity to embrace AI in its healthcare system as it will highly benefit the country's growth and development. Scope, impact and application of AI in India:

1. AI to help in Diagnosis and Prevention

We have seen India face surge of communicable/non-communicable diseases and an increased aging population. The burden of disease management is increasing hence need for innovation is required. AI can help in identifying vulnerable patients early and classifying them into high risk and very high risk. Antibiotic resistance, malaria, tuberculosis, health insurance, diabetes, cardiovascular diseases and cancer are some fields which can be highly benefitted by AI. Cancer screening, Imaging Biobank for Cancer, Diabetic Retinopathy Screening and Chronic Obstructive Pulmonary Disease Diagnosis are few applications of AI in Indian Healthcare system.

2. AI is the technology to Empower the Healthcare Sector

There prevails a huge inequality in the healthcare distribution in India along with lack of trained healthcare professionals and infrastructure and low government spending on the healthcare industry. India hence, has room for immense innovation, sustainability, scalability and scope for application of various technologies like AI in the healthcare industry to improve the life of the population.

3. AI applications to reduce Healthcare costs

Indian Government's Niti Aayog estimated that there can be an increase of USD 957 billion which can be summed up with the GDP by 2035 by incorporating AI in healthcare sector and hence boosting India's annual growth by 1.3% by 2035. India has a very scattered and under-developed healthcare system and infrastructure and definitely. AI can bridge the resource gap in healthcare system in India and hence reduce the costs. AI helps in informative assistance for doctors and hence saves lot of time and money.

4. AI helped to fight the pandemic

- Infrared sensor with an AI powered facial recognition technology to check temperature of people at various places.
- Drones with AI thermal screening system are launched in public places to detect fever.
- AI and cloud computing is helping in vaccine development
- AI powered virtual assistance agent called the Watson Assistant for citizens helps the government to give people correct information.
- Chatbots powered by AI helped identify the best action plan based on their symptoms.
- Decentralised contact tracing tool has been developed as well.

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ARTIFICIAL INTELLIGENCE IN HEALTH CARE

ANEESH SHARMA
20MIS0328
School of Information Technology and Engineering
VIT, Vellore, India

Introduction

Reddy, S., Fox, J., & Purohit, M. P. (2019). Artificial intelligence is an upcoming field in computer science and engineering which refers to way through which a machine can easily do a tasks which generally require human intervention and human intelligence .Basically a way through which a machine can think on its own to perform a task. Through artificial intelligence machine can execute any complex or simple task with greater efficiency and greater speed than humans would do. Now many researchers believe that artificial intelligence can be next digital revolution in this world.

Mail My Statements (Nov 15, 2018)and Rita Sharma, With advancement in technology and science many things have become boon to society and many things are becoming harmful. As many hospitals are now maintaining the patient medical records online they are becoming more prone to cyber theft. So one of the major problems faced by healthcare industry is cyber security .Patients medical records are breached which is very precious for their health. When data breach occurs not only patient confidential information is at risk but also patient's privacy is also violated. Beside cyber security lack of price transparency is a major problem faced by healthcare industry. Many patients are now prior research about the facilities and pricing offered by the healthcare department. Due to this any official department not making their pricing public will not be in the attention of the patient. Another problem faced by the healthcare organization is patient experience. Healthcare industry is now facing problem of retaining and attracting customers with great facilities and low cost. The amount of workload a healthcare official has to carry is so exhausting at an extent that they have to compromise their personal life to fulfill their duty. Increase in the price of pharmaceutical drug has created a major problem for healthcare enterprise and patients.

Davenport, T., & Kalakota, R. (2019). With the help of artificial intelligence and further advancement in technology treatment and diagnosis of diseases will be much easier and cost effective. Many tech startups are using artificial intelligence to detect a diseases well before it becomes critical so that it could be easily cured in advance .Many firms are working on the diagnosis of deadly disease such as cancer well before in advance through machine learning and artificial intelligence. To improve patient health fast a hospital develops a clinical plan for the patient so that patient recovers fast , but sometime the clinical plans do not go as planned in such cases artificial intelligence will be very helpful as a better plan would be executed through machine learning. Administrative work will also be made easier through artificial intelligence. All the payment transaction will be easily managed. Patients mental health and physical condition will easily be diagnosed through artificial intelligence. Whether a particular drug given to a patient is helping the patient to fight the disease will easily able to achieve through machine learning and artificial intelligence.

Literary survey

- Will artificial intelligence solve the human resource crisis in healthcare

  Meskó, et al. (2018)**.** There is a huge crises of healthcare workforce because of doctors shortage worldwide, aging and burnout physicians and more demand for chronic health care. There is over 17 million shortage of healthcare workers globally in addition to aging workforce. Because of increasing

number of patients and shortage of physicians ,we can see sleep disorder and burnout of healthcare workers can be seen these problems and gaps in society can be solved by the use of technology and artificial intelligence very easily. Artificial intelligence could help in diagnoses of disease much faster than a doctor ,it can also facilitates in administration work thus reducing work for the staff . Deep Genomics could help in identify linkages to diseases in sets of genetic information and medical record. Supercomputers could help in finding new ways a disease could be cured and help in clinical trials . AI could be used in reducing viruses infectivity in less than a research of a day instead of years .technology will not only reduce the cost of care but also making it faster, efficient and solve workforce crises in healthcare.

- Ways artificial intelligence will transform primary care

  Lin, S. Y., Mahoney, M. R., et al.(2019). As the we moves away from fee-for-service to value-based payments, the of the population of health management industry is expected to increase many companies are exploring the role of AI to improve their ability to identify, and to optimize their performance by using population health tools for physicians. Many companies are developing Artificial Intelligence doctors that will provide health advice directly to patients with common thus reducing workload for more complex care. With increase in technology many people are wearing devices that detects early signs of a disease physicians may be able to use data from such devices to treat disease at earlier stages. AI-powered machines are diagnosing disease with greater precession than physicians in curing skin cancer,[3] breast cancer colorectal cancer, brain cancer,[3] and cardiac arrhythmias. These tools in the hands of primary care doctors can provide significant benefit to patients. Artificial intelligence can be used to automate some primary care with more efficient and greater speed for patients and physicians.

- Artificial intelligence in neurosciences: A clinician's perspective.

  Ganapathy , K., Abdul, S. S ,et al. (2018). Human brain is very complex to understand and perform surgeries. human brain is very diligent part of our body so while surgeries human error may occur Application of AI in neurosciences will help us to understand the intelligent functioning of the brain. AI aims to mimic human cognitive functions.AI can help doctors to remain up to date by providing recent research about certain diseases and helping them to provide better care to their patients. AI outperformed many doctors in predicting the operative findings. Patients suffering from mental health issues can be helped by using AI,it may also reduce risk of suicide. Machine learning algorithms could help in medication therapies and curing for many mental Diseases. Accurate prediction of tremor can be achieved by using machine learning but prediction accuracy is dependent on the quality of the clinical measurements. AI will be adopted in neurological treatments only when there is evidence that AI leads to better outcomes, efficiency and reduces costs. Hopefully, the AI enabled clinician will now spend more time with his patient for the well being of patient mentally rather than struggling with the data.

- Artificial intelligence in thoracic surgery: past, present, perspective and limits

  Etienne, H., Hamdi, S., (2020) et al. Thoracic surgeries are showing great improvement by recent advances in AI technologies . Improvements in fields such as radiology, pathology or respiratory medicine have helped surgeons to treat patient effectively. In the field of radiology with the help of deep learning major developments have been occuring. It helps to detect the pulmonary nodules on chest radiographs. Algorithm based system outperformed many surgeons in radiograph classification and nodule detection performance .these . The robot is a tool set to mimic surgeons' capabilities and is not to be used as a replacement for surgeon. The surgeon will have control of the

robot's every move; the system mimics the surgeon's hand movements in real time. By using robots we surgeries can performed with great precision and efficiency. These development have not only helped patients but also helped surgeons. AI technologies could improve clinical practice and efficiency of the surgeons.

- Artificial Intelligence in Cardiac Management
  Nadikattu, R. R. (2017). Cardiac disease is considered to be one of the leading causes of death across the globe. so there has been an ongoing demand to create a new way to treat cardiac diseases and AI has created an enormous impact in healthcare industry by diagnoses and treatment of diseases. due to unhealthy lifestyle blood gets cloth in artery which increases heart risk even in children. AI records the patient's response to the questions of doctors to determine the problems and symptoms.AI will make easier for doctors to analyze the patient and determine which patient require extra care and treatment. high risk patient will have much more chances of survival . AI can also provide a multi-monitoring feature through it will be easier for doctors to monitor more than one person at a time. cardiologists with the use of artificial intelligence and machine learning can make decisions based on data and new researches in that area to treat patient effectively. It also helps the person by cutting down the price by providing better treatment at same time. Integration of technology in medical field is helping to cure people with less price and more effective so that no one dies due to lack of facilities.
- How artificial intelligence is changing nursing.
  Robert, N. (2019). Artificial intelligence has introduced new algorithms and ways into nursing and medical practice. As new algorithms are integrated in system to help nurses to take care of patient .It will be very important for nurses to gain enough knowledge in interpreting multiple data results and integrating new information into nursing practice. Now some robots are designed in such a way they can emotionally respond to circumstances and provide mental support to patients. As robots will learn to perform nursing activities, such as ambulation support, vital signs measurement, medication administration, and infectious disease protocols, the role of nurses in healthcare industry will change. Nurses with robot will have the enough time and spend more of it with patients. And to support them mentally. Technology will change how nurses perform their tasks, but the need for nurses will remain same . Integrating AI and technology in medical field will help the patients for better care and treatment.

Advantages

1. High expensive surgeries will be replaced by robot governed surgeries which will not only be cost effective but will also be beneficial to patient treatment.
2. AI will help in management in hospital records which is a tedious work but with the help of AI it will fast and efficient.
3. Diagnosis of diseases will be more efficient and earlier than a doctor which will help in fast treatment.
4. With real time data, clinical decision making will be much easier with help of artificial intelligence.
5. Specific patient data can easily be track with the help of AI which will help in treatment.
6. AI will reduce human work and helps them to concentrate in more productive work like taking care of patient mental health which is very important.
7. All the administrative work accounts for 30% healthcare cost with the help of AI administrative work will done much more faster and effectively thus saving money.
8. AI used in wearable healthcare devices will allow to detect problems more faster than conventional process.
9. With use of AI healthcare cost will be reduced thus making basic health facilities available to all.
10. Time needed for diagnosis and treatment will be reduced with use of artificial intelligence.

Conclusion

Artificial intelligence will be very useful for a country like India where healthcare facilities are not affordable to all and are a luxury for some people. With use of AI cost deduction in basic healthcare facilities will be implemented and everyone will be able to afford necessary facilities in their life. With increase in communicable, non communicable diseases and new virus infection being spread AI will be of greater use to the people as it will detect diseases much faster and cure patient's life much more effectively. Increase in population is creating a lot of burden to our healthcare staff due to which healthcare staff is not getting proper sleep and are being exhausted mentally due to which their efficiency is decreasing in patient care and treatment, with use of AI smart robots will be able to assist our healthcare staff providing much more efficiency in patient care and treatment, it will also be reducing burden on healthcare staff. Thus with use of AI more patients will be treated which will help in reduce the demand and supply gap present in our country. Common men and women will be able to detect small diseases on their own with the help if AI powered smart watches and band, it will not only save their time which they spent on going to a hospital but also save their money. The potential for artificial intelligence is enormous and will keep on growing every year with new innovations in the society and providing great help to human mankind.

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DRONES, THE TECHNOLOGY INVOLVED, AND THEIR WIDESPREAD USE

BADHA RATHNA SABHAPATHY
20MIS0338
School of Information Technology and Engineering
VIT, Vellore, India

Introduction

Margaret Rouseet.al, (2019) Drone also called an Unmanned aerial vehicle is an autonomous robot that has a propelling unit and can be controlled by changing the direction of the propellors. It is well known for its versatility and its maneuvering ability. A drone can almost go anywhere in the world. Drone being a robot, can be equipped with smart devices such as a camera, GPS tracker, LIDAR scanner, distance sensor, and many more devices that are still under research. Drones can fly upto 8000Mtsand still have a clear view of the places they are flying over. Drones are used in the military as a surveillance unit to check their borders, drones were used to rescue people in mountain regions in several places with a greater success rate compared to human rescue operations.

Carrillo-Larco et.al, (2018) According to several studies, Drones are considered to be an asset in the military and were used in warzones to establish their connection between camps using drones as a medium of exchange. In the medical industry, drones were used to transport critical medical supplies in times like cardiac arrest, where a defibrillator was sent to help perform the procedure. Drones were used to locate missing people in the forest where drones had a clear advantage over the humans by providing rescuers with a bird's eye view of the forests. Drones are also helpful in weather prediction, they are programmed to check the changes in the weather patterns, terrain to accurately predict the weather. The agricultural sector had seen a rapid rise in the use of drones in the automation of the farming process. Drones are used to sow seeds, spray fertilizers, manage to water the crop based on the photos of the crop by Image processing.

Restas, A. (2015) Drones being useful also are a privacy breach. Manufacturers are producing good drones for the common public, which some of the customers take advantage of. Drones that are run by AI programs are still in research, drones can easily misidentify a human stuck in the snow with a rock and its vision is only decided by a few sensors that it has been equipped with, therefore if any of the sensors are damaged the Drone can be considered as a liability than an asset in the situation. That is why drones are still banned in some places in the world which include The United States of America, The European Union. People violate air restrictions while flying a drone which can cause interference in the low bandwidth frequencies used in data transmission by many companies.

Literary survey

There has been a recent increase in the use of unmanned aerial vehicles (DRONES) in the field of medical, scouting, transportation, disaster management, and emergency communication. Which has been due to the increased research interests in developing new algorithms, flight patterns for DRONES to reduce the stress on the drones, decrease flight time, increase load carrying capacity while still maintain to reduce the drone weight. This enables us to fly drones in harsh climatic conditions such as deserts, forests, flooded regions, snow-covered mountains. Drones despite their low weight can carry upto 5000Kgs of cargo, therefore drones are preferred in the Military.

1. Current day Applications

Balasingam, M. (2017). Drones are been used to transport several Goods such as food, medical supplies such as blood in time-sensitive situations in hard-to-reach places. This is because drones can go

to places which humans cannot, which is because of the exclusion of the human factor. It has also been observed that using drones as a medium of transport leads to less destruction of goods as compared to those deliveries which are done by humans while maintaining time in the process.

2.1 Use in Hospitals

Konert, A, et.al(2019) It has been researched that there is no adverse effect in transporting blood by drones and there has been no effect on hemoglobin levels, blood pH, no significant changes in the platelet count and, other parameters. Two hospitals in Switzerland are using drones to deliver bold and other analytic materials. Which has been deduced to be time safe. The Karolinska Institute in Sweden had connected a defibrillator to a drone and had sent it to places where there were reports of Heart Attack.

2.2 Rescue Operations

Podsiadło, P, et.al(2019) Drones have been used to deliver aid packages to disaster-struck areas such as, the 2010 Haiti earthquake, 2012 Sandy Superstorm (Sally) which affected the liver of the north-eastern states of the USA and, the 2015 earthquakes of Goroka (Nepal). In places like the Himalayas, a helicopter cannot always be used to do rescue operations because of the adverse climatic changes in the Himalayas. Therefore, drones are used to carry out rescue operations, send aid packages, medicine, and all tools required to extract people.

1.3 Crop Protection

Berner, B., & Chojnacki, J. (2017) Drones can be used in the agricultural sector to evenly spread the chemical such as fertilizers, pesticides, insecticides in farming plots. Drones can be equipped with different nozzles, different payloads for different spread, the concentration of chemicals. Drones have an advantage in swapping the energy source in an instant, which is very useful in this case. With being equipped for carrying a load of upto 800Kgs drones can spray the whole field with the chemicals required in one go if the batteries have the capacity to run for a long time.

1.4 Delivery services

Güner, S., et.al (2017), Drones are being used in both medical and commercial areas for the deliveries, flying of drones is restricted in Germany so that there is space for the transportation of medical supplies. Dominos pizza started the trend to deliver pizza using drones then amazon shopping followed this by seeing the success dominos had received. In Europe, one of the leading pharmaceutical chain companies shop APOTHEKE utilizes drones for the transportation of medical supplies due to the high traffic in countries like Germany.

2. Advantages

Konert, A, et.al(2019) Drones being completely electrical, they can travel in very cold and hot climates. Since drones are controlled by humans at higher altitudes they can also fly in cloudy climates. Drones can easily map out the complete region which it flies by. Due to improvement in the latest camera technology drones can see the subjects clearly from heights greater than 8000Mts. Because of further research in Drones, drones now can use new algorithms and sense patterns to identify a situation and report back to the person controlling the Drone, this adds a new level of autonomy to the drones.

Zabunov, S, (2015) IoT (Internet of Things) is the interconnection between the drones to exchange instructions, data for better functioning of the drones. Interconnection of Drones largely increases the functionality because of the exchange of the data all drones can concentrate on the leading hints in a rescue operation. Due to recent technological advancements the range of drones has increased, we can easily connect to a local network to control the drones. Using IoT increases the capability of autonomous flight vastly.

Güner, S., et.al (2017), The overall cost of maintaining the drone, the cost of transportation, damage caused, the price per kilometer traveled by the drone is less compared to that of the traditional modes of transport. Surveillance capabilities are also better compared to that of traditional ways as the

drones are directly connected to the cloud using IoT, which reduces the chance of data loss.

3. Drawbacks

Drones despite being autonomous, rely on human instructions to carry out further tasks. Drones can only detect humans in the mountains, but they still rely on humans to carry out further tasks.

Currently, there are several drone restrictions in place for the flight of a drone. One must register their drone to fly it. Because of the network traffic that is caused because of the low bandwidth signal the drones use. Which will interfere with other signals.

Zabunov, S, (2015) Implementing of autonomous flight can be done but it should be done with care as if the implementation is done wrong it would lead to a lot of drawbacks.

Berner, B., & Chojnacki, J. (2017) Using drones for agricultural purposes is not currently recommended as the research in drones has not been perfected yet. The lift of the drone depends on the load that the drones have been loaded with. The drone is not yet capable to automatically change its thrust yet. Also due to the wind produced by the drone, the spray pattern can change which can lead to irregular concentration of the chemicals throughout the fields. Which will lead to the destruction of the crop.

Findings

Drones are being continuously worked on ever since the first-time drone was introduced to the scientific field. Drones make fewer errors in the work compare to humans and therefore drones now play a major role in almost every field where the human factor can be reduced optimizing the process even more.

Drones can do thingsthat humans are not capableof, drones play a major role in scouting, rescuing, delivering, emergency broadcasting, emergency antennas, and many more things. Drone technology which is being upgraded everyday leads to reducing the limits the drones were facing now. For example, the introduction of automated geo-mapping along with sensors such as LIDAR increase the accuracy of the rescue operation in rough/harsh terrain, it also increased the area in which the drones can scan the area. Even in the area of farming the increase in the optimization of the motors and the batteries result in increasing in flying time and the overall load-carrying capacity of the Drone.

Further increase in the research about the Internet of Things lead to the Government using these drones for emergency situations, in case of the enemy attacks the communication part of the military. Drones act as individual antennas for the encrypted data to pass through. The government also uses drones as a surveillance tool to check on sensitive areas.

Deliveries are now eve safer and quicker with the implementation of drones in major companies such as Amazon. Hospitals are also using drones to transport time-sensitive materials, tools such as blood., defibrillators to remote areas.

Even though there are many advantages for using a drone mass use of the drones would lead to mass air traffic which would lead to many air accidents, loss of time for time-sensitive operations, therefore the government has flying restrictions in place. Also, drone technology is not perfect as of today, so there is a long way till the mass implementation of drones will be successful.

Conclusion

Drones, as they are of today, are very useful in a variety of tasks such as rescue operations, military use, hospital use but, there are also a lot of disadvantages of implementing them in current fields because of the lack of availability of the technology which is needed to perfect the implementation of drones. Drones being easy to use and having versatility, there is a future where Drones are fully researched upon and are being used for everyday tasks.

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Zabunov, S. INTERNET OF THINGS AND DRONES.

DRONE TECHNOLOGY AND ITS APPLICATION FOR HUMAN BENEFITS

J. AJAY TARUN
20MISO349
School of Information Technology and Engineering
VIT, Vellore, India

Introduction

Elizabeth howell (2018) Drone is an aerial craft size ranges from a fist size to an average car length. It has wide variety of shape size and structure. It can be operated easily .it has become a modern day trend in maximum every field and is reaching its peak .it is also an new sensation of this era .with lot more feature its development takes place every second since it is also a part of technology. Facebook has initiated its artificial intelligence drone. Drones are commonly used nowadays more interestingly in the cinematic universe with the innovation beyond that of the limit of the drone**.** Divya Joshi (2018) the application of drone is so wide that nowadays drone can be seen in every fields. In military its use is unpredictable and very important for example THE SURGICAL STRIKE which has done by India is a great example for the involvement of drone in military .Drones are special because of the main reason that it can be made available for common public, yes we can see children play with it for fun and in the function like marriage for the memorable photos and it is cost efficient to buy for anyone. As for commercial its use in filmmaking is inevitable as it slowly conquers the heart of art lovers of cinema. It also plays a vital role in industries as its production is rapid to its use. Its application in medical emergency also now gains a lot of attention soon it will be the main allocation in every field. The development of unmanned drone is a major breakthrough in drone development as it involves person surveillance from a distance without a physical contact**.** Alsamhi. S.H., et.al, (2019) Drone has become a part of our daily life since many of the big billionaire companies have already began its drone delivery all over the world. Soon it will be as common as cab in the streets we come upon daily. Drones are used for the surveillance and its part during the surgical attack or hostage situation where we can get to know the information of the enemies. Meanwhile America initiated its first drone first aid emergency as it is very useful in the place of heavy traffic where ambulance are unable to arrive on time as its collaboration with humans and our daily activities are increasing. In the sports gallery its use has become more common as it gives a clear aerial view of the field and it is well used to define any fouls are misplay in a game.

Literary Survey

Irizarry, J (2012) The construction industry lags behind many others in the rate of adoption of cutting edge technologies .Till now the safety measures on the construction sites are not well developed and henceforth we can make drone fill the holes in the development of safety measures in the field of construction . Innovative use of these drones can be greatly welcomed by the workers of the mentioned field. The initial application of drone technology in the construction industry is what we are to explore as the follow. AR drone is a small-scale aerial drone is used as a tool for exploring ultimate benefits to safety managers within the construction jobsite. This drone is an aerial quadricopter that can be piloted remotely using a smart phone, or a computer. Some of the user interface problems of the drone interface considering the context of the safety inspection are uncovered while in its developing stage. Drone can be used to uncover the blind spots of the construction without having someone keep front their life for it and also the altitude spots of the construction can also be covered and made easier for the workers .But there also comes some problem regarding the

initiation of drone in the construction site as if it is mishandled it may hurt the worker for whom we intended it to be useful .Considering the task and the controlled variables, this experimental approach revealed that using the drone together with a large-size interface (e.g. IPad) would be as accurate as having the safety manager with plain view of the jobsite. As I mentioned if it mishandled it may cause chaotic situation around the construction site and we should not also remember its vital role in the construction site.

Vergouw, B.,et.al,(2016) The different types of drones can be differentiated in terms of the type of the degree of autonomy, the size and weight, and the power source. These specifications are important for the identification of to its purpose .A the example for the drone's manipulation range, the maximum flight duration, and the carrying capacity. We are already aware of the various payloads like freight, posts etc. we also know the different types of sensors (e.g., cameras, photoelectric sensors, etc.).drone does not simply fly as it seems to be there must be connection established between the operator and the drone also sometimes extra connection is required for the connection between sensor such as camera for the live recording and so to establish the connection there is frequency spectrum the risk in using the frequency spectrum is that it can be identified easily and so it can also be operated by unknown operator yet there is a need for the standardizing the frequency spectrum by making so we can achieve the fearless use of drones even by the public for the purpose of payload . On using the frequency spectrum and surveillance and compliance and the enforcement of frequency spectrum use, equipment requirements, and the need for international and European cooperation. Finally, future developments in drone technology are unstoppable. The trend is for drones to become smaller, lighter, more efficient, and cheaper. As a result, drones will become increasingly available to the public at large and will be used for an increasing range of purposes. Drones will become increasingly available and are more capable of operating in swarms.

Bristeau, P.J.,et.al (2016) The navigation and the manual control of the drone are very easy but the principle behind the flight are not easy as it seems to fly. It involves basic and complex measurement of the principles of aerodynamics. The accelerometers and gyroscopes can be used together as the control inputs of the motion device such as mobile phone and PCs. The principle behind the flight requires the accurate measurement of the aerodynamics which, once integrated give the estimates of attitude angles and velocities with $V = [u\ v\ w]\ T$ and the vector velocity of the center of gravity of the IMU in the body frame, $Q = [\varphi\ \theta\ \psi]\ T$ the Euler angles (roll-pitch-yaw), i.e. the angles between the inertial frame and the body, and$\Omega = [p\ q\ r]\ T$ the angular rate of turn in the body frame, and F the external forces, the governing equation is $V^{\cdot} = -\Omega \times V + F\ Q^{\cdot} = G(\Omega, Q)$ with Facts That inertial sensors suffer from the following flaws. The accelerometers, which do not measure the body accelerations but its acceleration minus the gravity, expressed in the body frame, are biased and misaligned. Classically, we consider that the accelerometer signal YV has a bias BV (independently on each axis) and suffers from additive white noise μv. The measurement equations are $YV = F - Rg + BV + \mu V$ where g stands for the gravity acceleration and R is the rotation matrix from the inertial frame to the body frame

Oshodin, D.,et.al(2019)Our human civilization started to fight with stone and in every decade there was a huge revolution in human warfare , for example we can consider the arrow and bow an huge catastrophic revolution in the mankind .But if we look at it it now it may look very fragile when compared to gun and rifles and that is how the technical revolution has been the past years .when we look at bad part of history lot of them caused by the war and the development of lethal weapon we humans are the one destroy ourselves this is what Albert Einstein told that no mouse would build its own trap .This sure makes an sense after witnessing the destruction caused by the US army over the town

of japan (Hiroshima and Nagasaki). The aftermath of the explosion is unforgettable from the shades of history. However the UNO made treaty with all countries in the world not to prepare a atomic bomb and anything harmful and lethal to mankind and henceforth every nation began to produce the weapon in a lethal along with ethical warfare of mankind. The United States Administration escalated the use of advanced military weapons especially drone strikes in its intractable War on Terror in Pakistan, Afghanistan, Syria, Yemen and Somalia. The essential reason behind this decision is that autonomous military weapons are more precise in targeting militants and more effective for reducing the number of deaths of American soldiers and unintended killing of civilians. However, for better understanding of the true situation of the drone strikes one must look at the results over a period of time. From the year 2004 until 2015 the United Stated carried out more than four-hundred drone strikes and independent investigations demonstrate that these drone strikes caused more unintended killings of civilians than the actual terrorists they were targeted at with the US administration trying numerous of times to deny such reports deviating the media from focusing on the collateral damage while releasing reports of successful operations against militants in Pakistan. In fact local sources from Pakistan reported that between the year of 2007 and 2009 more than 700 citizens were killed which does not indicate any type of accuracy or precision due to the use of autonomous weapons developed and deployed by the U.S military .Thus here comes the major role of the drone or UAV(unmanned aerial vehicle).Avoiding the human conflict also becomes the main purpose when it comes to war and so UAV are plays a very crucial part as it can be controlled from outside the range of the enemy .Autonomy in military defense defines the weapon which can be operated to exterminate target without any human interface once the target is engaged. This type of defense can be overpowered with the usage of drones as they are very suitable to carry such autonomous weapon. It can be concluded that the development of drone in the military or defense field it is very useful as it increase the power of the military in both defensive and attacking along with the ethical warfare for which all nations are subdued.

Ntalakas, A.,et.al (2019)The investigative part of drone in the journalism is very useful as it the helped people through journalist in untying the knot which was thought to be mysterious but soon got revealed by the means of drones with the camera sensors. Journalists have been among the pioneers of civilian adaptation of this technology which offers many compelling advantages for news gathering; however the introduction of drone journalism must be carefully balanced with the critical issues of air safety and privacy. Government regulators in Australia, the US and elsewhere continue to wrestle with the complexities of controlling the technology. This drones makes the journalist capture events during the disaster in any place, so that people get to know of what is happening and the the humankind comes forward to help each other thus the donation or fund is raised for the damage stricken people during the pandemic situation .The aerial view of the flooded place or the place that got affected by the earthquake can be easily identified and can be reported to rescue operators by journalists. It can also come in handy when the prohibited places are to be exposed under the suspicious act.

Canis, B. (2015). The main elements of a UAV are frame, electronic speed controllers (which send signals to the motors), motors, battery, flight controller, radio and receiver .Propellers UAVs are constructed of various materials including aluminum and composites, which make them lightweight and durable, two factors that enable them to withstand outdoor environments .So that it is easy to manufacture and can be made available to every common people. Drone and its commercial uses are widely varied as of industries, agriculture, law enforcement, etc. In US it is useful in law enforcement by providing security to high risk warrant and to find the missing person. UAS helpful in learning earlier about details of a fire or in assessing a hazardous waste spill on a major

highway. Meanwhile US government also prevented the overuse of drones by the amendment of law regarding drone usage and its seizure.

Ahirwar, S., et.al (2019)The application of drone in agriculture is a great revolution in field of agriculture as it can be easily operated by a farmer who lacks education .The manual operating system of drone is very simple although its working principle are very complex . Since the working principles are so easy that it need not required to be operated by a farmer he or she can easily use the device for the agriculture field. The flight duration of the drones are longer it can be used efficiently and also eco-friendly .Soon drone will nearly occupy the field of agriculture as the water pumps did last decade . It can be used to monitor any damaged pipes, canals, and survey of crops in a vast field. They produce precise 3-D maps for early soil analysis, useful in planning seed planting patterns. After planting, drone-driven soil analysis provides data for irrigation and nitrogen-level management .Irrigation can be done using drones as aerial irrigation so that it can conserve a lot of water. Using drones we can scan the land and can plot a map after that pesticide can be sprayed on the controlled and effective manner. It can be said that drones are a great invention of all time if used in an effective and controlled manner.

Disadvantages

1. UAV's while making a development in the society also has its own flaw from both internal and external factors. These UAV can be easily taken control by someone other than the user if they are able to get the suitable radio transmission frequency of the drone.
2. If someone is able to manipulate our drone then they also have the access to the camera fixed in the drone. Hence it becomes a problem of privacy. If military database of aerial imagery on the terrains of the border is hacked then it becomes a national threat of the country.
3. Though the development of law regarding the usage of drones is on progress there must be a strict overlooking on using the drone. As these drones are available to everyone they can be easily misused for the trespassing or some other violations.
4. When it comes to the safety, the operation of the drones requires a specific care on operating it. If the operator is not well at operating drone then he may crash on the public leading to the severe damage as the blades of the propellers are sharp and fast.
5. Military drones have some fire powers and sensors associated with software so that it can make its flight even in the rough terrains but there is the problem of the malfunction of the software. These malfunctions can lead to attack of other military personnel's safety.
6. Drones are vulnerable to animals such as eagles as they easily attack the drone and destroy it. Sometimes the birds also get hurt badly when its wings flap against the blades. Though there is no problem to the problem to the society it makes a loss to the owner.
7. As earlier mentioned drones can be misused in several ways one of it is spying. Some may use drones to spying their victim without the sound and also it can be used for the robbery by using drone with the night vision cameras to check the passage and exit of the house to be looted.
8. Usage of drone is limited by the weather conditions as it makes difficulty for both the operator as well as aerial imagery. Drones can also be damaged by the heavy spiral of wind.
9. Though the controlling of the drone is easy the process of analyzing data for the agriculture requires a skill set. This can be provided by the drone service provider which must be authorized.
10. Despite being operated in a lower operation speed military UAV can fire missiles to kill many people. The wastes dumped after the attack can also cause harm to the public health as they also cause produce CO2 emission during their flight.

Conclusion

For the country like India drone technology can play a vital role in the development and betterment of the country in various fields. Since agriculture is the back bone of India its use in the farming is of great importance with least drawbacks that can be easily rectified. India has a heavy rainfall region during the monsoon and there is a chance for the flooding. People who got struck in the flooding can be located by the means of drones, it can also be used in the natural disaster such as earthquakes, forest fire etc. India stands second place in the highest number of population so drones can be used for the surveillance in the crowded area effectively. Now a day drones are used widely in the cinema by making frame shots of different angles to make the art more beautiful. For the country with military power like India drones also happens to make an additional strength in various situations. Development in the fields of agriculture and military security provides better harvesting to remove insufficient of food and better security to the people respectively so we consider benefits received in these fields of work also benefits the common men and women. There is a chance of reduction of women abuse and rapes by the surveillance of drones. My view is that though drones have some disadvantages it can be used effectively considering its limitations. Drones can maintain its harmony in peace if its usage limited only to the soft helpful applications such as agriculture rather than using it in the modern warfare.

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