SDMS: a user-centered tool for mapping and management of spatial documents

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Our research aims to develop a tool for easily handling and instantly mapping various kinds of spatial documents. A spatial document is defined as a digital document that includes location reference information such as addresses, postal codes and place names. Many people generate, share and exchange such spatial documents everyday. The existing GIS software cannot directly operate such spatial documents because these documents are semi-structured or un-structured spatial data. Generally, GIS users must prepare structured spatial data such as table data and shape files before analysis and visualization on GIS. Also, it is difficult for ordinary users to operate the existing GIS software. A new tool, that can manage directly spatial documents and is easy-to-use for ordinary users, is required in various kinds of application fields. Therefore, we are developing and improving a user-centered tool for managing various types of spatial documents such as HTML pages, Word files, Excel files, TEXT file and so on. We call our developing tool a Spatial Document Management System (SDMS).

Our system provides simple and intuitive interface for handling spatial documents. A user can load spatial documents into this system by 'drag and drop' operation for a file or folder icon. 'Drag and drop' operation is familiar and acceptable for many ordinary users. Our SDMS extracts address information from the loaded documents and converts it into latitude and longitude information by communicating a remote address matching server. As a result, the system generates POI (Point of Interest) information for each spatial document and displays these POIs on a map. By such simple and familiar operations, a user can easily and instantly browse a distribution of POIs for spatial documents. The SDMS is a desktop environment that manages digital documents based on spatial and temporal information.

Our system has some characteristics for management of spatial documents. It provides robust and reasonable address matching. We use the CSIS address matching web service. The SDMS provides some layer management functions. Each loaded spatial document is managed as a layer and the corresponding POIs are managed at each layer. The SDMS can generate a parent layer of multiple layers and manage multiple layers and POIs hierarchically. A user can order these layers based on time stamp information and display these POI for each document in temporal order. Such animation function will be effective for understanding the overall tendencies and temporal changes of spatial events such as the spread of influenza and temporary closing of classes. POI information can be exported as Shape, CSV and GML formats. With this function, a user can load these exported files into GIS and statistical software and will execute more advanced visualization for the point distribution. Spatial documents do not always include address information. Some spatial documents include names of locations, places and facilities. If our system has a user dictionary that manages such names and the corresponding coordinates, it can convert location names into latitude/longitude information by referring the user dictionary. Such user dictionary function is under development.

The SDMS is a new tool for mapping and management of spatial documents that are un-formatted spatial data but are commonly-used through everyday communications among people. Currently, we are improving the usability of our software tool and preparing for the distribution to ordinary users.