Web-Based Public Participatory GIS

Tan Yigitcanlar
Queensland University of Technology, Australia

Ori Gudes
Ben-Gurion University of the Negev, Israel

INTRODUCTION

Decision support systems (DSS) have evolved rapidly during the last decade from stand alone or limited networked solutions to online participatory solutions. One of the major enablers of this change is the fastest growing areas of geographical information system (GIS) technology development that relates to the use of the Internet as a means to access, display, and analyze geospatial data remotely. World-wide many federal, state, and particularly local governments are designing to facilitate data sharing using interactive Internet map servers. This new generation DSS or planning support systems (PSS), interactive Internet map server, is the solution for delivering dynamic maps and GIS data and services via the world-wide Web, and providing public participatory GIS (PPGIS) opportunities to a wider community (Carver, 2001; Jankowski & Nyerges, 2001). It provides a highly scalable framework for GIS Web publishing, Web-based public participatory GIS (WPPGIS), which meets the needs of corporate intranets and demands of worldwide Internet access (Craig, 2002). The establishment of WPPGIS provides spatial data access through a support centre or a GIS portal to facilitate efficient access to and sharing of related geospatial data (Yigitcanlar, Baum, & Stimson, 2003). As more and more public and private entities adopt WPPGIS technology, the importance and complexity of facilitating geospatial data sharing is growing rapidly (Carver, 2003). Therefore, this article focuses on the online public participation dimension of the GIS technology. The article provides an overview of recent literature on GIS and WPPGIS, and includes a discussion on the potential use of these technologies in providing a democratic platform for the public in decision-making.

BACKGROUND

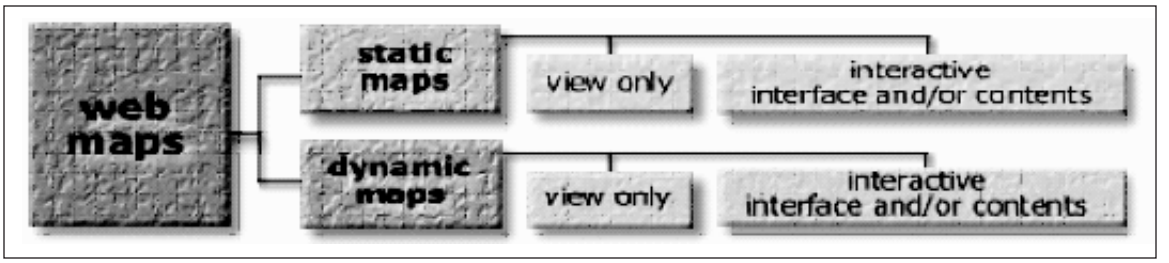
GIS is first established by the Canadian Geographic Information Systems in 1967. Since then, many developments have realized in its technology and fields of implementation, specifically during the last decade. Accessibility to the technology, databases, information, and professionals seems to be part of the integrator for those developments in every country or region.

Although GIS has been utilized by a large number of disciplines, it has been particularly found a very large implementation ground in the following five major fields:

- Cartography and mapping.
- Environmental and urban information analysis.
- Environmental and urban model development.
- Environmental and urban information management.
- Planning support and decision-making.

Mapping has always been the hardcore function and component of a GIS. In a GIS environment there are variety of mapping options including 2D and 3D mapping. During the last three decades, environmental and urban information analysis benefited heavily from GIS techniques. GIS enables users with variety of analysis methods such as spatial statistic analysis, which is considered as one of the most powerful feature of GIS. Environmental and urban model development is another field that in the recent years had an immense contribution from GIS. Accessibility to spatial information via GIS database is easing the complexity of the information management and enhancing the effectiveness of the environmental and urban systems

Figure 1. Web maps (Terkel, 2006)



in a significant way. GIS is widely considered as a central means in the decision-making processes and delivers solutions for variety of planning-support and DSS problems. In all five fields GIS uses two types of mapping formats, which are static maps and dynamic maps (Figure 1).

A majority of the online (Internet) maps are 'static maps,' which are often used by basic explanatory mapping such as tourist and historical maps. When interactive functions are included, such as zooming, panning, hyperlinks, pictures, videos, alpha numeric access, and queries, these maps are considered as 'dynamic maps'(Plewe, 1997). Dynamic interactive mapping, which is one of the main characteristics of GIS, is particularly of use for geographic analyses that are frequently taken place in the environmental and urban decision-making processes (Peng & Tsou, 2003).

GIS, INTERNET, AND E-GOVERNMENT

During the last decade, the Internet has started to influence many aspects of the modern life and created new opportunities to many. This influence is evident all around the world and includes: commercial, communication, and governmental services. Internet with GIS serves as a new democracy and DSS/PSS tool, reduces distances between people all over the world, and enables sophisticated participation opportunities (Yigitcanlar & Baum, 2006). For example, a few years ago the UK government activated Internet-based online systems in order to provide infrastructure that enables citizens to share information between government and themselves and among each other. Moreover, the UK government enables the public to receive almost the entire local and national services by e-government through the Internet (Al-Kodmany, 2001). Similarly, the Israeli government has adopted an e-government platform for the public. In 1997 the Israeli Parliament formed the Israeli e-government policy to improve the connection between the government and the citizens via advanced information technologies.

The e-government policies are generally based on the following five key characteristics:

- E-government is a 24/7 service for anyone to receive public information with an opportunity to respond their views.
- The government operates the system as a 'one-stop-shop,' fact that this decreases the paperwork and peoples' attendance to the government offices.
- The information is updated on-time and secured.
- The users are capable of identifying the addressee and the contents of the services.
- The contents of two-way communications are valid as legal documents.

The widespread implementation of national and local e-government services brought the necessity of providing spatial information as well as tabular information. Developments in the Web-based GIS field made public sector including local governments serve geographic information via the Internet and also has led to a variety of WPPGIS opportunities.

WEB-BASED PUBLIC PARTICIPATORY GIS

WPPGIS gathers the strengths of Web-based public participation (WPP), Web-based GIS (WGIS), and PPGIS in its body. It borrows: large participation potential, which can empower the public, from WPP; online geographical information dissemination from WGIS;