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Abstract Submitted By:

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Developing geo-temporal context from implicit sources with Geovisual Analytics

The key Geovisual Analytics research question addressed by the research presented in this paper is how knowledge of past situations can be computationally extracted from heterogeneous and implicit information spaces and presented as visual artifacts within an interactive virtual environment to facilitate reasoning about situations from geographic and temporal (or geo-temporal) contextual perspectives.

Geo-temporal context, as defined by this research, is information about the interconnectedness of phenomena, events, and place across multiple spatial and temporal scales within past situations that can provide meaning and background information to the understanding of present situations and insight into future situations.

Information sources that can potentially provide geo-temporal context to situations are vast and heterogeneous – ranging anywhere from GIS layers, email, text messages, camera-enabled cell phone pictures, online news reports, and beyond. Therefore, the problem with developing geo-temporal context is not a lack of information, but rather, how relevant information is made available, presented, accepted, and understood by those who need it at the right time for the right reason. Geovisual Analytics offers a new scientific approach to identifying relevant geo-temporal context information using analytical process that combine human vision and cognition with computer-based visualization and computational tools and interfaces that can support flexible connections to relevant data and supporting knowledge, and are specifically designed to provide support for analytical reasoning.

An area of inquiry that is particularly relevant for using a Geovisual Analytics approach is the development of geo-temporal context from implicit geospatial and temporal references. The notion of implicit geospatial and temporal references refers to largely qualitative, unstructured information contained in text documents such as textual/word references to locations such as towns, counties or countries that can be combined with the largely numerical and structured information found in geospatial databases. Implicit geographical information contained in open-source channels such as the news media present an important source of geo-temporal context information. For application domains such as crisis management, implicit information sources such as the news media are used by organizations such as the Federal Emergency Management Agency (FEMA) and Reliefweb.org for geospatial intelligence analysis and situation monitoring/reporting.

The “Context Discovery Application” (CDA), which is a prototype collaborative, Geovisual Analytic decision making environment that facilitates the development of geographical and temporal context using implicit sources, is presented in this paper (Figure 1).

