Introduction to the Minitrack: Data and Knowledge Management in Health Care

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The delivery of health care involves a myriad of stakeholders, including patients, direct health care providers, researchers, managed care organizations, and third-party payers. These stakeholders often have considerable differences in objectives, concerns, priorities and constraints, making data management in health care organizations a challenging endeavor. The Data and Knowledge Management in Health Care Minitrack focuses on the evolution of the database infrastructure required for handling clinical, managerial, and population-based data in the health care arena. The adoption of electronic commerce models in health care is making data management technologies even more critical. The ability to support both business-to-business and business-to-consumer efforts often rests on a foundation of database systems, along with evolving standards and networking infrastructures.

This year, we have accepted seven papers from among ten submissions dealing with a cross section of data and knowledge management topics. The first paper, “Data Mining in Healthcare Information Systems: Case Study of a Veterans Administration Spinal Cord Injury Population” by M. Kraft, K. Desouza, and I. Androwich, uses a neural network model to estimate the length of stay associated with spinal cord injuries. Artificial neural networks are being used for many medical applications, so it is particularly appropriate for this session. A unique aspect of their work is the use of nursing diagnosis data, which requires a great deal of data staging and cleansing effort. Typically, more readily available, but less rich clinical data may be used for such a project.

The second paper, “Storage Model for CDA Documents,” by Z. Liang, P. Bodorik, and M. Shepherd, considers several design and implementation issues involved with handling the Health Level 7 Clinical Document Architecture (CDA). In particular, the authors contrast an object-relational approach with a more traditional relational database design for storing clinical documents. These types of document repositories provide the necessary infrastructure for efficient document retrieval, supporting higher level analytic and data mining applications.

The third paper, “Measuring Healthcare Inequities using the Gini Index,” by D. Berndt, J. Fisher, R. Rajendrababu, and J. Studnicki, explores the use of economic measures of inequality in a health care data warehouse environment. While the Gini index and related measures have been used in the health care arena, this work focuses on using these measures for community level analysis, rather than the more typical macro-level perspective. The paper includes ZIP code level Lorenz curves for several key health status indicators in Florida.

The fourth paper, “Does the Extended Technology Acceptance Model Apply to Physicians,” by W. Chismar and S. Wiley-Patton, considers a popular model of information technology adoption in the health care context. This work included significant data collection in the field, focusing on the acceptance of Internet-based applications by pediatricians in Hawaii. The results partially confirm the general model, but the authors include an interesting discussion of specific issues surrounding the use of the model with physicians, and possibly other professional users.

The fifth paper, “Development of a Hand-held Real-time Decision Support Aid for Critical Care Nursing,” by P. Fortier, S. Jagannathan, H. Michel, N. Dluhy, and E. Oneill, reports on their initial efforts to provide real-time access for nurses to evidence-based medical knowledge, standardized practice guidelines, and clinical algorithms. The goal is to help the nurse clinician work “faster and smarter.”

Similarly, the sixth paper, “An Interactive Software-Agent Smoking Quit Program” by T. Shimoda, reports on initial efforts to use intelligent agent technology to tailor messages in smoking cessation efforts.

Lastly, the seventh paper, “A Self-Disclosure Model for Examining the Role of Information Technology in Acquiring Socially Sensitive Personal Health Information” by L. Kam and W. Chismar, proposes a model of self-disclosure that makes explicit several of the critical motivating factors. Understanding the willingness to disclose personal health information is important for designing medical Web sites and other computer-assisted data collection efforts.