The role of computers in medical procedures

Technology, Computer

We all live in an age ofscience and technology. The appliances of science andtechnologyhave revolutionized our way of life. There is nothing that has influenced our lives more than a computer. There can not be any field that is devoid of the influence of computer applications. From agriculture to rocket science, computers have significant roles to play. The demand of computers has always been on the increase for some time in many fields.

Among the fields that have made tremendous advances in the twentieth century due to the advent of computers, medicine stands out from the rest. Computers are used in medicine in almost all areas. Whether it is diagnosis, treatment, research or data management, computers have there own applications. Whatever we enjoy today in terms of ourhealthmay not be possible without the invaluable contribution of computers. Therefore, my endeavor is to discuss how significantly computers have contributed in the field of medicine.

Diagnosis helps to determine the nature of a disease. Without a proper diagnosis, a disease can not be treated effectively. Before the advent of computers, physicians merely guessed at what caused certain diseases. Consequently, many patients either ended up in getting treatment for something that they did not require treatment for or losing their lives. This unfortunate situation does not exist at all now.

Thanks to computers, physicians can diagnose a disease with astonishing efficiency nowadays. Modern diagnosis consists of three main steps. Taking of patient's health history, examining the patient physically and conducting laboratory or radiological examinations are the three main steps. In all three

steps, computers are used invariably. Instead of guessing the causes for a disease, the physicians just have to enter the symptoms of a patient into the computers. With the help ofartificial intelligence, they get a crystal clear picture of the disease. For example, Twenty years ago, doctors relied on conjectures to determine the causes of heart attacks. But now, they use chemicals, nuclear imaging devices and databases they diagnose heart attacks with great accuracy and treat them with tremendous success.

Telemedicine is a novel idea that can play a great part in diagnosis. In telemedicine, arrangements are made to see patients via video or computers links. When a specialist sees a patient through computer links, the specialist can provide diagnosis for the disease and help to obtain a proper treatment.

Computers are also being used to produce patterns to help physicians diagnose problems of the brain. Research has revealed that a certain pattern of stripes can be painful to look at for some people. " The pattern resembles a circle filled with alternating black-and -white vertical stripes. At a viewing distance of forty-three centimeters, this grating has a spatial frequency of three cycles/degree of visual arc and a Michelson contrast of about 0. 7."

As mentioned earlier, computers are used in medical treatments as well. Computer aided surgery known, as CAS can be a well-known example. Initially, CAS meant a technology of surgical simulation using three-dimensional organ models reconstructed by medical imaging using a computer graphics technique. There is a notion among the public that CAS completely replaces surgeons' hands with robots. This is not the purpose of CAS. Invention in CAS is always to support surgeons but not replace them.

Decision-making is the most important process in surgery. Only the surgeons should make decisions regarding a surgery.

CAS can provide a lot of new styles of surgery that we have never imagined. Endoscopic surgery is good example. Modern surgery is to remove or replace legions, but rapid progress in laser surgery or radiological treatment may make it unnecessary in the future. Thanks to computers, surgery without operation has become reality.

The Role of Computers in Storing and Processing Information

Computers have been used as storage of medical information for many years. Electronic patient records called EPR are good examples to prove the worth of computers as information storage. Due to startup and running costs, training staffmotivation, obsolesce, poor function possibility for abuse, risk of loss of confidentiality, EPR were not used very much in the past, but now they are very common. They have become almost indispensable. They have many advantages " Faster and simpler access to notes, maintenance of more detailed notes over longer periods, reduced staffing levels, ease of booking, investigation orders and results, health updates, reminders, integration with telemedicine, ease of integration of non-hospital based care, increased ability to collect health information."

Computers are used for scheduling and appointment keeping. They are used to keep track of patients' visits. With the help of word processors, letters are typed and sent to patients reminding them for follow-up appointments. Accurate keeping of detailed patient records is extremely important to the

medical practitioners. Therefore, medical practitioners have to rely on computers heavily in order to be efficient and successful in their profession. Exchange of medical information among the medical professionals has become a common thing now. With the help of computers, they are able to share valuable information with a high level of confidentiality. Computer conferencing is an effective way of achieving this purpose.

The Role of Computers in Medical Research andEducation

The life p of human beings gets increased with the passage of time. This has been possible only owing to the concerted efforts effort's of medical scientists. They have to conduct researches not only to find out the causes for different diseases and ailments, but also to explore new cures for those diseases. Computers are very much utilized in research and education. Modern computer is capable of designing drugs these days. At first, a scientist must find the molecular structure of the targeted virus or bacterium, and then a computer helps find a magic bullet drug to combat it. Incredible equipment from chemistry, atomic energy, and basic physics research help biologists find the structure of molecules.

Radioisotopes are used to track molecule through any living organism. Chromatography is used to separate and identify chemicals. Through a computer nuclear magnetic resonance (N MR) produces images, that show charges in the living organism as they happen. Tiny electrodes monitor the movement of material in and out of a cell. Then the exact structure of a molecule is seen by an X-ray crystallography. Once the structure of the molecule is seen, the data is put into a computer and the image of the

molecule appears on screen. The image can be turned around to view at all possible angles. The purpose is to design another molecule that will fit the disease organism. The new molecule will be an effective drug. " A drug designed in this way has a good chance of being effective and safe"

Three-dimensional computer models of the human thorax, lungs, heart, arteries, and veins are already available to help train medical students. This allows students to be able to perform dissections or surgeries on the models instead of on real human cadavers. These major achievements in medicine have greatly helped people around the world. It has made life easier for us. Further more, computers are becoming an essential tool in medical education. They are used to enhance the learning process. The ability of a computer to incorporate text, graphics, animation, and sound all at the same time improves the presentations of materials better than a textbook. In addition, a concept known as a hypertext system helps the student to understand a specific topic better. A hypertext system allows the user to browse through other materials related to the user's topic. Also, software-based programs are used for tutorials and multimedia textbooks.

The Advantages of Computers in Medicine

After the introduction of computers to medicine, we have witnessed an abrupt abundance of new technologies and discoveries in this field. However, computers are also beneficial in medical education and its practice. As new developments are made in medicine, the medical literature continues to grow. There has not been such a huge explosion of new information in

history than these past few decades. " It is estimated that that the quantity of information is doubling every two years."

Yet, our brain capacity stays the same. The ability of a computer to incorporate text, graphics, animation, and sound help students to understand and retain more information. Also, a computer can link the students to other areas related to the subject of their studies. This application of computers to incorporate more text and graphics is known as the use of hypertext and/or hyper media. This is very advantageous because more of the senses are engaged, increasing the chances to recall the information presented. Another matter to keep in consideration is that the information can easily be updated and immediately distributed to those concerned. This allows students and physicians to obtain current information to serve their patients better.

In the practice of medicine, doctors have been relieved of the small manual tasks they must perform. For example, doctors no longer have to be bothered keeping manual records of patient visits. There are fewer chances of losing or forgetting an appointment and it so the information can easily be retrieved. In maintaining billing, the computer is very accurate when performing mathematical tasks. In addition, it allows doctors to keep very organized and detailed patient records. Also computers provide assistance in decision-making situations. In making a diagnosis, thedoctorsimply has to enter the patient's symptoms and the computer provides him or her possible diagnosis and therapies. If a doctor wishes to consult with other doctors, he contacts them through E-mails. The computer also allows doctors to keep

with current news and differentiate which alternative therapies have scientific basis. Overall, computers have helped doctors in serving their patients to the best of their abilities.

The Disadvantages of Computers in Medicine

Where there are benefits, there are also problems. The negative impact of computers on people in our society is that people can become over-dependent on them. They rely on the computer to do everything. When the computer fails to work out a problem, they become distraught. Computer reliance is a big downfall for many people. Computers do not always give correct answers. There are occasions where the computer will make the wrong diagnosis, which can result in the worsening of a patient's condition.

Another problem with computers is that they are prone to viruses and breakdowns. If a virus enters a computer, it has the potential to destroy every file in it. Then, all patient records are lost. Computer breakdowns and power shortages prevent the doctor form accessing patients' records and files. However, scanning the computer for viruses and making backup hard copies can prevent this.

Computers can never mechanize the art of medicine. Neither can they eliminate the need of human beings. What they can do is help us bring relevant and timely information to bear on our care of individual patients. They can also help run the medical offices or hospitals in a way that makes good business sense. That is why many physicians have embraced the computer and made information technology an integral part of their

approach to patient care. That is why they have been able to meet the increasing needs of the patents remarkably well.