Chapter 16
Spatial Intelligence for Regional Analysis

Chenfeng Zhang
East China University of Science and Technology, China

Shuming Bao
University of Michigan, USA & East China University of Science and Technology, China

Bing She
Wuhan University, China

Xinyan Zhu
Wuhan University, China

Xu Zhang
Wuhan University, China

ABSTRACT

With the announcement of open information policy by the Chinese government, there has been lots of development in government statistics, Census data, and GIS data. That information provides rich reference for regional analysis in China. The primary challenges under rapid data growth include how to efficiently integrate those space-time data, provide methodology for different research targets, and promote their applications in different fields. This report will present some recent developments of spatial intelligence technologies for spatial data integration, data analysis, as well as their applications. The report will introduce the newly developed spatial explorer (China Geo-Explorer) as a joint effort by the University of Michigan China Data Center and Wuhan University. It will demonstrate how space-time data of different formats and sources can be integrated, visualized, analyzed and reported in a web based system. Some applications in disaster assessment, environment and health, cultural and religious studies will be discussed for China and global studies.

INTRODUCTION

The applications of Geographic Information Systems (GIS) nowadays are not limited to natural sciences anymore. Social scientists have found the spatial data analysis with GIS increasingly helpful and necessary. For example, it helps researchers in the identification of the distribution of social problems like alcohol outlets (Ellaway, Macdonald, Forsyth, & Macintyre, 2010). More and more people and organizations

are using GIS to assist them in solving real-world complex problems and decision making, such as the spatial planning and transportation improvements (Nyerges & Jankowski, 2009).

Many studies on complex systems require data from different sources with different formats. It is usually difficult and costly for users with no GIS background to integrate and analyze the data in a timely and efficient manner. With the advent of Web 2.0 technology and the increased popularity of internet mapping in recent years, both commercial and open-source map APIs have emerged to help make GIS technology available to general users. The concept of spatial intelligence is raised to address these problems, which allows efficient data integration for spatial and attribute data, and generates time-saving, easy-to-use, and pre-formatted reports as well as customized reports (She, Zhu & Bao, 2010; Zhang, Zhu, She & Bao, 2009). This paper will introduce China Geo-Explorer, a web based platform with spatial intelligence for spatial data integration, analysis and solution deployment, built on Web 2.0 technology (See Figure 1). It can integrate data with different formats such as raster data, vector data, space-time series data, and text data, allow flexible data selection in traditional or spatial approaches, offer simple and advanced data analysis such as graphic analysis and spatial statistical data analysis, and provide solution support with pre-defined/customized reports, charts, tables, and maps for spatial data exploration and visualizations.

The rest of the paper is organized as follows: the next section discusses the technology of our platform implementation. Section III introduces the methodology applied in the system. Section IV describes the system architecture. Section V describes data sources and functionalities. Section VI gives several

Figure 1. The framework of China geo-explorer
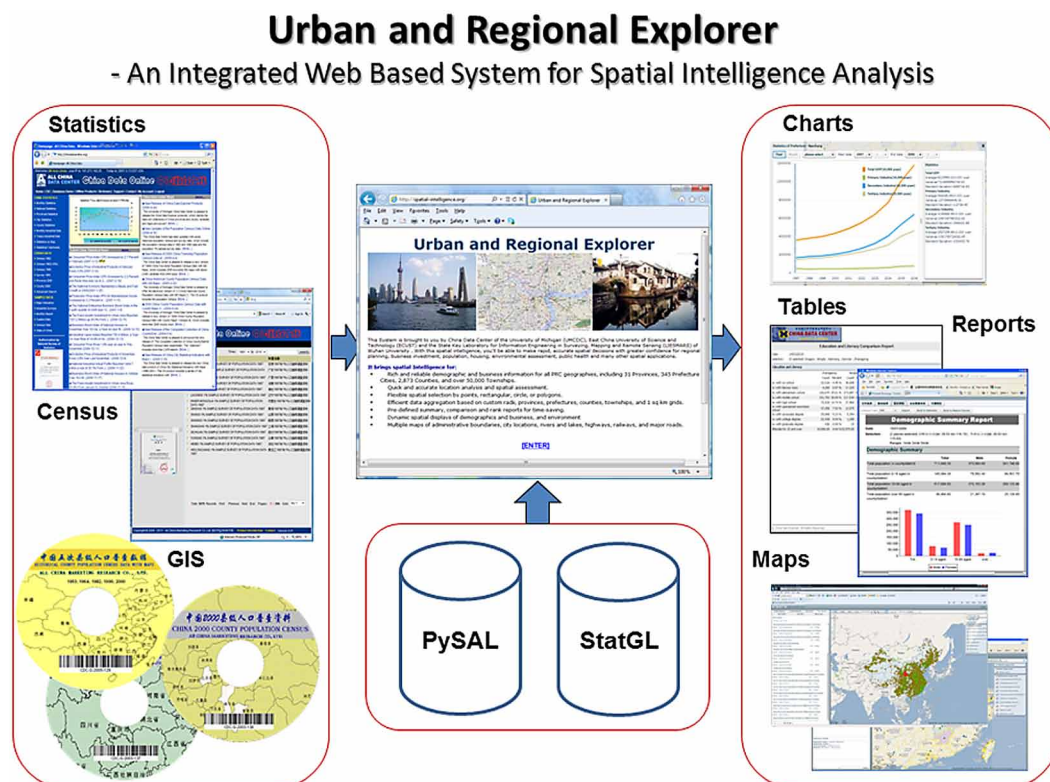
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