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A STUDY OF URBAN CRIME MANAGEMENT: A WEB-GIS MODEL FOR KUMBAKONAM

PRATIMA SHRIKANT NIKHADE
RESEARCH SCHOLAR, SUNRISE UNIVERSITY ALWAR
DR. SURENDER SHARMA
PROFESSOR, SUNRISE UNIVERSITY ALWAR

ABSTRACT

The development of intranet based GIS, which totally resides on local remote server, allows users to access and analyze the dynamic geospatial information through a web browser or equivalent, thus requiring no user installed software. The system provides enough core GIS capability and allows the creation of GIS data layers but is user friendly enough to provide access to users who are not GIS specialists. Web-based GIS could provide interactive mapping and spatial analysis capabilities reducing the problem of data ownership as data providers could open their sources for online mapping and analysis. Web-GIS is the latest advances in GIS technologies that bring spatial information and non-spatial information via Internet. Access to data over the Internet is growing rapidly and Information sharing through Web GIS Server is important as it reduces cost of data, provide standard data, conformity of data and data interoperability. In this era Web has changed every aspect of our life from our daily activities to our professions activities like our jobs and so on. Among these changes, GIS has been affected by this technology and a new technology, which is called Web GIS, appeared. Today, a vast majority of Internet users uses this technology but most of them don't notice it, some examples of it could be finding hotels and addresses in a strange city using Google maps or other online maps or when you are lost you can easily locate your location using your phone GPS system and find your path. There are many, many usages that we can name, some refers to this technology and Web GIS and some others call it Internet GIS.

KEYWORDS: Urban Crime Management, Web-GIS Model, GPS system, GIS technologies

INTRODUCTION

A GIS basically consists of Hardware, Software, data and users. Seeing the evolution among these components over the years is interesting. In 1960s and 1970s these components were joined together in one computer. Later distributed GIS emerged with the adoption of a local area network (LAN). Using distributed GIS, these components no longer needed to be located together, instead the components could be in separate buildings long distances from each other. With the development of Web GIS these components are now separated farther distances than before; GIS users sitting on one side of the globe can access a server located on the other side of the globe.

HISTORY OF WEB MAPPING

Event types

- Cartography-related events
- Technical events directly related to web mapping
- General technical events
- Events relating to Web standards

This section contains some of the milestones of web mapping, online mapping services and atlases.

- 1989: Birth of the WWW, WWW invented at CERN for the exchange of research documents.
- 1993: Xerox PARC Map Viewer, The first map server based on CGI/Perl, allowed reprojection styling and definition of map extent.
- 1994: The World Wide Earthquake Locator, the first interactive web mapping mashup was released, based on the Xerox PARC map view.
- 1994: The National Atlas of Canada, The first version of the National Atlas of Canada was released. Can be regarded as the first online atlas.
- 1995: The Gazetteer for Scotland, The prototype version of the Gazetteer for Scotland was released. The first geographical database with interactive mapping.

- 1995: Map Guide, First introduced as Argus Map Guide.
- 1996: Center for Advanced Spatial Technologies Interactive Mapper, Based on CGI/C shell/GRASS would allow the user to select a geographic extent, a raster base layer, and number of vector layers to create personalized map.
- 1996: Map quest, The first popular online Address Matching and Routing Service with mapping output.
- 1996: Multi Map, The UK-based Multi Map website launched offering online mapping, routing and location based services. Grew into one of the most popular UK web sites.
- 1996: Geo media Web Map 1.0, First version of Geo media Web Map, already supports vector graphics through the use of Active CGM.
- 1996: Map Guide, Autodesk acquired Argus Technologies. and introduced Autodesk Map Guide 2.0.
- 1997: US Online National Atlas Initiative, The USGS received the mandate to coordinate and create the online National Atlas of the United States of America.
- 1997: UMN Map Server 1.0, Developed at the University of Minnesota (UMN) as Part of the NASA For Net Project. Grew out of the need to deliver remote sensing data across the web for foresters.
- 1997: Geo Info Mapper Geo Info Solutions developed the first Java GIS Applet called 'JavaMap'. The application supported the export and conversion of MapInfo data for display in the thematic mapping tool for the web. Geo info Mapper was demonstrated at the Victoria Computer Show in 1997 and referenced in the Universal Locator project at UC Berkeley School of Information.
- 1998: Terraserver USA, A Web Map Service serving aerial images (mainly b+w) and USGS DRGs was released. One of the first popular WMS. This service is a joint effort of USGS, Microsoft and HP.
- 1998: UMN Map Server 2.0, Added reprojection support (PROJ.4).

- 1998: Map Objects Internet Map Server, ESRI's entry into the web mapping business.
- 1999: National Atlas of Canada, 6th edition, This new version was launched at the ICA 1999 conference in Ottawa. Introduced many new features and topics. Is being improved gradually, since then, and kept upto-date with technical advancements.
- 2000: ArcIMS 3.0, the first public release of ESRI's ArcIMS.
- 2000: ESRI Geography Network, ESRI founded Geography Network to distribute data and web map services.
- 2000: UMN Map Server 3.0, Developed as part of the NASA TerraSIP Project. This is also the first public, open source release of UMN Map server. Added raster support and support for TrueType fonts (Free Type).
- 2001: Geo Server, starts of the Geo Server project (Geo server History)
- 2001: Map Script [5] 1.0 for UMN Map Server, Adds a lot of flexibility to UMN Map Server solutions.
- 2001: Tirolatlas, A highly interactive online atlas, the first to be based on the SVG standard.
- 2002: UMN Map Server 3.5, Added support for Post GIS and ArcSDE. Version 3.6 adds initial OGC WMS support.
- 2002: ArcIMS 4.0, Version 4 of the ArcIMS web map server.
- 2003: NASA World Wind, NASA World Wind Released. An open virtual globe that loads data from distributed resources across the internet. Terrain and buildings can be viewed 3 dimensionally. The (XML based) markup language allows users to integrate their own personal content. This virtual globe needs special software and doesn't run in a web browser.
- 2003: UMN Map Server 4.0, Adds 24bit raster output support and support for PDF and SWF.
- 2004: Open Street Map, an open source, open content world map founded by Steve Coast.

- 2005: Google Maps, The first version of Google Maps. Based on raster tiles organized in a quad tree scheme, data loading done with XML Http Requests. This mapping application became highly popular on the web, also because it allowed other people to integrate google map services into their own website.
- 2005: UMN Map Server introduced as open source by the Open Source Geospatial Foundation (OS Geo). UMN Map Server 4.6, Adds support for SVG.
- 2005: Map Guide Open Source introduced as open source by Autodesk
- 2005: Google Earth, The first version of Google Earth was released building on the virtual globe metaphor. Terrain and buildings can be viewed 3 dimensionally. The KML (XML based) mark-up language allows users to integrate their own personal content. This virtual globe needs special software and doesn't run in a web browser.
- 2005: Open Layers, the first version of the open source Java script library Open Layers.
- 2006: Wiki Mapia Launched
- 2009: Nokia makes Ovi Maps free on its smartphones.
- 2010: Map Box is founded
- 2012: Apple removes Google Maps as the default mapping app and replaces it with its own mapping app
- 2013: Map Box announces Vector Tiles for Map Box Streets 5.3 Web GIS

As you might know Web GIS is a GIS system that uses web technologies. It often uses web technologies to communicate among different components of the system. Web GIS originates from a combination of web technology and the Geographical Information System, which is a recognized technology that is mainly composed of data handling tools for storage, recovery, management and analysis of spatial data Web GIS is a kind of distributed information system. The simplest architecture of a Web GIS must have at least one client and one server that client is a desktop application or web browser application that allows users to communicate with server, and the server is a web server application. Web GIS is a type of distributed information system,

comprising at least a server and a client, where the server is a GIS server and the client is a web browser, desktop application, or mobile application. In its simplest form, web GIS can be defined as any GIS that use web technology to communicate between a server and a client.

INTERNET GIS

Web GIS is a close term to Internet GIS. These two words are always used as synonymous with each other. There is a slight difference between these two words. The Internet supports many services with the Web being one of these services. So we can call a system as Internet GIS if it uses many of services of Internet not only Web service and if it uses only Web we should name it Web GIS. This definition makes Internet GIS boarder than Web GIS. In real world Web is the most attractive service of Internet and it is why Web GIS is more common than Internet GIS.

WEB-BASED

GIS applications various web based projects have been implemented in US and Canada's federal agencies to allow users to access various types of data and map services by using Web GIS. Many public data services provide interactive capabilities to retrieve spatial data and information from the internet to local machines. For example, the Florida Geographic Data Library (FGDL, 2005) provides a repository of spatial data of Florida to clients using the data service concept. In contrast, some map services are constrained to online use and no data or information can be retrieved by local client machines. For example, the web site surf your watershed developed by the US enviormental protection agency provides map services to clients (U.S. Environmental Protection Agency, 2004).

An example of an interactive Web GIS site providing map services is the Florida Seminole County Watershed Atlas web site (Florida Seminole County, 2004). In addition, there are broad ranges of applications addressing different Web GIS issues. For example, a mapping application project, OMIMA, developed by Fisheries and Oceans Canada (DFO) has demonstrated the feasibility of combining raster and vector data and disseminating the results efficiently over the Internet (Michalak and Wojnarowska, 2002). Interactive maps of nunavut's capital city, liqualuit, and its environment, have been successfully developed for viewing and distribution on the internet by a team in Geomatics Canada (Siekierska et al, 2000). To promote better democratic decision-making, the Kentucky Water Information Network (KY-WIN) allows citizens to share their non-formal local knowledge with formal information held by government agency staff, in web accessible database (Harvey, 2002).

OVERVIEW OF WEB-BASED GIS TECHNOLOGY

Initial developments of web-based GIS concentrated on map visualization, eg. Map Viewer (Xerox, 2004). The developments were quickly followed by querying capabilities such as Map Server (University of Minnesota, 2004) and USCB Tiger mapping service (U.S.CensusBereau, 2004). Generally, the main components of any Web GIS are the client, the server, and the network. On the server side resides the GIS database and applications to process the user's request. On the client side is a user interface within a web browser. Whenever a user submits a request, the server processes the request with the GIS application program and returns the result to the user. With web-based GIS, the technology has evolved from web map publishing to web GIS mapping.

1 Static web map publishing

At the basic level, publishing geospatial data on the internet does not require any GIS. All it needs is a web server (also called HTTP server) and a set of maps. The maps should be supplied in a format which most web browser (such as well-known Internet Explorer, Netscape Navigator) understands like JPEG or GIF. Standard web browser communicates with the web server by the Hypertext Transfer Protocol (HTTP), and the server can then send the maps on request to the browser. The HTTP is the standard for transferring World Wide Web documents. The simplest HTTP message is "GET url", to which the server replies by sending the named document. The next level of geospatial data publishing is to use clickable images. Hyper Text Markup Language (HTML) allows creating image maps which link certain parts of an image (a circle, rectangle or polygon) to another URL. With a click on an image a request with the related URL will be sent to the web server.

2 GIS server

Currently, there are over 30 different GIS server packages or solutions available from different GIS vendors. Thousands of Web GIS servers operate in the world. However, different types of mapping tasks require different types of Web GIS servers. A GIS professional or GIS manager might be overwhelmed with different choices of Web GIS software programs. Choosing the right Web GIS software for specific GIS application is truly a major challenge.

3 The web GIS advantage

By utilizing the Internet to access information over the web without regard to how far apart the server and client might be from each other, web GIS introduces distinct advantages over traditional desktop GIS, including the following:

A global reach: As an ArcGIS user, you can present web GIS applications to the world, and the world can access them from their computers or mobile devices. The global nature of web GIS is inherited from HTTP, which is broadly supported. Almost all organizations open their firewalls at certain network ports to allow HTTP requests and responses to go through their local network, thus increasing accessibility.

A large number of users: In general, a traditional desktop GIS is used by only one user at a time, while a web GIS can be used by dozens or hundreds of users simultaneously. Thus, web GIS requires much higher performance and scalability than desktop GIS.

Better cross-platform capability: The majority of web GIS clients are web browsers: Internet Explorer, Mozilla Firefox, Apple Safari, Google Chrome, and so on. Because these web browsers largely comply with HTML and JavaScript standards, web GIS that relies on HTML clients will typically support different operating systems such as Microsoft Windows, Linux, and Apple Mac OS.

Low cost as averaged by the number of users: The vast majority of Internet content is free of charge to end users, and this is true of web GIS. Generally, you do not need to buy software or pay to use web GIS. Organizations that need to provide GIS capabilities too many users can also minimize their costs through web GIS. Instead of buying and setting up desktop GIS for every user, an organization can set up just one web GIS, and this single system can be shared by many users: from home, at work, or in the field.

Easy to use: Desktop GIS is intended for professional users with months of training and experience in GIS. Web GIS is intended for a broad audience, including public users who may know nothing about GIS. They expect web GIS to be as easy as using a regular website. Web GIS is commonly designed for simplicity, intuition, and convenience, making it typically much easier to use than desktop GIS.

Unified updates: For desktop GIS to be updated to a new version, the update needs to be installed on every computer. For web GIS, one update works for all clients. This ease of maintenance makes web GIS a good fit for delivering real-time information.

Diverse applications: Unlike desktop GIS, which is limited to a certain number of GIS professionals, web GIS can be used by everyone in an enterprise as well as the public at large. This broad audience has diverse demands. Applications such as mapping celebrity homes, tagging personal photos, locating friends, and displaying Wi-Fi hot spots are a few of the many current examples of web GIS.

These characteristics reveal both the advantages and challenges facing web GIS. For example, the easy-to-use nature of web GIS stimulates public participation, but it also reminds you to take into account Internet users who have no GIS background. Conversely, supporting a large number of users requires web GIS to be scalable.

WEB MAPPING

Web mapping is the process of using maps delivered by geographical information systems (GIS). Since a web map on the World Wide Web is both served and consumed, web mapping is more than just web cartography, it is both a service activity and consumer activity. Web GIS emphasizes geo data processing aspects more involved with design aspects such as data acquisition and server software architecture such as data storage and algorithms, than it does the end-user reports them. The terms web GIS and web mapping remain somewhat synonymous. Web GIS uses web maps, and end users who are web mapping are gaining analytical capabilities. The term location-based service refers to web mapping consumer goods and services. Web mapping usually involves a web browser or other user agent capable of client-server interactions. While web mapping today is still being developed, challenges and innovations involving the feedback of the quality, the usability, the social benefits, and the legal constraints, drive its evolution.

CONCLUSION

Crime data should be made available as well as training of police officers in crime mapping should be encourage to aid decision making process, once the law enforcement officers are taught spatial techniques of crime hotspots analysis, it will assist them in performing spatial analysis functions queries to display crime prone areas in order to maximise available resources to abate crime. The study revealed that crime incidence increases in slum area development as

well as in areas where land use conversion have taken place, therefore, it is suggested that an effective physical planning will seek to put an end to this problem. Finally, it is also recommended that there should be improvement in lightning within the neighbourhoods which will go a long way to abate crime as suggested by some of the residents that were interviewed whom attributed crime in their neighbourhood to erratic power supply. Conclusively, further study with a spatial coverage of Federal Capital Territory is recommended to ensure lasting solution to this problem. If the Web applications and GIS services that were developed in this thesis were to be re-released in the future, the author would recommend a number of changes and updates that could benefit the overall performance and usability of the Web applications. Such recommendations were not included due to the financial costs associated with these Web applications or simply due to time constraints that were not possible during the timeframe for this thesis. While some of these recommendations are provided directly from the author, others are adapted from user feedback that was returned via the surveys.

REFERENCES

1. Bushway, S., & Reuter, P. (2008). Economists Contribution to the Study of Crime and the Criminal Justice System. Crime and Justice, 37(1), 389-451.
2. Calderón, F.(2015).Drug Trafficking and Organized Crime: Connected but Different. Harvard International Review, 36(4), 52-56.
3. Cantor, D., & Land, K. (2001). Unemployment and Crime Rate Fluctuations: A Comment on Greenberg. Journal of Quantitative Criminology, 17(4), 329342.
4. Chakrabarty, D. (2007). In the Name of Politics, Democracy and the Power of Multitude in India, public culture, 19(1).
5. Chakraborty, J &Anjuman, B. (2013). Witch hunting in Assam: Strategising alternative media for women empowerment and overcoming superstition, Journal of North East India studies,Vol.3 (2).
6. Chakraborty, T. (2001). An Alternative to Crime Trend Analysis in India. Accessed http://www.satp.org/satporgtp/publication/faultlines/volume14/Article5.htm
7. Chancel, L., &Piketty, T. (2019). Indian Income Inequality, 1922-2015: From British Raj to Billionaire Raj?. Review of Income and Wealth, 65, S33-S62.
8. Charmarbagwala, R. & Sharma, G. (2008). Crime and Inequality in India. Indiana University Working Paper.

9. Chaturvedi, R (2020). Theories of Punishment- A thorough study. Pleaders. Theories of punishment- a thorough study (ipleaders.in)
10. Chhuani, L. (2013). A Study on Socio Economic Profile of the Prisoners in the Central Jail of Mizoram India, http://hdl.handle.net/10603/197785
11. Chikkara&Kodan. (2012). Rape Victims and Major Offenders in India : An Empirical Study, International Journal Advance Research in Management and Social Sciences,