

Anticipating the Information Needs of Clinicians

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Clinicians constantly need information, and many studies have shown that these needs are often not resolved.[1] The information needs of a clinician using a clinical information system may be easier to answer than other needs because the user's context (who the user is, what he is doing, who the patient is, what data are being reviewed, etc.) can be detected and the same computer can be used to help obtain answers. We hypothesize that information needs in this setting can be predicted, based on contextual attributes of the setting. We also hypothesize that the information needs can be resolved automatically, using these contextual attributes. Previous efforts (the Medline Button [2,3] and the Infobutton [4]) have attempted to provide direct connections between clinical systems and online health knowledge resources. Experience from that work shows that the information needs can be quite variable and that additional information is needed from the user in order to help predict and resolve the user's specific need.

We have conducted several studies, including log file analyses and observational studies in which clinicians "think aloud" as they use clinical information systems.[5] We have analyzed video recordings of these observational sessions to determine the information needs that arise and have created a "question knowledge base" (QKB) that expresses each need as a question, identifies the contexts in which the need occurs, and provides a link to a resource that will automatically answer the question. We have also created an "Infobutton Manager" (IM) that selects questions from the QKB to present to users.[6,7] We have integrated the Infobutton Manager into several clinical information systems (including one commercial product), have tracked its usage and surveyed the users to determine the success of our approach to anticipating the information needs of clinicians and the impact on patient care.[8]

We summarize 14 years of experience with automated linkages between clinical and knowledge systems. At present, the IM is integrated into two clinical systems at New York Presbyterian Hospital (one commercial system and one system developed locally) and is used about 1,200 times a month by 300 users. It is also integrated into two systems at other institutions. Recent surveys have shown that the IM is usually able to anticipate the users' information needs by presenting the right questions. It is also generally good at answering the questions. Most users find that it is faster than looking up their own answers and that it improves patient care. Additional work is needed to improve the user interface so that users can scan the list of questions more quickly.

Our observations of users, analyses of log files, and surveys support our hypothesis that user information needs can be predicted and answered using information about the users' contexts. However, there are usually many possible information needs for any particular context. Presenting the questions to the user in a way that is easy to navigate continues to be a challenge.

Literatur

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