

Geo-temporal Information Discovery

Alan M. MacEachren
Penn State University

Abstract

This presentation will focus on the challenges of exploiting complex, heterogeneous information that contain both implicit and explicit geospatial and temporal references. The approaches and applications presented are part of a larger effort to develop, implement, test, and deploy a suite of geovisual analytics methods and tools directed to supporting an iterative process of information foraging, analysis, sensemaking, and decision-making. The particular focus in this presentation is on a set of approaches and tools developed to support the analysis of fragmentary, heterogeneous information. Geospatial references in heterogeneous information sources are used to both explore the geo-temporal components of the information and to stitch together otherwise independent data sources. One set of tools discussed focuses on integration of methods for place-time-concept extraction from text, ontology mapping, and geolocation from imprecise information with web map services to create applications that support geographical contextualization and application of extracted information. A second set of tools focuses on the complementary process of exploration and analysis of complex sets of fragmentary information. Examples will be presented of tools targeting the following problems: identifying patterns of behavior from sparse data containing place, time, and attribute components, identifying group behavior from movement data, understanding the spatial-temporal-concept characteristics of news stories, developing possible explanations of fragmentary evidence from field reports, and relating geographic and social diffusion of scientific knowledge to real world events.