biomedical and health informatics

Biomedical and Health Informatics Lecture Series

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12:00 - 12:50 p.m., Room T-498

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"Content-Specific Auditing of a Large Scale Anatomy Ontology"

Biomedical ontologies are envisioned to be useable in a range of research and clinical applications. The requirements for such uses include formal consistency, adequacy of coverage, and possibly other domain specific constraints. In this report we describe a case study that illustrates how application specific requirements may be used to identify modeling problems as well as data entry errors in ontology building and evolution. We have begun a project to use the UW Foundational Model of Anatomy (FMA) in a clinical application in radiation therapy planning. This application focuses mainly (but not exclusively) on the representation of the lymphatic system in the FMA, in order to predict the spread of tumor cells to regional metastatic sites. This application requires that the downstream relations associated with lymphatic system components must only be to other lymphatic chains or vessels, must be at the appropriate level of granularity, and that every path through the lymphatic system must terminate at one of the two well known trunks of the lymphatic system. It is possible through a programmable query interface to the FMA to write small programs that systematically audit the FMA for compliance with these constraints. We report on the design of some of these programs, and the results we obtained by applying them to the lymphatic system. The algorithms and approach are generalizable to other network organ systems in the FMA such as arteries and veins. In addition to illustrating exact constraint checking methods, this work illustrates how the details of an application may reflect back a requirement to revise the design of the ontology itself.

Ira Kalet is a Professor of Radiation Oncology and Medical Education and Biomedical Informatics at the University of Washington, and an Adjunct Professor in Computer Science and Engineering, and Biological Structure. He also serves as IT Security Director for the UW School of Medicine and its two major teaching hospitals. His research interests include simulation systems for design of radiation treatment for cancer, software development methodology and artificial intelligence applications to medicine, particularly expert systems, ontologies and modeling. More recently he has been interested in protocols for network exchange of medical data, and IT security in the health care environment.