Commonsense Geography meets Web Technology: Online Community Mapping

Andrea Wei-Ching Huang andreahg@iis.sinica.edu.tw

Tyng-Ruey Chuang trc@iis.sinica.edu.tw

Institute of Information Science, Academia Sinica, Taipei, Taiwan

Abstract

A web case like housingmaps.com offers daily housing services in combination of Google map with craigslist.org, one of most popular online communities which “get the word out about everyday, real-world stuff, and keep things simple and common-sense” on web. This case is not alone as we explored in this research for *Online Community Mapping*. It also leads us to change the conventional question which was to ask how to find the need or data which people want from web. Instead we ask how to allow the need and the data to be generated and integrated (participation and collaboration). As such, this question may provide a solution to extend a more flexible, explorative and creative result. The availability and validity of data will be enriched and corrected by the one who own the body of knowledge about their surrounding geographical world (Commonsense Geography). The key underlying here is the design mechanism of open technology and open access to geospatial information.

Keywords

collaborative software, online community mapping, open access, web technology.

1. INTRODUCTION

"The whole of science is nothing more than a refinement of everyday thinking."
Albert Einstein, *Bite-Size Einstein*, p. 96

GIS can be used by the public to solve day-to-day problems. This scenario was a dream to Egenhofer, M. J. and Mark, D. M when they proposed the notion of Naïve Geography which concerns with knowledge that people have about their surrounding geographic world. This paper is an attempt to enter into their surprise. As we see that the interaction between geospatial data suppliers and users is basically a one way communicating and publishing process. However, a convergence of web-based, geographical, and participatory personal interaction emerges in the first half-decade of the twenty-first century.

Non-traditional geospatial information and web technologies are the two new emerging conditions for people participation and collaboration. We look closely at the overall picture and characterize it as a new way of thinking as "Online Community Mapping". This proposed concept model is an extension of our research described in (Chuang and Huang, 2005), where an analysis framework based on issues of online community, community mapping and online mapping has been proposed.

2. A CONCEPTUAL MODEL: ONLINE COMMUNITY MAPPING

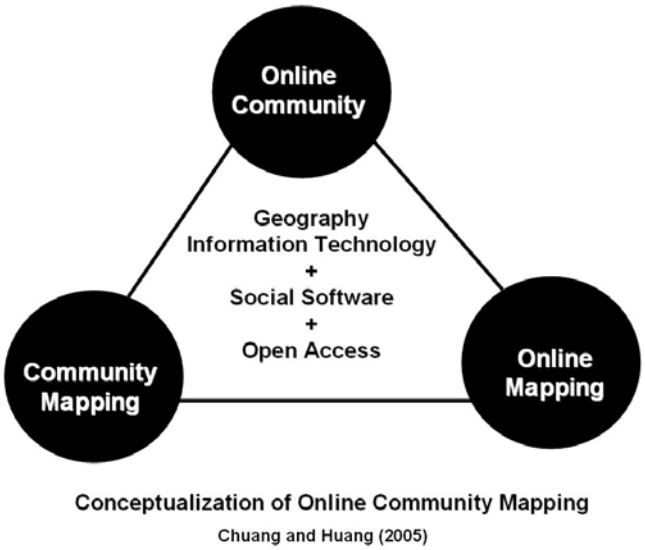

Figure 1: Online Community Mapping.

A brief explanation of conceptual model of Online Community Mapping model can be illustrated in Figures 1 and 2. Note that this initial model has been developed by four stages: (1) functionalized from web, community, and map elements; (2) phenomenalized by web collaboration, community participation, and geospatial visualization; (3) examplized by phenomena of bloggers and wikis' collaboration; cases like neighborhood-created GIS, Participatory GIS (PGIS), Public Participation GIS (PPGIS), and Community-Integrated GIS (CiGIS) /Community GIS; online mapping services like Google Map/Eath, Yahoo Map, and MSN Map; (4) theorized by three supporting frameworks namely Online Community Framework (de Souzqa and Preece, 2004), Participatory Research (Pain, 2004, 2003) and Naïve Geography (Egenhofer and Mark, 1995).

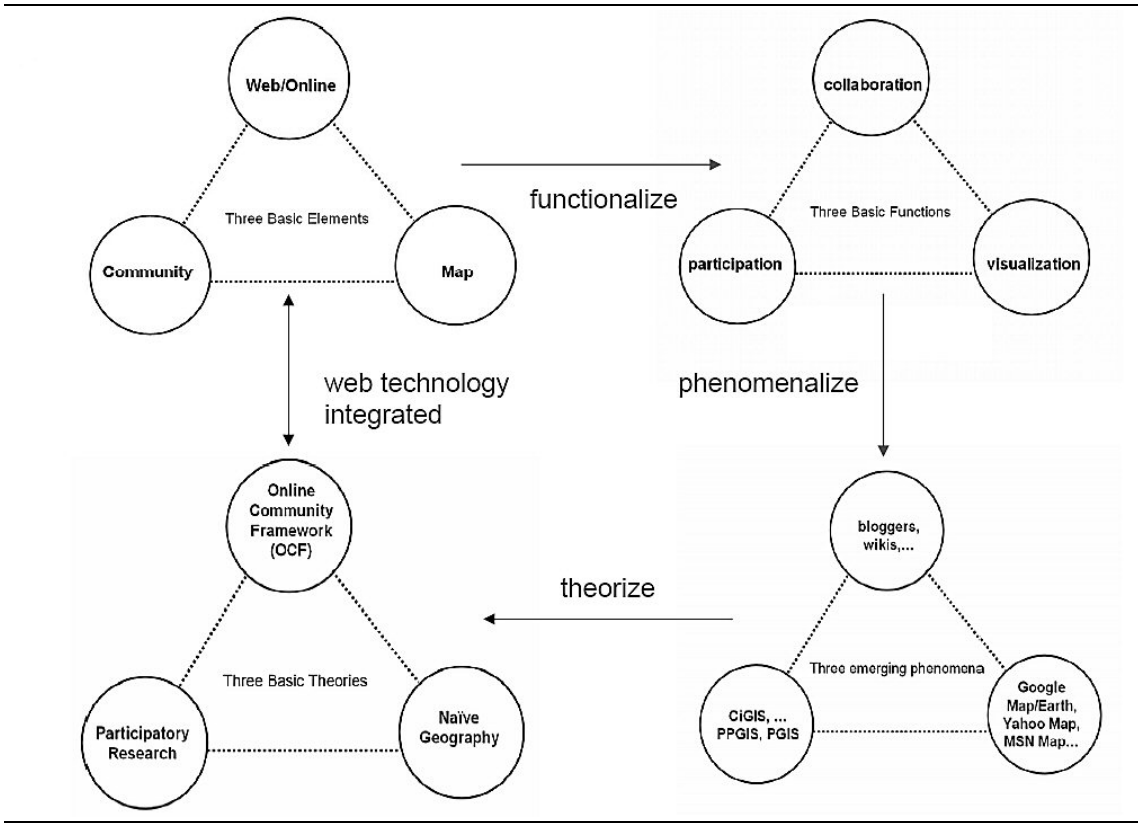

Figure 2: A Proposed Model (Chuang and Huang 2005)

In our research we adapt its central concepts that Naïve geography concerns the common-sense geography and allows errors, inconsistent and incomplete geographical information. This offers a conceptual notion for the non-traditional/ community participation data which may be challenged by its data availability and quality. For sure, the Online Community Mapping still remains open to be advised and adjusted.

3. OPEN TECHNOLOGY AND OPEN ACCESS

3.1 Open Collaborative Technology

How to make available user-generated geospatial data to those who are interested in it? Traditional GISs are limited with software packages for widely acceptance and associated with high setting up costs. It is estimated that it costs about annual €120 million worldwide for building and maintaining 80 global national clearinghouses (Crompvoets et al.,2004). Among these constrains, open and free GIS projects offer open standards and interoperability. Much attention has been moved to user centred design as well as new map roles (such as indexing, searching, and previewing) (Sarjakoski, 1998; Ghose, 2001; Kraak, 2004). To date, the Geographic Resources Analysis Support System (GRASS) community was the first to use open source GIS. GIS vendors like Autodesk, ESRI, Intergraph, MapInfo have also participated in this expected movement. More recently, choices of open standards and open technologies like GML and SVG have been adapted. State level examples include the Dutch Geoservices in public works[i] and UK Ordnance Survey MasterMap[ii]. Our experience using GML and SVG to retrofit legacy geospatial data standards for new web mapping applications has also been very positive. (Chang et al, 2003; Chang and Chuang, 2003).

Yet, one stage further to be explored is needed. People participation online is not only limited in common browsing activities; the web is designed to be a more like two-way communication and participation platform. Providing a “writable web” as the web inventor originally designed it (Berners-Lee and Fischetti, 1999), the degree of online participation is not limited in browsing only. However, through the writable participation, the separation of authors (data suppliers) and readers (data consumers) is decreasing and overlapping in a more collaborative way (Iorio and Vitali, 2005). The rise of social software like blog and wiki plays a major role in the Online Community Mapping process which is more enduring than the traditional geospatial society can imagine.

Social Software[iii]helps each individual community of interest to build up their own language and their own knowledge base. Blogging technology is recognised as a powerful tool for facilitating social communications, creating and maintaining online communities, and even being coined for its participation indication as “participatory media” and “participatory democracy” in expression (Blood, 2004;

Rosenbloom, 2004). Similarly, the Wiki (WikiWikiWeb) has an open, simple and freely editability which lead to online community collaborate in building knowledge repository easily. To take one revealing example, Wikipedia is one of the most successful model that a free encyclopaedia web site being cooperated from people all over the web to write together online. Along with (1) the Wikimaps, a project using SVG technology to generated map images from wiki-based data[iv]; (2) social geo-tagging in Connotea[v] (with its combination with Google Earth display can be generated automatically); as well as (3) the Geowiki project which is built upon a GPS map where people can annotate (now working with Openstreetmap project[vi]). In depth, an overall picture for the combination of social software and geospatial application has been categorised and analysed in (Chuang and Hung, 2005).

Together with the advance of location based services, while modern mobile computing systems can automatically sense and communicate personal geospatial data, we believe that aggregation and distribution of geographic information by collaborative efforts will become more and more promising.

3.2 Open Public Access

Enhancing collaborative geospatial technology is identified above as a sound way to guarantee online community mapping success. That is the familiar story both in the computer science and geospatial domain — however, reality is a bit more complex. The major barriers and impediments to achieve potentials will not be technical but rather organisational and institutional. Of all the factors that can catapult an innovative information service from good to great, none is as essential as having public information in hand (such as train tables, boundary maps of the administration, or census data).

Here are some examples: (1) fundrace.org combines political information with geographical distribution analysis and display; (2) housingmaps.com offers daily housing services in combination of Google map with craigslist.org, one of most popular online communities which get “the word out about everyday, real-world stuff”, and keep “things simple and common-sense” on web; as well as (3) one of our earlier researches, Taiwan Social Map (tsm.iis.sinica.edu.tw), an XML-based Web system for interactive exploration of Taiwan population datasets with SVG generated map.

Throughout history, people did not manage their information very well because they were restricted in accessing public data in life or, in the recent past, they relied on information released “once a while” by their governments, authority agencies, or academic institutions. But times have drastically changed. Today, web technologies have advanced information distribution process. The cases in point are online games, online auctions, e-forums, newsletters, BBS and blog communities. They are identified and revealed as public participatory phenomena. Challenges now move forward to information and service sharing. Accessing and managing public information, as well as providing open interfaces to software systems, are key stimulation for public participation. Efforts like moveon.org, confluence.org and openfoundry.org are developing to create open information sharing and open collaborative services, and have been identified convincingly and effectively.

Despite the enormous time and energy that have been drawn into open public access development, geospatial domains have little to show for in these aspects. A recent research by the GeoConnections project in Canada suggests that developments of geospatial data and licensing frameworks have not caught up with technical progressing and user demands (Werschler and Rancourt, 2005). We now present the findings of our survey in the following.

(1) Economical reasons are not as strong as as an argument by its proponents for restricting geospatial data

Proponents of restricted authorship for geospatial data and information hold issues such as (1) the user-pay model for marginal cost charging and cost recovery; (2) the fears of intellectual property leakage by unfair competition between industries and academics (*e.g.*, if geospatial data is made free to academics, problems may raise from an unfair competition because some industries hire academic members as their consultants) ; or (3) more broadly impacts, as commercial values of map data are the base for a knowledge economy.

However, there’s no direct evidence that governments or public agencies selling data result in bringing in significant revenue. In contrast, restricted and charging policies will lead to diminishing activities in education and research. On the other hand, new business models, such as revenue from advertisements, may provide other windows to recover the infrastructure costs. Moreover, limitations of free use also may contradict government’s roles to fulfil their obligations as public agencies. It is especially so when their data is produced through state-funded projects, which are funded by taxation. The right of tax-payer as "information commons" can be

identified from the frequently cited USA model for “Freedom of Information” in federal level.

In addition, while geospatial information have been highly recognised as a sound tool for empowerment of citizens (*e.g.,* PPGIS), the value of geospatial data accumulates more easily with more open and free usability.

(2) The choices of public license for geospatial information are in hand.

What a collaborative approach should be inevitably addressed? Legal issues relating, for instance, to the choice of license must be taken in consideration. Based upon our previous research in open source and licensing experiences (Lin et al, 2006), while discussing with public information and public participation, the public licensing model offers a promising solution. Alternatives include GNU General Public License (for source code public releasing), GNU Free Documentation License（for documentation licensing）as well as Creative Commons Licenses (for general content creation licensing）. Outstanding examples like Wikipedia.org, Creative Commons Taiwan (www.creativecommons.org.tw), magnatune.com and pixnet.net are proved that those collaborative resources under public licensing are ensured not to be privatized and further can be used, improved and created for sustainable development.

Specific in the geospatial domain, the US National Research Council has proposed a National Commons in Geographic Information approach in 2004, to create freely usable geographic data and products at local scales, which is similar in effect to the public domain datasets and works created by federal agencies (NRC, 2004). The open source web mapping community like MapServer Cheetah is licensed under an MIT-style open source license. MapServer will be licensed using the OSI-approved GNU Lesser General Public License (LGPL) in the near future[vii]. UK based OpenStreetMap.org project adapts the GNU GPL for its software development and Creative Commons Attribution-ShareAlike 2.0 license[viii] for those collaborative content creation.

In short, we advocate that released geospatial datasets should be in source forms (not in digested or rendered forms) and should be accompanied by the necessary data models (i.e., schema), metadata and catalogue descriptions, data format definitions, and source code of the related software tools. Rather than rely on authority-sanctioned subsets only, it would be more appropriate if users had timely

access to the source datasets, and were able to extract from them a profile of geospatial layers as a basis for collaborative mapping.

4. CONCLUSIONS

As previously acknowledged by Egenhofer and Mark, there was/is a big gap between what common people want to do with a GIS and the spatial concepts presented by the GIS. A decade later, an informal survey by GeoReport (November, 2005) asked if it's important to be able to add multiple data layers when using an online viewer (such as Google Map/Earth, Yahoo Maps or Microsoft Virtual Earth). The interesting result shows that about 95 percent of respondents think that it is important to be able to add their own data. Thus, no doubts the need shows that the gap still exists. But how can we develop new mapping paradigm to change the gap?

As we suggest in this paper by changing the question which was to ask how to find the need or data people want, but instead we ask how to allow the need and the data of people to be generated and integrated from the one who need. The demand side plays a part of the supply side. The supply side adapts accordingly to the demand side. As such, this question provides a way to extend a more flexible, explorative and creative collaboration. The availability and validity of data will be enriched and corrected by the one who own the body of knowledge about their surrounding geographical world. The key underlying here is the design mechanism of open technology and open access to geospatial information.

5. REFERENCE

Berners-Lee, T and Fischetti, M (1999), Weaving the Web, The Original Design and Ultimate Destiny of the World Wide Web By Its Inventor, Tim Berners-Lee with Mark Fischetti, 1999

Blood, R (2004), How Blogging Software Reshapes The Online Community, *Communications of the ACM*, Vol.47, No.12, 53-55

Chang, C.H. et al (2003), Bridging two geography languages: Experience in mapping SEF to GML, in *GML Days 2003*. Available from <http://www.iis.sinica.edu.tw/ trc/papers/gml2003/>.(July 2003).

Chang, Y. H. and Chuang, T.R (2003), Embedding domain semantics in SVG, in *SVG Open 2003*. Available from <http://www.iis.sinica.edu.tw/ trc/papers/svgopen2003/>. (July 2003).

Chuang, T.R. and Huang, A.W.C. (2005), Online Community Mapping, Presented at. Oct.31-Nov.3, University of Hawaii at Manoa in Honolulu, Hawai'I, (2005) The presentation file will be *the PNC 2005 Annual Conference and Joint Meetings* published online at http://pnclink.org/pnc2005/02_GIS2.htm

Crompvoets et al. (2004), Assessing the worldwide developments of national spatial data clearinghouses, *INT. J. Geographical Information Science* 18: 7, 665–689

de Souzqa, C.S. and Preece, J (2004) A framework for analysing and understanding online communities, *Interacting with Computers* 16:579-610

Egenhofer, M. J. and Mark, D. M (1995), Naive Geography. In Frank, A. U.and Kuhn, W., editors, Spatial Information Theory: A Theoretical Basis for GIS, Berlin: Springer-Verlag, *Lecture Notes in Computer Sciences*, No. 988, 1-15.

Ghose, R (2001),Use of IT for Community Empowerment: Transforming GIS into Community Information System, *Transactions in GIS*, 5(2)

Iorio, A.D. and Vitali, F (2005) Web authoring: a closed case? In *Proceedings of the 38th Hawaii International Conference on system Sciences*

Kraak, M (2004), The role of the map in a Web-GIS environment, *Journal of Geographical Systems*, Vol.6, No.2, 83-93

Lin, Y.H; Ko, T.M.; Chuang, T.R; Lin, K.J (2006), Open Source Licenses and the Creative Commons Framework: License Selection and Comparison, *Journal Of Information Science And Engineer* 22, 1-17 (accepted October 10, 2005)

Longhorn, R and Blakemore, M (2004), Re-visiting the Valuing and Pricing of Digital Geographic Information, *Journal of Digital Information, Volume 4 Issue 2* Paper No. 250, 2004-03-24

NRC (2004),Licensing Geographic Data and Services, available http://www.nap.edu/catalog/11079.html

Pain, R (2004), Social geography: participatory research, in *Progress in Human Geography*, vol. 28, no.5, pp.652-663

Pain, R (2003), Social geography: on action-orientated research, *Progress in Human*

Geography 27, 5:649-657

Rosenbloom, A (2004), The Blogosphere, *Communications of the ACM*, Vol.47, No.12, 31-33

Sarjakoski,T (1998),Networked GIS For Public Participation – Emphasis on Utilising Image Data, *Computer, Environment and Urban Systems*, Vol.22, No.4, 381-392

Werschler , T and Rancourt ,J (2005), The Dissemination Of Government Geographic Data In CANADA - Guide To Best Practices, Winter 2005 Version 1.2 http://www.geoconnections.org/publications/Best_practices_guide/Guide_to_Best_Practices_v12_finale_e.pdf

6. NOTE

[i] see http://europa.eu.int/idabc/en/document/3934

[ii] see details at http://www.ordnancesurvey.co.uk/oswebsite/products/osmastermap/technicalinformation/index.html

[iii] The term *Social Software*, as various perspectives see it, is already a well-mixed bowl of collaborative software, computer supported cooperative work, groupware, social computing, and nanotechnology community. See http://en.wikipedia.org/wiki/Social_software and Allen, C (2004), Tracing the Evolution of Social Software, http://www.lifewithalacrity.com/2004/10/tracing_the_evo.html

[iv] see http://magnusmanske.de/wikimaps/index.php/Main_Page

[v] www.connotea.org/tag/geotagged

[vi] www.openstreetmap.org/

[vii] An Open Letter to the MapServer Open Source Web Mapping Community, available at http://mapserverfoundation.org/open_letter_en.pdf

[viii] http://creativecommons.org/licenses/by-sa/2.0/