

MedicDAT

- Making Information Available -

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1. Introduction

Today most hospitals use computer-based systems for administrative purposes. Electronic patient-records exist in highly specialised versions mostly limited to the needs of single departments. In contrast integrative systems that allow a hospital-wide documentation of medical data are rare. Also electronic systems are used in practices, hospitals and medical schools to gain non-patientspecific medical information. Drug-index-systems, handbooks or scientific publications on CD are available. Access to the Internet to search online-databases is at more and more physicians disposal.

2. The problem

However the acceptance of these electronic media is poor. There are several reasons that keep healthcare-professionals away from using the majority of the offered electronic tools regularly and frequently. Whereas the global performance of database-research used to be a major problem in former times the technical aspect of performance becomes less and less important today. The different user-interfaces, the often complex navigation within the various systems and the increasing amount of redundant or worthless information that is presented especially by the internet limits the use of electronic media in everyday use. The efficiency of using electronic information systems is often too low compared to traditional media therefore the use of these systems costs the most expensive good that is at the user's disposal - his time.

3. The MedicDAT-project

The aim of the MedicDAT(Interface for Medical Documents, Scientific Abstracts and Text Books)-project is to increase the acceptance of electronic media in clinical medicine. MedicDAT shall reach this aim by simplifying the acquisition of qualified information in the electronical media environment. The University of Regensburg is initiator and leader of the MedicDAT-project. The scientific publishing houses Urban & Fischer (München) and Springer (Heidelberg), the online content-provider HOS-Multimedia, the SAP related software-developer GSD (Berlin) and the medical informatics section of the University of Lübeck are partners in the project. The project is granted as "Leitprojekt" of the German federal ministry of education, science, research and technology (bmb+f).

4. Communication of electronical media in medicine today

Although electronic media in medicine are used in diagnosis, therapy and education, there is hardly any communication between the different programmes and machines. Only structured data like monitor values or laboratory results can be transported from application to application using standard exchange-protocols like HL7. Nevertheless most of the applications are typical "island"-solutions that deal with their own data but - besides a minimal data-set like patient's name and address - cannot share or exchange data or functionality with any other application. When looking at electronic media holding non-patientspecific medical data, no common interface to link similar, extended or supplemental information exists. In the majority of cases each data-source provides it's own method and user-interface to navigate within this application and to present the requested information. So it costs an increasing lot of time to look for information at more than one data-source. The users' acceptance to ask for a comprehensive "second electronic opinion" therefore is little. Even the world wide web with it's millions of references usually only links one homepage to the other instead of a closer content-oriented linking. The need of redundant navigation is the unfavourable result.

5. What can be the benefit of electronically available information

The use of books and newspapers instead of electronic media is easier, as no costly and unwieldy machine is necessary to present the contents. Therefore there must be an additional benefit to change to the new media. Such benefit can be the availability of all latest information at all computers at the same time in a network. Another benefit can be the possibility of electronically collecting and linking information from different sources. This can easily be illustrated with two examples:

It is of no special interest to the student to find virtual lectures on the net, if this information can be brought to him by the "real professor". So the use of such services is limited to special circumstances like long-distance-education. A benefit of virtual lectures - besides these special circumstances and the effect of revision - could be the possibility to look for further information. The lecture's topic may be found in scientific papers, textbooks or other additional sources of information. A consolidation or expansion of the obtained information according to the actual needs of the student with an increase of the quality of education could result from this.

In everyday's work the clinician already sits at his computer for diagnosis, therapy-planing or documentation. He or she would greatly appreciate to navigate right from this application to look up additional information that might be needed right at that moment. If high-quality information could be obtained quick and preselected from various data-sources, according exactly to the actual needs of the user, a lot of time could be saved compared to the traditional way of gathering information.

6. Why another interface for medical data

A lot of highly developed interfaces for medical data exist. But all these interfaces refer to structured information. It is easy to exchange patient's names, birthdays, insurances etc. and there is no problem to communicate laboratory data from one system to the other, but there is no interface for medical contents. No existing interface or technology provides a link between similar or extended medical information. There is no technology in use that keeps in mind, what the specific requirements of the user are. Of course a student needs other

information than an attending physician while doing the same job. There is no technology in use that is able to check what is done at a computer at the moment and use this context to judge what specific information therefore may be relevant to the user. MedicDAT wants to provide a technology and an interface that helps to find medical information that is text-related, user-specific and context-orientated. This is what we call a content-based linking.

7. What is the MedicDAT functionality

MedicDAT wants to improve the search within electronic media. Not all possible results shall be displayed. MedicDAT shall help to preselect reliable information that is fitting in the context of the actual workflow. To make a complete search possible besides the search's headwords also its synonyms have to be processed. This leads straight to the technical and logical possibility of translating the headwords to other languages, forming the language-independent concept of the MedicDAT-research. To find the required information, not only conventional database-indexes can be used. Also new indexes - that can be compared to the tables of contents in the first pages of most scientific books - must be used by the MedicDAT "intelligent meta-search-engine" to make sure that more than just the headword can be found in the potential data-source. The presentation of information has to be homogeneous. The user does not want to navigate through different graphically decorated applications when quickly searching for information. He needs a standardised form of presentation. MedicDAT therefore will display the gathered information in a standard user-environment independent from the data-source. MedicDAT has to "keep in mind", what information the user needed when finishing his query. Based on this information MedicDAT can be able to lead him quicker to the required information when he starts his next MedicDAT-query. MedicDAT also has to provide billing functionality, as parts of the displayed information - especially when searching across the web - will not be for free. So the user will have to decide whether he wants to see what is offered and whether he accepts to pay for the information, if it is not for free. Including the billing functionality multiple login-procedures can be avoided. Finally MedicDAT integrates a tool for the efficiency control of its functions. During the phase of development and further on the project wants to make sure to produce a useful tool for everyday-practice, not just an academic toy.

8. Technical realisation

Applications that call MedicDAT to fetch information are called MedicDAT-Clients, applications that serve information are called MedicDAT-Servers in the project-terminology. The technical realisation is possible since intra- and internet-technology are available. An independent technical platform can be defined to allow access to most existing data-sources. Also the technology for the knowledge-based functions already exists and only has to be adapted to the MedicDAT-requirements. More complex is the context-based indexing and structuring of information to make the MedicDAT search-functions possible. This is the reason for the primary partnership including three providers of medical contents. The content-providers take part in the project with adapting their potential sources of information - the MedicDAT-Servers - with the necessary additional content-based structures. The manufacturers of potential MedicDAT-Clients integrate the link to MedicDAT into their products. This includes the integration of functionality to submit information about the user's workflow. The University of Regensburg will provide the MedicDAT core-technology and is responsible for project co-ordination and final definition of the data-structures. Six project-phases are planned. The prephase with the project-

definition is already finished. The first MedicDAT-release will connect the clinic communication system IS-H*med to certain intranet-informations provided on MedicDAT-adapted customary CDs. The second project-phase will allow other communication-systems to use MedicDAT, then also gaining information from the web. The third project-phase will add the knowledge based functions. In the following phase the automatic or semi-automatic adaption of any data-source to MedicDAT shall be established. At the same time MedicDAT shall be tested at various hard- and software-platforms. On from the beginning MedicDAT will be available to a selected number of pilot-users. Finally after the fifth project-phase MedicDAT will be commercially available.

9. Economic realisation

The yearly releases of MedicDAT force the project to focus on fixed product-cycles that always result in an application ready to use. This shall prevent an escalation of useless high-tech development without final benefit to the user. The distribution of MedicDAT - once commercially available - will be provided by the manufacturers of MedicDAT-compatible products. MedicDAT simply will be shipped with their products either MedicDAT-Servers or -Clients. The MedicDAT-license itself will be for free to the end-user. MedicDAT will be financed by the manufacturers of MedicDAT-compatible products and by taking money for billing-services. Primary financing of the project is guaranteed by the grant of the bmb+f. An amount of 4.2 million Euro can be spent during the next five years. After that time the organisation of the MedicDAT-project will consist of three administrative structures. The MedicDAT-company as the commercial copyright-holder, being responsible for development and product-support. The MedicDAT-consortium representing the producers of MedicDAT-compatible products. The MedicDAT-association as the scientific board to keep the project under an independent control.

10. What is the aim and perspective of MedicDAT

According to the Announcement of the bmb+f's competition about "world-wide knowledge" that was won by MedicDAT, it shall be a structured information- and knowledge-system based upon modern information- and communication-technology. MedicDAT shall be an independent and strategic product that can be used in medical science and hospitals just as in the practice of a general practitioner. It shall reevaluate compatible products so that their acceptance by the professional user increases. The aim of MedicDAT is that someone buying a MedicDAT compatible CD knows that on from the moment when he puts this CD in his computer or his net, the contained knowledge is available together with and linked to all other previously installed MedicDAT-compatible data-sources.

As a perspective the project-partners hope that in the future the MedicDAT-integration will be a standard-feature of all high-quality software in medicine.

MedicDAT on a portable computer is technically also already possible today. If MedicDAT can provide real quick highly specialised medical information to nearly every place in the world this could open a new dimension especially to emergency- and out-patient treatment. The capability of MedicDAT to link between languages makes it a primarily international product. The acceptance of MedicDAT throughout the "medical world" will be directly depending on the benefit of MedicDAT to the user. Only if MedicDAT will help to save time and increase the quality of work, it will be a successful bridge of knowledge.