

Medical Expert Systems: You Won't Work Without Them Once You Know Them

Judith Federhofer

Department of Medical Computer Sciences, University of Vienna/Austria
judithf@netway.at

Clemens Chizzali-Bonfadin

Department of Medical Computer Sciences, University of Vienna/Austria
ccb@akh-wien.ac.at

Klaus-Peter Adlassnig

Department of Medical Computer Sciences, University of Vienna/Austria
kpa@akh-wien.ac.at

Abstract: Recent years have seen an enormous development in the field of medical expert systems, making it a time consuming and complicated task for physicians finding the system most capable for them. To give physicians the opportunity to get fast and easy access to a specific system, our department has developed a web site which intends to be a comprehensive source for physicians, students and other health-care professionals in providing information on over 65 worldwide available medical expert and knowledge-based systems.

Medical Expert Systems: Doctor's Silent Partners

Our web page will be a unique collection of over 65 state-of-the-art medical expert systems and knowledge based systems.

An expert system is an Artificial Intelligence program that uses knowledge to solve problems that would normally require a human specialist. Expert systems are one of the most successful commercial applications of Artificial Intelligence and they are used in many different areas. In medicine, expert systems have been developed to assist the physicians in a hospital or in his office in the course of interpreting medical findings, providing diagnostic support and therapy advice, giving hints for disease prognosis, guiding patient management, and monitoring hospital and patient's medical data and costs.

Expert systems and knowledge based systems in medicine help in the manipulation and application of expert medical knowledge.

The growing complexity of the fund of knowledge makes the application of such systems more and more indispensable. The amount of medical knowledge is such that today no physician can access or memorize all the necessary information in his daily practice. Therefore, in an attempt to minimize the incidence of misdiagnosis, physicians are increasingly looking to expert systems to corroborate their findings and/or highlight anomalies and errors. Provided that expert systems are used correctly, they also reduce much of the repetitive and specialized mental efforts made by the treating physicians and enable him to devote his time and attention to the personal care of the patient. Another reason, why decision support technologies are becoming more and more important in medicine is their benefit in cost reduction. For example, expert systems allow the dissemination of information held by one or a small number of experts. This makes the knowledge available to a larger number of people, and less skilled (so less expensive) people, reducing the cost of accessing information.

Additionally, human expertise about medical subjects in question is not always available when it is needed. This may be because the necessary knowledge is held by a small group of medical experts, who may not be in the right place at the right time.

Alternatively it may be because the knowledge is distributed through a variety of sources and is therefore difficult to assimilate.

Medical Expert Systems: Struggling for Acceptance

Increasing ease of access to personal computers is partially responsible for the growing interest in medical expert systems. The availability of relatively inexpensive powerful computers is increasing health care workers familiarity with machines, and physicians are ready to accept computers in all areas of their daily life. The World Wide Web demystified computers for many new users by providing the physician with relevant, timely and unique information. As networks have grown and become more robust academics and other healthcare professionals have become to appreciate how they can be used in the process of patient management, teaching and learning.

However, medical expert systems are not yet in widespread use because of the following reason: In recent years a variety of programs designed to assist the physician with drug dosing, health maintenance, diagnosis and other clinically relevant decisions have been developed for the medical market, making it a time consuming and complicated task for physicians finding the system most capable for them. Physicians in Austria, who have been interested in the application of computer-based decision support for clinical medicine, reported the same problems. In most cases, not familiar with the web and using search engines, it was hardly impossible for them to find the right expert system. So thus far the systems have failed to gain widespread acceptance by physicians.

To cope with these needs, our web page will offer enhanced access for health professionals to a wealth of information resources and expert systems, to provide the opportunity to deliver patient care more effectively.

The Purpose of our Web Site

The purpose of this web site is to serve as a comprehensive resource for physicians, students, and other health-care workers in providing information on over 65 state-of-the-art clinical expert and knowledge-based systems. The web site is a unique collection of worldwide available expert systems designed to give physicians the opportunity to get fast and easy access to a specific program.

Physicians are provided with detailed description of the programs, links to the online version (if available), availability, pricing description, clinical use, information about the developer and evaluation statistics. As the web site was primarily designed for physicians, we put the emphasis on medical relevant data and skipped technical details. Special care was taken to provide a logical interface for easy exploration and navigation through the featured expert system. The physician will have the possibility to chose the program he is interested in by name, or decide on a special field and chose from a list of relevant programs. Once the physician selects a program he will have further access to detailed description. Information about the clinical use and the developer can also be recalled. As with the advent of the WWW more and more programs have begun to appear on the Internet (i.e. Hepaxpert, DxPlain, the Heart Disease Program, Computerized Medical Diagnosis), the web site will focus especially on the Online/Offline availability of the featured expert system. Categorization in full version, demo version and Internet version will be given.

The section “ Historical Perspective” will illustrate the milestones in the development of expert systems and will give a short overview about the first groundbreaking systems (MYCIN, de Dombals System, Help).

Health care professionals will also be provided with additional background information for like a list of upcoming congresses and events, a link to the Austrian chamber of physicians, and links to other useful international medical sites on the Internet.

The web site will be accessible via our homepage <http://www.akh-wien.ac.at/imc/MES>

Conclusion

The Department of Medical Computer Sciences of Vienna, which has been developing expert systems for over twenty years, predicts a bright future for the implementation of expert systems in everyday clinical use.

To promote the popularity of such programs, our Institute decided to concentrate as many programs as possible and to make them jointly available in a single source, which hopefully leads to a broader acceptance among physicians.