

An Infrastructure for Delivering Geospatial Data from Heterogeneous Data Sources to the Field

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Project Overview

We present 4 posters that present the full range of our interdisciplinary Digital Government research program. The first poster describes a conceptual framework for accessing, using and collecting geospatial information in mobile data collection environments. The next 3 posters discuss specific components of this research, including interoperable digital geospatial libraries, wearable computing technologies for field data collection, and middleware to support adaptive exchange and analysis of geospatial data between the field computing and repository environments. In the final poster, testbed environments will be used to illustrate research principles in federal statistics applications.

Poster Details

A key feature of any environment designed to give field workers access to geospatial data is the infrastructure used to connect the field devices to the data sources. The infrastructure must be very flexible in its ability to obtain data. At the same time, it must be capable of minimizing the amount of data flowing through the network. To do this, we have chosen to make use of object-oriented views implemented as mobile agents. The views provide an excellent basis for deriving the data for the user's request and the mobile agent aspect creates a great deal of flexibility in the location for integrating or analyzing data.

The implementation of our view agent infrastructure model makes use of wrappers, mediation, and XML. The wrappers are used for encapsulating the data sources and the mobile field devices. As is generally the case, the wrappers allow the details associated with the heterogeneity of the data source (or device) to be localized. The result is that within the boundaries of the wrappers, the mobile view agents work in a relatively homogeneous environment of manipulating XML encoded data.

The internal infrastructure environment is also populated with a set of computation servers. Each computation server has a local object-oriented data warehouse equipped

with a set of tools designed to work with geospatial data. Since the prospect of query reuse is likely for a field worker, we store the final and intermediate results in the data warehouse, allowing the warehouse to act as an active cache.

The combination of these tools gives us a dynamic, adaptable infrastructure for handling geospatial data in field applications.