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Critical Study On Application Of Computer In Human Healthcare

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ABSTRACT:

Healthcare is concerned with providing medical treatment to patients, whereas computer science is about computers and their sophisticated computing systems. These two professions could not be more dissimilar from one another. The application of computer science in the healthcare sector is the focus of the relatively new area of health informatics, which combines the two. This paper reflects critical study on application of Computer in Human Healthcare.

Keywords: healthcare, computer, health informatics, design, diagnosis, doctor

I INTRODUCTION:

When doctors started looking into how computer logic may aid in the diagnosis and treatment of medical conditions around the beginning of World War II, health informatics initially gained widespread attention. Health informatics didn't really take off until the 1950s, when computer technology made significant strides. Today, governments all around the world are putting into place policies that encourage the use of health informatics. Health informatics helps to save lives, money, and time. In fact, incorporating a doctor's knowledge with a computer's algorithmic output helps minimise mistakes in patient diagnosis and care. Health informatics also makes it easier for patients and clinicians to communicate and allows for the delivery of remote medical treatment. Finally, computer technology improves coordination and administration; tools like digital apps and electronic health records make it simpler for people to keep track of their health and get accurate, dependable medical advice.

Telehealth is the delivery of medical services and knowledge via electronic communication and information technology. It enables remote admissions as well as long-distance patient and clinician interaction, care, guidance, and reminders. Sometimes the term "telemedicine" is used synonymously or in a narrower meaning to refer to remote healthcare services like diagnosis and monitoring. Medical personnel can remotely monitor a patient utilising a variety of technology gadgets through remote monitoring, commonly referred to as self-monitoring or testing. Managing chronic diseases or particular ailments like heart disease, diabetes mellitus, or asthma are the main uses of this technique. These services can offer patients better satisfaction and health outcomes that are comparable to those of conventional in-person patient

consultations. They may also be more affordable. The delivery of rehabilitation services via telecommunications networks and the Internet is referred to as telerehabilitation (or e-rehabilitation). Clinical assessment (the patient's functional abilities in his or her environment) and clinical therapy make up the majority of service kinds. Neuropsychology, speech-language pathology, audiology, occupational therapy, and physical therapy are a few rehabilitation practise areas that have investigated telerehabilitation. People who are unable to travel to a clinic due to a handicap or the distance must receive therapy via telerehabilitation. Additionally, telerehabilitation enables clinical consultations between rehabilitation specialists over the internet.

American biomedical informatician Edward H. Shortliffe was a pioneer in the application of artificial intelligence to healthcare. In this field, artificial intelligence and machine learning algorithms are used to analyse, understand, and comprehend complex medical and healthcare data in ways that are similar to how humans think. AI specifically refers to computer algorithms' capacity to make approximations of conclusions based only on input data. Applications of AI include the formulation of treatment protocols, medication development, personalised medicine, patient monitoring, and patient care. Clinical decision support systems are a major area of industrial interest for the application of AI in the healthcare sector. Machine learning algorithms change as more data is gathered, enabling more reliable replies and solutions. Many businesses are looking into the potential applications of big data in the healthcare sector. The "data assessment, storage, management, and analysis technologies" sectors, which are all essential components of the healthcare industry, are where many businesses look into the market opportunities. Examples of significant businesses that have contributed to AI algorithms for application in healthcare include the following:

a) IBM's Watson Oncology is in development at Memorial Sloan Kettering Cancer Center and Cleveland Clinic. IBM is also working with CVS Health on AI applications in chronic disease treatment and with Johnson & Johnson on analysis of scientific papers to find new connections for drug development. In May 2017, IBM and Rensselaer Polytechnic Institute began a joint project entitled Health Empowerment by Analytics, Learning and Semantics (HEALS), to explore using AI technology to enhance healthcare.

b) Microsoft's Hanover project, in partnership with Oregon Health & Science University's Knight Cancer Institute, analyzes medical research to predict the most effective cancer drug treatment options for patients. Other projects include medical image analysis of tumor progression and the development of programmable cells.

c) Google's DeepMind platform is being used by the UK National Health Service to detect certain health risks through data collected via a mobile app. A second project with the NHS involves analysis of medical images collected from NHS patients to develop computer vision algorithms to detect cancerous tissues.

With the advent of computers in the early 1950s, computer technology in medicine was first used on a global scale. The first professional organisation for informatics in Germany was founded by Gustav Wagner in 1949. Reference is made to the prehistory, history, and future of medical and health information technology. In France, Germany, Belgium, and the Netherlands, specialised university departments and informatics training programmes got their start in the 1960s. In Poland and the US, medical informatics research units first appeared in the 1970s. Since that time, the U.S. and the European Union have worked to build high-quality health informatics research, teaching, and infrastructure.

Medical computing, biomedical computing, medical computer science, medical computer technology, medical electronic data processing, medical automatic data processing, medical information processing, medical information science, medical software engineering, and medical computer technology were some of the early names for health informatics.

II APPLICATION OF COMUPTER IN HUMAN HEALTHCARE :

Industrial design advancements have influenced how people and computers interact. It is a necessary step for people to "communicate" with machines and is the link that allows people to use machines for daily tasks and production operations. Since the invention of computers, practically every aspect of human existence has been intertwined with information technology and the computer interface allows for seamless human-computer interaction. Nearly everywhere in design today, user experience and quality of life are prioritised. The user's operating style and device experience are consequently impacted by the design of the human-computer interaction interface, which has a significant impact on how easily and practically machines and computer equipment can be used.

The design of human-machine interfaces is more precise and demanding in the medical and healthcare industries. Medical monitoring equipment requires more precise and accurate expression, as well as prompt and easy operation, due to its monitoring and reference functions. Consequently, the interface design for medical monitoring equipment is crucial in terms of human-computer interaction. In terms of the domestic setting, people are progressively starting to pay attention to the application of design aesthetics in production and living, including health and medical equipment. This is due to the awakening and growth of design consciousness.

The human-computer interaction of the user interface is not taken into account by the home medical equipment, which makes it challenging to identify the user interface and causes passive user behaviour. When it comes to the user interface of household medical devices, it is imperative to underline the design principles of comfort and humanization in order to build a harmonious interaction between users and products.

In markets and hospitals, various national brands of medical device models are accessible. Although the functions are comparable, the operations are different, which leads to a steep learning curve and a high error rate. High-end medical device research and development must carefully consider the design of human-computer interface because it is connected to user safety. When designing medical equipment, the human-computer interaction must be carefully considered. When designing medical equipment, the human-computer interaction must be carefully considered. By enabling material, colour, and touch characteristics, medical staff fault tolerance can be decreased and the system can be customised to user preferences.

Information and communication technologies based on computers continue to revolutionise how healthcare is provided as well as how the human body and the diseases that affect it, are understood. Without computers, it is almost impossible to imagine Healthcare Industry. Innovative methods attempt to combine computer technology with the human body in order to gain understanding of how the body functions and to provide fresh diagnostic and therapeutic techniques. For instance, over the past few years, medical imaging has advanced at an accelerated rate. Magnetic resonance imaging (MRI) and X-ray computer-aided tomography scanners (X-ray CT, MDCT) can now be used often to gather high-resolution, three-dimensional anatomical data. Positron emission tomography (PET) images of a functioning four-dimensional electrophysiology can provide three-dimensional functional imaging of blood flow and metabolic data. Additionally, an ultrasonography device can show real-time images of inside organs and data on blood flow. Computers became more prevalent in various areas of medical institutions as legislation evolved and technology advanced. Nowadays, laptops can be found everywhere, including at nurse stations, patient bedsides, medical carts, labs, and operating rooms.

Medical imaging technologies have the potential to raise key societal concerns including the gap between urban and rural areas and while also increasing the effectiveness and quality of patient care. The knowledge of the care provider is crucial for delivering high-quality medical treatment. This is especially true in radiology, where the evaluating radiologist's diagnostic aptitude is crucial. However, professional radiology skills are pricy. Because it is not financially possible for smaller hospitals and clinics to maintain a big radiology team, expert radiology services are concentrated in super speciality institutions and major metropolitan centres.

Medical and Patient Data :

Doctors and nurses can make notes on patients' examinations and recommend remedies right away. This greatly reduces the possibility of staff making mistakes while attempting to read handwriting or afterwards trying to recall the circumstance. Because doctors and nurses can immediately input relevant information, it also increases efficiency.

Patient Monitoring :

Human Healthcare

In hospitals, automated monitoring can save lives. Computers can now handle vital medical devices like blood pressure and heart rate monitors, as well as lab equipment. They can also alert employees when something is wrong. Computers can sometimes help doctors with procedures, resulting in safer and more convenient conditions for both the patient and the staff. While computerised technology is keeping an eye on a patient, it is also continuously gathering data so it can be accessed later on if necessary.

Research :

The amount of knowledge that medical professionals may access has significantly expanded because of computers in the healthcare industry. To find out additional information about a given condition or treatment strategy, doctors can check medical databases. In order to boost the likelihood of finding the causes and treatments for diseases, computers can run simulations and collaborate with other devices.

Communication and Telemedicine :

Healthcare professionals lead busy lives. Their jobs are made simpler and more efficient by the use of computers for communication. They can chat in real-time to ensure that crucial information is transmitted when required rather than taking messages or writing notes.

Now that telemedicine is a possibility, it wasn't before. Patients in remote places can receive a diagnosis without visiting to a hospital because to the ability of doctors to speak with colleagues around the globe via computers and mobile devices. Telemedicine can significantly enhance care in crisis settings where it would not otherwise be possible, as as following the Haiti earthquake or in conflict zones.

Inventory:

For the treatment of patients, it is essential to know what medications are on hand. The importance of updating inventory lists can therefore not be overstated. Recovery could be slowed considerably if a doctor prescribes anything that is not currently in stock. Instead, utilising a computer to track inventory would immediately tell the staff when something was incorrect so they could alter their treatment plan as necessary.

To prevent abuse and improper prescription, many medications are heavily controlled and must be closely monitored. Computers can record inventory, keep track of a drug's history so that it may be retrieved later if needed, and prevent human mistake.

Computers Made for Healthcare:

Computers still need to be particularly created for use in healthcare institutions despite all these advantages. To maintain cleanliness and safety in these organisations, equipment must have medical certifications, antibacterial enclosures, and easily

washable components. Simply putting a consumer-grade computer in a hospital without these features could ultimately lead to more issues than it would solve.

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