Special Issue:  
Semantic Web and Health Care  
Information Systems Interoperability

Asuman Dogac, Middle East Technical University (METU), Turkey

Vipul Kashyap, Clinical Informatics R&D, Partners HealthCare System, USA

The rising cost of health care is a great concern in the recovering U.S., European, and global economies. There is an important and pressing need to reduce costs of delivering health care, and information technology is being viewed as a key enabler for introducing efficiencies into the health care system. The issue of building out a National Health Information Infrastructure is gaining a lot of attention, with the approach being to encourage the linking up of local health care delivery networks across institutional, regional, and health boundaries.

Current approaches for interoperability have focused on the syntactic level, such as ODBC data gateways, message queues and interface engines, software adapters, and, more recently, Web Services. While such developments have been very useful, providing interoperability at the schema and data level is still a very difficult problem. The problem gets more complicated in the health care domain, since clinical information is very complex — there are more than 300,000 clinical concepts and many coding systems.

This special issue addresses some of the recent developments in the semantic interoperability in the e-health domain. The first two articles describe the research realized within the scope of a European Commission supported project titled “Artemis: A Semantic Web Service-Based P2P Infrastructure for the Interoperability of Medical Information Systems” (http://www.srdc.metu.edu.tr/webpage/projects/artemis/). The first article by Bicer, Kilic, Dogac, and Laleci addresses how to semantically annotate Web Service messages through archetypes in order to provide Web-Service-based semantic interoperability in the health care domain. For this purpose, the Web Service messages are annotated with OWL representation of the archetypes, and by providing the ontology mapping between the archetypes through an OWL ontology mapping tool called OWLmt, the interoperability of the Web Service message instances are achieved. The second article by Eichelberg, Aden, and Thoben describes a protocol that allows one to locate patient records for a given patient in a distributed
environment without the need to keep a master patient index. The protocol combines cryptographic techniques with semantic annotation and mediation, and presents a simple, Web-Service-based access to clinical documents. The third article by Shabo and Hughes addresses the family history information exchange services using HL7 Clinical Genomics Standard Specifications. The future vision of the article is the use of these services based on health standards over the Web such that various family history specialized applications will be able to use them to seamlessly exchange family history data.

Asuman Dogac is a full professor with the Computer Engineering Department, Middle East Technical University (METU), Ankara, Turkey. She is also the founding director of the Software Research and Development Center (SRDC), METU. Her research interests include healthcare informatics, Web services, and semantic interoperability.

Vipul Kashyap, PhD, is a senior medical informatician in the Clinical Informatics Research & Development group at Partners HealthCare System and is currently the chief architect of a knowledge management platform that enables browsing, retrieval, aggregation, analysis and management of clinical knowledge across the Partners HealthCare System. He earned his PhD from the Department of Computer Science, Rutgers University, New Brunswick. Vipul has worked on semantics and knowledge-based approaches for information and knowledge management. He was a co-project manager of a knowledge management effort at Telcordia Technologies (formerly known as Bellcore) focused on knowledge sharing and reuse across Telecordia’s Professional Services Units. He was also a fellow at the National Library of Medicine, has held a position at Micro-electronics and Computer Technology Corporation (MCC) and is currently working with NIST as a guest researcher on topics related to the role of semantics in the context of healthcare IT. Vipul has published two books on the topic of semantics in information brokering and integration, 40 to 50 articles in prestigious conferences and journals. He serves on the editorial boards of three journals, and the technical advisory board of a company developing semantics-based products. Vipul has also served on the program committees of various international conferences and has organized and participated in multiple panels.