DEVELOPMENT A PPGIS TO COLLECT GEODATA ON THE PARTICULAR PROBLEMS OF URBAN FURNITURE

A BOTTOM-UP PLANNING APPROACH

M. Taleai¹, N. Ranjbar² and K. Ebadi³

¹ Assistance professor, Centre of Excellence for geomatics information technology, Geomatics Faculty, K.N. Toosi University of Technology, Tehran, Iran
taleai@kntu.ac.ir

² MSc student, GIS department, Geomatics Faculty, K.N. Toosi University of Technology, Tehran, Iran

³ MSc in social communication sciences, Allameh Tabatabaei University (ATU), Tehran, Iran

ABSTRACT:

Today municipalities are searching for the new tools for increasing the public participation in different levels of urban planning. This approach of urban planning involves the community in planning process using participatory approaches instead of the long traditional top-down planning methods. These tools can be used to obtain the particular problems of urban furniture form the residents’ point of view. One of the tools that is designed with this goal is public participation GIS (PPGIS) that enables citizen to record and following up their feeling and spatial knowledge regarding main problems of the city, specifically urban furniture, in the form of maps. In this research we develop a PPGIS using of Web.2 to collect voluntary geodata and saving this data in a spatial database. This way of collecting and saving data provides an opportunity for urban planners to analysis data and find problem’s clusters and extract knowledge of data. This system is implemented in a case study area in Tehran, Iran and the challenges to make it applicable and its potential for real urban planning have been evaluated. Doing some data mining analysis on this data is our next work.

KEY WORDS

PPGIS; Urban planning; Urban furniture; Web GIS; VGI
INTRODUCTION

In developing countries the most common development planning approach is top-down. One of the main reasons for this dominance of the top-down planning approach is that it is seen to allow rapid, large scale spending of budgets in accordance with pre-established timetables. Also it gives government planners, donors and the bureaucrats an illusory feeling of control and efficiency [Cooksay, 2005]. In contrast, with bottom-up planning, municipalities give their project deeper focus because they have a larger number of citizens involved, each with their own area of expert opinion. Plans are developed at the lowest levels and are then passed on to each next higher level and it then reaches senior management for approval [project-planning, 2011]. In this way of planning we have the term of public participation. The basic idea of public participation is that people could control all decisions that affect their live. In traditional top-down planning methods, many people excluded from the planning process for utilities but recent advances in ICT and GIS facilitate the public participation [James, 2004].

One of the plans that public participation is key issue in it and is implemented in different cities of the world is providing the suitable platform for collecting and documenting environmental and social reports of neighbourhoods from their residents (that include specially reports about urban furniture). This system named 137 in Tehran, Iran [Handbook of 137, 2010]. This system lets people to report observed problems in relation to a range of environmental and social issues via telephone, text phone, text messaging, e-mail and on-line forms. However, the 137 service is in the first steps and is faced by many defects. One of this is the way of addressing that is text based and causes prohibition from many post analysis on this data and sometimes is hard for citizen to say or write the accurate address. This may cause problem to find the correct place to fix the problem.

In this research we design a PPGIS for improving the 137 services. Proposed system utilized a web based map to collect citizens’ reports and save this report in a spatial database. This system is implemented in a case study area in Tehran, Iran. Following section provides a brief explanation about public participation and GIS, and then the paper demonstrates the 137 services in Tehran. The next section describes the implemented system and finally, some discussions are presented.

GIS BASED PUBLIC PARTICIPATION

Public participation can be any process that directly engages the public in decision-making and gives full consideration to public input in making that decision [International Programs 2013]. According to Smith (1993), public participation is the process to “allow those affected by a decision to have an input into that decision.

It is necessary to note that there are various levels of public participation. Arnstein(1969) claimed that citizen involvement in planning represents a redistribution of power from managers to the public. She divided the eight citizen participation levels into three classifications: non-participation, degrees of Tokenism and degrees of Citizen power. Based on the Arnstein Ladder, Weidemann and Femers (1993) presented a new ladder in which they divided public participation into six different levels: public right to know; informing the public; public right to object; public participation in defining interests, actors and determining agenda; public participation in assessing risks and recommending solutions; and public participation in final decision.
According to their description, public participation increases with the level of access to information as well as with the degree to which citizens have rights in the decision making process. ‘The higher levels in the ladder can be reached only by fulfilling the requirements of the lower steps in the ladder.’ [Sadagopan, 2000]. This means that when developing a public participation project, we must begin with the lowest step, making sure that it is satisfactorily implemented. Then, the development can continue to the highest possible level. In most cases, public participation is limited to the right to object [Sadagopan, 2000]. GIS and current computer technologies (e.g. Internet technology) can provide opportunities to help public participation move further up in the public participation ladder. The concept of employing data processing and visualization tools of GIS to help the public become engaged in influencing processes and outcomes of place-based decision making involves an integration of scientific knowledge and evidence with institutional/legal procedures, views, and experiences of those who will be affected by decisions [Jankowski, 2009].

In contrast to more traditional or non-digital methods, new forms of participation based on Web-based technologies are beginning to evolve. Consequently, an e-participation ladder has been developed by Kingston [Kingston, 2002] [Fig.1]. The bottom of this participation ladder represents online delivery of public services such as access to government information. Further up the e-participation ladder, the communication is two-way making participation more interactive through the sharing of data and comments [Carver, 2001].

![The e-participation ladder (based on Kingston, 2002)](image)

The aim of our research is achieving the top of this ladder and giving the power of control the neighbourhood to citizens.

In this paper, we focus on the system that enables citizen to report environmental and social problems of their neighbourhoods. The nature of this system is spatial because people need to specify the place of their report, therefore a web-based GIS could help to improve the system. Employing data processing and visualization tools of GIS could help the public become engaged in influencing processes and outcomes of place-based decision making involves an integration of scientific
knowledge and evidence with institutional/legal procedures, views, and experiences of those who will be affected by decisions [Jankowski, 2009].

137 SERVICE IN IRAN
Social and environmental reporting services named 137 are implemented in several cities of Iran. This service enables citizen to report their social and environmental problems of their neighbourhoods via text message, phone, e-mail and on-line forums in 24 hours of 7 days of week. When a citizen report a problem receive an unique code that let him(her) to follow the status of the report [Handbook of 137, 2010]. In the centre of 137, this steps are performed when a citizen report a problem [Fig.2].

PROPOSED PPGIS FOR 137 SERVICE
To tackle with mentioned problems, we develop a PPGIS. Google Maps API, PostGreSql9.2 database, JavaScript as a client side scripting language and PHP as a server side scripting language is utilized to develop the system.

In proposed PPGIS, at first user have to select one of the 22 regions of the municipality that is related to his/her report [Fig.3]. By selecting the proper region, the report will be sent automatically to regional centre of 137 for next action. Then, proposed PPGIS navigates the map to the selected region to help citizen to find the location of the report.
Development a PPGIS to Collect Geodata on the Particular Problems of Urban Furniture’s: a Bottom-Up Planning Approach

M. Taleai et al.

N-AERUS XIV
Enschede 12 - 14th September 2013

There are blue markers on this map that show all of the recorded reports in this region. If there is a marker on the location that user want to tag a report, (s)he can select the marker and see if the report is recorded later or not [Fig.4]. (S)He can see subject, sub subject and the number of updates on each recorded report. Citizens can update previously recorded report by filling out a form and even can send an image related to the report. This updates will be save in a different table in our database, but have unique code for following up. With using this tool it’s not necessary to check replicated reports by an expert.

When a report is new, user could find the location of report on the map and by clicking on the map a form will be opened that user must select the subject, sub subject and write her comment and send an image related to of the reported problem (this is optional). User must fill her personal information and save her reports with pushing the submit button. After that the report is saved in a spatial database and a code is assigned for following purpose [Fig.5]. This database will be able experts to do spatial analysis to find clusters of problem and the relationships between reports.
By using geovisualization tools, user can see recorded reports in the latest month with different coloured markers. This tool helps users to see the spatial distribution of reports and find some good insights such as clustered or major reported problems etc. [Fig.6].

**RESULT AND DISCUSSION**

Our system help the citizens to: enter their reports of their neighbourhood, comment on the existing reports and see the spatial distribution of reports. These tools allow citizen to help municipalities in regeneration of the neighbourhoods.

With the aid of this system, surveying time of each report would be shorter and it’s not necessary to check the status of reports by an expert to find duplicated ones. Also, with tagging on the map group has accurate location of the reports that helps them to find the location of report, easily.

Proposed PPGIS meets the sixth rung of Kingstons e-participation ladder and helps citizen to involve in neighbourhoods regeneration and play more highlighted roles in their societies. Implementing this
system in real urban planning activity would lead to more sustainable, legitimate, democratic, and effective plan. PPGIS provides unique approach for engaging the public in planning to fix problems related to urban furniture and allows participants to dynamically interact with their reports. It helps municipalities to apply citizen’s knowledge for improving neighbourhoods. By using proposed PPGIS, citizens play the role of official’s eyes to check the status and quality of urban furniture. Furthermore, recording the report as a spatial data in a spatial database enables experts to do spatial analysis and find existing clusters and relationships between various reports and help them to predict new problems and equip the neighbourhoods to tackle it. These analysis tools will be added to proposed PPGIS as future works.

In contrast to good attentions of PPGIS, there are many challenges in developing countries for implementing PPGIS. Participatory planning has a political and legal backing and in developing countries like Iran, municipalities don’t publish their information and all of the plans and information are in secret. As a result catching top of the participation ladder that is a key element of PPGIS is too hard. For example in our case study Tehran municipality don’t make recorded reports available for public. Furthermore, citizens don’t have enough skills to work with web base; therefore to implement such systems in real planning in Iran some legal revisions are needed.

REFERENCES