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Bioinformatics: Applications of Computers in Genetics

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Abstract:

This study discusses key areas of computing strength and how these abilities can be learned as part of a medical genetics programme. Geneticists are pioneering the use of computers in health care in the context of the human genome project. In order to keep molecular genetic data from ballooning and being directly tied to clinical care, the computer search of an international database is perhaps the most efficient strategy for doing so. The use of computers in genomics education may go well beyond using computer-aided instruction (CAI) to demonstrate how computers can help with clinical decision-making. Genetic software can be used to acquire the required basic computing abilities. Use of (1) microcomputers, (2) productivity software, (3) CAI, patient simulation, and particular applications, (4) virtual computers, (5) analytics and knowledge bases; Patients' clinical care are among the six talents advocated.

Keywords: Bio-informatics, computer programming, Genetics analysis, Softwares.

Introduction

In light of the growing application of suitable genome programmes and global databases, sophisticated computer skills are becoming increasingly important as a precondition for medical genetics practice. On order to provide patients with high-quality health care, learners, researchers, and genetic counsellors must be trained in how to access and interpret genetic information. This is a focus for many accredited health institutes. Even while the number of doctors institutions recognize the importance of basic knowledge in medical practice (Pages et al. 1983; AAMC 1984; Starkweather 1986; Salamon et al. 1989), many colleges are indeed searching for model programmes to use in their curriculum. Real-world demonstrations of how computers can be used to assist in clinical practice and patient care.

This study presents certain areas of computing capability and outlines how to learn how to motivate as part of a medical genetics' comprehensive platform, which is described in detail in the following

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section. Using computers in genetics education can go beyond typical computer-aided instruction (CAI) by connecting computer technology to readily available contemporary genetic data, which goes beyond the conventional CAI.

These Computer Skills Competencies that are being developed
The following are the basic computer abilities that are proposed as being required for practising medicine:
I. Knowledge of the fundamentals of microcomputer operation

(II). The application of productivity software

III-The usage of CAI, patient simulations, and specific application programmes are all examples of this.

IV. Access to and usage of distant computers.

V. An awareness of and ability to make use of data bases and information databases

The use of computers to enhance diagnosis and treatment

The limits between the six zones are a little bit fuzzy in different places. Each of the six domains is utilized continuously in the practice of daily medicine to increase problem-solving abilities, refine mental processes, and stay abreast of latest discoveries. This is, in essence, the concept of competency VI, which is the final goal of this learning process.

1**. Knowledge of the fundamentals of microcomputer operation**

Nowadays, computer literacy is primarily concentrated on desktop microcomputers, rather than on mainframe computation. One, it takes approximately 2-3 hours to learn the fundamentals of computer literacy. What to do to start a computer, how and when to care for a floppy disc, how to do basic data management activities, how to communicate with a computer, and how to use special keys on a keyboard or mouse, among other things, are all fundamental abilities. Most students must deal with these concepts before enrolling in a medical school programme.

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The Implementation of Productivity Software

The knowledge of productivity software is essential for students in order to grasp the various capabilities of software products, determine when they need to be employed, and be able to use it. Word processing, e-mail, graphics, spreadsheets, and spreadsheets are some of the most basic types of efficiency software available.

There are a variety of approaches that can be used to allow students to use productivity software to complete genetics tasks. Educators have the authority to (a) prescribe homework. In addition, students will be permitted to submit assignments via e-mail; in addition, students will be permitted to consider generations of gene frequency changes or laboratory-based data analysis, and they will be required to use graphical operating systems to present their findings. Permitting students to calculate gene frequency, risk, and changes in Bayesian conditions using spreadsheets is step (D). In addition, they could use the data to store a simple history of all the patient populations they see (Oliver et al., 1990), all of the programmes they have done, the concepts and diseases they have learned, and the data those who have obtained for response to the researchers and apprentices

The utilization of CAI, patient models, and specific feature programmes is ineffective.

Any list of these programmes would be out of date as soon as it was published since this is a very interesting group of software design; the goal of this review is not to list each plausible software package, but instead to highlight the overview with some real-world examples of software design. The fundamental abilities of the students include the ability to: (1) comprehend the content presented in each course; (2) utilize the course; and (3) recognize the course's value as a tool for lifelong, autonomous learning. When it comes to new software, students should be competent appraisers who are able to call into question the value of a new package while also determining the equipment required to make it operational.

In a variety of CAI application packages, which were used in the multimedia and interactive video programmes on stage, several application packages were built. It takes a range of senses and a diversity of computer simulations of learning for multimedia to perform its real-world role. Graphics overlay area development, high-capacity CD-ROM, picture and action video disc, voice and voice reproduction for audio cards, and teaching programs for hyperlink CAI all contribute to a more effective overall experience.

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A. CAI courses are available.

A tutorial bundle, genetic algorithms, and more are included. It is a ten-disk set that teaches the fundamentals of medical genetics to students (see appendix address all the source of the software discussion). Use in a formal setting It provides background material for their students as a full curriculum, as a student guideline, and as a preparation tool for a survey questionnaire, the hope being to improve their performance. Entry genetics is a more basic package that is available.

Drill and practice with the CAI

Students make the erroneous decision during practice activities conducted through the computer to deliver questionnaires to aid them in these situations. Some The programme is tightly enforced, and some programmes will deliver the actual test, as well as the findings of the project analysis, in accordance with the results of the instructor key. The Medical Genetics Question Library (Reed et al.1989) is an example of a question bank that has been produced in the field of medical genetics. Everybody can benefit from it. The genetics course is used to review the content prior to the exam, and there are enough but brief explanations to help students succeed. The incorrect response to guide the students further Learn. A computer application for managing Bayesian risk estimates, developed by the Mac Gene Risk team. Various words or figures are used to fill in the holes in the statement.

National exams, which may be necessary, will be handled through the computer in order to provide students with the best possible experience. The patient management and multiple-choice questions should be as pleasant as the computer testing agent quizzes. The simulation format is the most likely to be used. In preparation for the first round of the countrywide computer management assessment.

Patient models are the fourth option.

Rather than practicing on real patients, trainees can use computer-based patient simulations to improve their diagnostic and management abilities on virtual patients. The idea is not for the computer to take the place of real-world patient experience, but rather to enhance educational opportunities and allow students to benefit from the real-world patients they observe. Student development of a specific deductive reasoning approach to medical problem solving and its incorporation into the process of patient care are the goals of these programmes.

Galactosemic, Down Syndrome, and Fragile X Syndrome are three genetic modelling programmes that are now available. These programmes are more focused on the management of specific

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complications than they are on the diagnosis of such complications, although they are still beneficial for learning overall management techniques and follow-up procedures.

D. Particular application programmes are included in this category.

Many specific genetics may be taught using the programme, and it can be used for genomics education in general. Possum (Picture of Standardized Condition and Undiagnosed Malformations), a programme that is frequently used, has a database of abnormalities as well as video data that depicts the picture of the syndrome. Despite the fact that the system's primary goal is to assist in diagnosis (Strmme 1990), several geneticists employ the system while teaching images and promoting "browsing" Image file.

A given application task is accomplished by the majority of applications. Examples include Clinic Management (GOAS or GenetiWare), Patient Enroll (Pratt and Mize 1990), risk evaluation, research-related calculations, pedigree mapping (Megadats or descent/painting), chromosome analysis, Mapping (Micro

For the learning system, these applications can be used to ensure that students are familiar with the programme and its proper usage. For example, educators can use local database management systems such as GOAS (Cutts et al. 1988) to teach students about database basics while also providing them with specific exercises to familiarize them with the database. Respond to the patient's care needs by conducting a database search and solving the research challenge.

Access to and use of network servers (Chapter IV)

Students must learn how to properly store patient information. In the hospital mainframe system, a reference number is provided. Database, bulletin board for the health profession, and remote-control. A health information database is a database that contains medical information. Practice and international data networks are both important. Students should be familiar with the national telecommunications network as well as the methods of accessing it. In particular, students should learn how to (a) utilize a modem, (b) obtain network access to the Internet, (c) connect on to a distant computer system, (d) file transfer files, and (E) after the remote system becomes operational on the Internet, configure the Educators can assist kids in developing these abilities. You have the option of selecting a specific system of interest to display. Access the application and learn how to use it, then talk about the modem. Demonstration of a network protocol configuration Upload and download data, as well as a visual representation of the system's current use One can be solved by students. In

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this case, a remote system is used as a tool that is like the problem. Using Grateful Med for MEDLINE access, we can see an example of this genetic education strategy (Proud et al. 1989, presented; Mitchell et al. 1990, in the news) being used in conjunction with Grateful Med. Along with MEDLINE, there are additional remote systems such as COMPUSERVE, which deals with patient care difficulties. BITNET sends the message to the medical form via BITNET. The information sought by OMIM is about the Mendelian disorder TERIS or Reprotox, which is looking for mating data. The toxicology of drugs and substances Pregnancy and information are now available on the internet. The disease neurofibromatosis will be the focus.

Understanding and utilizing data bases and repositories are the fifth and final components of the course.

Genetics found itself in an unusual position as a result of the demand for scientific research data. As a result, the following are the findings: The information was gathered and submitted to the research by the community, which maintains a database throughout the country. These outcomes can be in the form of electronic months or years. They were previously available in the published literature, but that was a few years ago. A great deal of information in the textbook about many different types of inherited disease is out of date. The textbook has been released. Also, journal literature falls into this category.

It is possible that it has expired before it is made available. In the future, electronic format will increasingly be used to store the most accurate and up-to-date facts and derivative knowledge. Unfortunately, this material is only applicable to those who are familiar with the fundamental structure of data mining and knowledge base, as well as their principles. Make use of and ensure that the search is accurate and full.

The concept of a knowledge base is a little more out of the ordinary. In genetics, however, promises will grow increasingly widespread in the coming years. The use of knowledge bases for diagnosis by chromosome abnormality information systems (Buyse and Edwards 1987) and Syndroc (Schorderet 1987) is suggested. In the field of bioinformatics, the system is intended to aid in the planning of biotechnology projects, among other things. The experiment (Brutlag 1990) has the potential to be beneficial. In my capacity as a basic scientist. It was outlined by Cooper and Friedman (1990) how the ISCN Expert System works, including how each chromosome is identified and how the output is current. Chromosomal abnormalities are a type of genetic disorder. It has been discovered that an expert system (Mitchell et al., 1985) has produced results that can be used to help develop diagnostic

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criteria. Various other systems It is currently in the process of being developed (Patton 1987; Baraitser Et al. 1989; Veloso and Feijoo 1989; Salgado et al 1990; Yamamoto et al. 1990).

Sixth, the Application of Computers to Optimize Clinical Services

Finally, the eventual aim is to employ a computer to improve the quality of clinical care. In many facets of the job, the computer can be of assistance. Develop your problem-solving skills by refining your ideas. Information for clinical care must be processed and kept up to date. Take a look at the following two realities: An illustration of how to make use of the currently existing system: Dr. Mary Smith, a medical geneticist, is cautious about type 1 neurofibromatosis.

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