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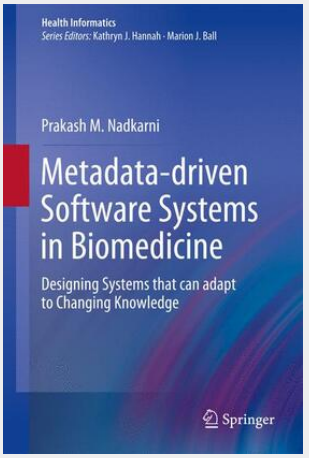
Metadata-driven Software Systems in Biomedicine

Designing Systems that can adapt to Changing Knowledge



While the use of database technology is ubiquitous throughout IT (and health IT in particular), it is not generally appreciated that, as a database increases in scope, certain designs are far superior to others. In biomedical domains, new knowledge is being generated continually, and the databases that must support areas such as clinical care and research must also be able to evolve while requiring minimal or no logical / physical redesign. Appropriately designed metadata, and software designed to utilize it effectively, can provide significant insulation against change. Many of the larger EMR or clinical research database vendors have realized this, but their designs are proprietary and not described in the literature. Consequently, numerous misconceptions abound among individuals who have not had to work with large-scale biomedical systems, and graduates of a health or bioinformatics program may find that they need to unlearn what they were taught in database and software design classes in order to work productively with such systems. A working knowledge of such systems is also important for individuals who are not primarily software developers, such as health informaticians, medical information officers and data analysts. This book is, in a sense, intended to prepare all of the above individuals for the real world.

To build good systems, one needs both good development skills as well as a thorough knowledge of the problem one is trying to solve. Knowledge of software history – what has worked and what hasn't – also helps in these types of detailed projects. Metadata-Driven Software Systems in Biomedicine lays down some of the foundations and provides a knowledge-base to assist this process. The technical portion of the book consists of database schemas and working code that provide non-trivial examples for the practitioner who is conversant with software development and wishes to employ the approaches described in the book. Eight of the ten chapters include case studies, while the book also includes extensible designs in biomedical applications: electronic medical records, clinical study data management systems, laboratory research support systems, ontologies, and production-rule subsystems. This book is therefore ideal for individuals who have to interact with large biomedical database systems in an information-technology or informatician capacity, build interfaces to such systems or design new systems themselves.

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