Notice of University Oral Examination

Geodesy and Geomatics Engineering

Doctor of Philosophy

Sheng Gao

Wednesday, February 17, 2010
Head Hall – ADI Studio @ 10:00 am

Co-Supervisors:	Dr. David Coleman, GGE
	Dr. Harold Boley, Adjunct Professor, Computer Science
Examining Board:	Dr. Yun Zhang, Geodesy and Geomatics Engineering
	Dr. Peter Dare, Geodesy and Geomatics Engineering
	Dr. Ed Biden, Mechanical Engineering
External Examiner:	Dr. Songnian Li, Ryerson University
Chair:	Dr. John Neville, School of Graduate Studies

ADVANCED HEALTH INFORMATION SHARING WITH WEB-BASED GIS

ABSTRACT

Web-based GIS is increasingly utilized in health organizations to share and visualize georeferenced health data through the Web. In the development of a public information and disease surveillance network, issues of data publishing and user access are important concerns. The handling of data heterogeneities, lack of available data and tools, and methods of health information representation constitute continuing challenges. The purpose of this research is to address these three problems and provide new solutions for health information sharing.

Regarding data heterogeneities, a Geospatial-enabled RuleML method has been designed for semantic disease information query. Geospatial and non-spatial components of health data are represented through an ontology-based approach. The support for spatial representation in the proposed method enables the discovery of spatial relations in a geospatial semantic system. This research proposes an improved system, based on ontologies and rules, addressing both non-spatial and geospatial semantics for the querying of respiratory disease information.

Furthermore, a new architecture based on open standards and Web Services is designed to provide better solutions in health information sharing with Web-based GIS. This architecture overcomes the weakness of a closely coupled design, allows interoperable data access, and enables dynamic data integration from different providers for decision making. Our architecture has demonstrated its effectiveness in an infectious disease information mapping application across international borders. In addition to demonstrating health information sharing, this research provides an initial approach to designing and implementing Web Processing Services that allow online sharing of health data processing functionalities.

For the dissemination of health information, a health information representation model has been designed to facilitate users' understanding in using health information. This model covers health information representation in the semantic, geometric, and graphic dimensions with the purpose of minimizing user misunderstanding. The platform-independent XML format is utilized in the implementation of our model, and maps can be generated from this XML format for visualization and analysis.

Faculty Members and Graduate Students are invited to attend this presentation