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USE OF

COMPUTER PROGRAMMING

IN THE FIELD OF

MEDICAL SCIENCE

RESEARCH ARTICLE

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HOW COMPUTER PROGRAMMING IS HELPFUL IN MEDICAL SCIENCE

Today’s health care industries uses computer in much more sophisticated way, and lab scientists are no longer required to analyze the data collected by computers in a research laboratory. These days, patients and doctors can log into Web-based information portals to coordinate treatment plans and schedule appointments. Patients are also increasingly using mobile and wearable devices to stay on regular dosage schedules and monitor vital information such as heart rate and blood pressure.

Programming jobs in the medical field fall into two categories: research and software engineering. The work performed by computer science researchers varies depending on where they work. Researchers working in hospitals and universities are usually the ones working on cutting-edge technology that will be published in scientific journals and used by anyone who needs it. This work is mostly general and theoretical, and it isn’t intended to be used in any particular product. Funding for this research comes from government grants, so the research is made public after it’s finished.

Researchers working for medical supply companies are paid to develop new products that will be sold to hospitals and clinics. Their work is kept private and is patented by the company they work for. Programmers working in these areas develop medical technology such as robots, database models and medical software, and the level of education required depends on where they work. Private companies usually require a [master’s in computer science degree](https://www.computersciencedegreehub.com/best/online-masters-program/) but may hire candidates with only a bachelor’s degree in some cases. Universities usually require a PhD but may hire master’s degree holders to do research, especially if they’re PhD students of the university.

In the field of software engineering, computers in healthcare are used to connect patients with doctors and to make the job of doctors and nurses more efficient. Programmers are needed to write the software for medical equipment and for hospital administration. People with computer science skills are needed to analyze clinical data and manage healthcare IT departments. The field of healthcare informatics is growing rapidly, and employment is expected to increase twice as fast in this industry as in other occupations. Salaries range from $64,000 to $144,000 per year, depending on the worker’s level of education and experience.

With a bachelor’s degree, jobs such as software developer and clinical analyst become available. With advanced education and experience, jobs such as project manager and lead engineer are available, and these positions often lead to executive positions in hospital and business administration. Computer scientists working in healthcare research usually need a terminal professional degree, and the highest level of employment they can reach is tenured professor. However, there are many opportunities for professors with well-known published work, including lucrative freelance and public speaking jobs.

Health informatics is a booming field, and there are many opportunities for interesting, high-paying work. If you have an interest in how computers in healthcare are used, you should consider pursuing a career in medical software engineering or research.

Doctors encounter hundreds, maybe thousands of patients. With that much experience, doctors quickly realize that there is a pattern of patients with particular symptoms. They must try to determine how these symptoms relate to a particular cause. Since there’s a lot of data, it is not practical to analyze all of it individually. Instead, machine learning techniques can be applied to predict or to identify the correlation of the symptoms with the patient's state. These machine learning techniques work based on probabilities and statistics.

In Python, you only need to write few lines of code to achieve your goals. There are plenty of resources out there to help you learn. You just need to understand the basics.

Discuss, with concrete reasoning, at least two cases where programming can be specifically used in this field.

IMPORTANCE OF COMPUTER PROGRAMMING IN MEDICINES:

Computers play a key role in almost every sphere of life. They facilitate storage of huge amounts of data, they enable speedy processing of information and they possess an inbuilt intelligence. Owing to these unique capabilities, computers function on levels close to that of a human brain. Computers can hence be employed in a wide variety of fields like engineering, data processing and storage, planning and scheduling, networking, education as well as health and medicine. You might want to take a look at the various uses of computers.

Computers are the excellent means for storage of patient related data. Big hospitals employ computer systems to maintain patient records. It is often necessary to maintain detailed records of the medical history of patients. Doctors often require the information about a patient’s family history, physical ailments, already diagnosed diseases and prescribed medicines. This information can be effectively stored in a computer database.

Computers can keep track of prescriptions and billing information. They can be used to store the information about the medicines prescribed to a patient as well as those, which cannot be prescribed to him/her. Computers enable an efficient storage of huge amounts of medical data.

Medicine comprises vast base of knowledge. Computer storage can serve as the best means of housing this information. Medical journals, research and diagnosis papers, important medical documents and reference books can best be stored in an electronic format.

Many of the modern-day medical equipment have small, programmed computers. Many of the medical appliances of today work on pre-programmed instructions. The circuitry and logic in most of the medical equipment is basically a computer. The functioning of hospital-bed beeping systems, emergency alarm systems, X-ray machines and several such medical appliances is based on computer logic.

Computer software is used for diagnosis of diseases. It can be used for the examination of internal organs of the body. Advanced computer-based systems are used to examine delicate organs of the body. Some of the complex surgeries can be performed with the aid of computers. The different types of monitoring equipment in hospitals are often based on computer programming.

Medical imaging is a vast field that deals with the techniques to create images of the human body for medical purposes. Many of the modern methods of scanning and imaging are largely based on the computer technology. We have been able to implement many of the advanced medical imaging techniques, thanks to the developments in computer science. Magnetic resonance imaging employs computer software. Computed tomography makes use of digital geometry processing techniques to obtain 3-D images. Sophisticated computers and infrared cameras are used for obtaining high-resolution images. Computers are widely used for the generation of 3-D images in medicine.

Computer networking enables quicker communication. Computers and Internet have proved to be a boon in all the spheres of life. In the field of medicine, computers allow for faster communication between a patient and a doctor. Doctors can collaborate better over the Internet. Today, it is possible to obtain experts’ opinions within seconds by means of the Internet. Medical professionals sitting on opposite sides of the globe can communicate within minutes by means of the Internet. It is due to computer networking technology that network communication has become easy. Medical practitioners can discuss medical issues in medical forums. They can exchange images and messages in seconds and derive conclusions speedily. They can seek advice and share knowledge in a convenient manner over the Internet.

The importance of computers cannot be stressed enough as computer technology has revolutionized the field of medicine.

# CT Scanner Computer:

A prototype relational data-base management system was installed on computed tomographic (CT) scanner computers at two hospitals. This was used to create com-puterized indices for a teaching file and a record of CT procedures. Several problems commonly encountered when maintaining and using a radiologic teaching file were solved. Interesting cases were easily retrieved for teaching, conferences, or publication because the system permits rapid search on the basis of patient name, identification number, date, diagnosis, special description, or a combination of these data. The procedure record index contains these data as well as administrative and technical data on all CT examinations. These data are entered into the data base semi automatically. The result is an extensive set of records that is easily accessible and requires a minimum of manpower to maintain.

All phases of medical practice require access to files of information. Although these files are maintained and accessed in different ways, they all share attributes that may be grouped under the concept of a data-base management system (DBMS). A DBMS handles related groups of data in an organized way; it has four basic parts: a set of records that represents the subject matter; a technique for adding, deleting, or editing records; a method for changing the order of records; and a mechanism for retrieving a certain subset of records. Although the abbreviation DBMS has become popular only in the computer age, earlier systems maintained on paper, such as lists, file folders, film jackets, or index cards, are also DBMSs.

Two formerly non computerized DBMSs at the Milwaukee County Medical complex and the Wood Veterans Administration Medical Center are the CT teaching file and the CT procedure record. The CT teaching file contains film jackets holding duplicate selected films for over 1500 cases of special teaching interest. Film jackets are filed according to a four-digit anatomy and pathology code that is similar to the American College of Radiology’s Index for Roentgen Diagnosis On each jacket is listed the diagnostic code, patient name and identification number, date of examination, examination accession (run) number, and a brief description of the case and pertinent findings. Film jackets are arranged numerically by diagnostic code and are stored in file cabinets. In the past, cases were accessed systematically by diagnostic code, but a search for cases based on any criterion other than diagnostic code may have required that all 1 500 jackets be reviewed.

The CT procedure record consists of a chronologic log book of administrative and diagnostic data on all patients examined by CT. In the past, cases were accessed systematically by date of examination, but a search based on any other data required that all entries be reviewed. We wished to expand the usefulness of the CT teaching file and the CT procedure record by creating computerized indices for each. To avoid additional hardware costs, we installed the system on the computers associated with our CT scanners. This paper describes application of a prototype computerized DBMS to these two specialized radiologic files and discusses the advantages of such a system over a conventional system maintained on paper. Comparison is also made with a previously described teaching file program that uses a CT computer. Alternative commercially available software systems are described in the Appendix.

CONCLUSION:

Other department computers may be suitable for these applications. Most radiology department information systems (registration, scheduling, and reporting systems) also offer teaching file software as part of the basic system or as an option. Microcomputers are becoming increasingly available in radiology departments, and most local computer stores offer a variety of relational data-base software that can run on these microcomputers. An Apple 11+ was used to test the acceptability of this approach. While a commercial relational DBMS worked satisfactorily for small files, the floppy-disk based system was very slow for larger files. The addition of a hard disk would have solved this prober, but at significant expense. A simpler, less flexible data-base system or dedicated teaching file software would run much more quickly and may be acceptable even on the typical floppy disk system.

REFERENCE:

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