

Harvesting Information to Sustain our Forests

Serendipity Supplement (2001) REU Supplement (2001)
Deployment Supplement (2003)

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Project:

The goal of this project is to build an application-specific digital library to support the natural resource manager by providing access to project and agency documents such as Environmental Impact Statements and wildlife biologist specialist reports. As a domain-specific digital library, we have focused on the use of keywords, organized into controlled vocabularies, which are appropriate for this domain. This includes support for the use of place names because location is very important in describing documents and in making decisions.

The computer science contributions that result from this work include: using domain-specific phrases (a form of precoordinated index terms), permitting one term to appear in multiple places in the hierarchy – thus using the path of broader terms to distinguish word senses, using the broader term/narrower term hierarchy as the organizing framework, and developing a seamless integration of GIS with the digital library for place names.

Status:

This project is nearing the end of its four-year project period. The current focus is three-fold: evaluating the software features through a series of user studies and performance evaluations, taking steps to transfer the technology to the USDA Forest Service or related agency, and formally defining the thesaurus model, as part of Weaver's dissertation. Tolle is the Co-Project Director (along with Delcambre, the PI) for this work and coordinated the participation of a wide range of agency personnel in this project as they identified the requirements for the system (including the target user and the target functionality), identified domains of interest for keywords, identified and evaluated controlled vocabularies for use in the system, and (currently) are participating in user studies.

Challenges:

The most obvious challenge for this project, because it involved agency personnel from the very beginning, is the different time scales for government workers vs. the academic research team. Most projects within the agencies that involve making information available (e.g., by developing a web site or repository) are completed in about 6 to 8 weeks. An academic research project, particularly one with PhD students, on the other hand, typically spans about 2 to 4 years,. Although Tolle and others working closely on the project understood the difference, it was often difficult for agency personnel to understand why our project was taking so long.

Another challenge for this project is the differences in the reward system and expectations for government workers and supervisors compared to researchers and university administrators. As

an example, Tolle was mostly unable to travel, e.g., to conferences where the work was demonstrated or presented, because the project was viewed as outside of his main job responsibilities.

Another important challenge is the natural tension for a PhD student between making progress in his or her research (with prototype development) compared to the demands of developing a usable system.

Benefits:

The Digital Government Program enabled us to work on a problem that we would not have otherwise considered. The specific challenges of a domain-specific digital library became known to us only after an in-depth exposure to the requirements and needs of the agency personnel. This kind of partnership makes it less likely for researchers to make inappropriate simplifying assumptions or focus (only) on toy problems of small size or complexity. The potential benefits to the USDA Forest Service are very strong – the agency has the opportunity to use and reuse valuable information, in spite of the agency culture that was accustomed to one-time use of documents. Documents are now readily available to other interested parties including personnel in additional Forest Service offices as well as natural-resource managers and planners in local, state, and government agencies.

Our suggestions for the Digital Government Program are to continue to support social science studies identifying barriers to the use and deployment of new technology and to consider appropriate policies for using new technology. It would also be helpful to be able to actively recognize the contribution of agency personnel on the project in some manner, perhaps by working with personnel at agency headquarters or with (first, second or third level) supervisors, as appropriate.

Publications in 2003:

- “On modeling conformance for flexible transformation over data models,” S. Bowers, L. Delcambre, in *Knowledge Transformation for the Semantic Web*, Volume 95 of the *Frontiers in Artificial Intelligence and Applications Series*, IOS Press, Amsterdam, 2003.
- “The Uni-Level Description: A Uniform Framework for Representing Information in Multiple Data Models,” S. Bowers and L. Delcambre, *Proc. 22nd Int’l. Conf. on Conceptual Modeling (ER 2003)*, Springer, Lecture Notes in Computer Science, Chicago, IL, Oct. 2003, best paper nominee.
- “Superimposing Spatial Enrichments in Traditional Information”, L. Delcambre, D. Maier, M. Weaver, L. Shapiro, J. Bayard Cushing, *International Workshop on Next Generation Geospatial Information*, Cambridge (Boston), Massachusetts. October 2003.
- “A Digital GeoLibrary: Integrating Keywords And Place Names,” M. Weaver, L. Delcambre, L. Shapiro, J. Brewster, A. Gutema and T. Tolle, *Proc. of the 7th European Conf. on Research and Advanced Technology for Digital Libraries (ECDL 2003)*, Trondheim, Norway, August 2003, *Lecture Notes in Computer Science*, Number 2769, Springer-Verlag, Berlin, 2003.
- "Gathering User Needs: A Case Study on the Process Used to Gather User Needs for for the Adaptive Management Area's Forestry Portal." Balbinder Banga, Lois Delcambre, Eric Landis, Fred Phillips, Tim Tolle, *Information Resources Management Association Conference*, Philadelphia, May, 2003.
- "Knowledge Management: A Re-assessment and Case." Lois Delcambre, Fred Phillips, Mathew Weaver, Submitted to *Knowledge, Technology & Policy*, January, 2004.