Chapter XLV
Collaborative Mapping and GIS: An Alternative Geographic Information Framework

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ABSTRACT

The collection and dissemination of geographic information has long been the prerogative of national mapping agencies. Nowadays, location-aware mobile devices could potentially turn everyone into a mapmaker. Collaborative mapping is an initiative to collectively produce models of real-world locations online that people can then access and use to virtually annotate locations in space. This chapter describes the technical and social developments that underpin this revolution in mapmaking. It presents a framework for an alternative geographic information infrastructure that draws from collaborative mapping initiatives and builds on established Web technologies. Storing geographic information in machine-readable formats and exchanging geographic information through Web services, collaborative mapping may enable the "napsterisation" of geographic information, thus providing complementary and alternative geographic information from the products created by national mapping agencies.

INTRODUCTION

Since the Enlightenment, mapping and the production of geographic information have been institutionalised: the map is the power. At home, maps were used as an instrument for nation building as nation states emerged: a legitimisation device (McHaffie, 1995). People learned about their country and administrations needed a tool to govern the territory. Away from home, maps were an instrument for colonisation, when Africa and Asia were split among the European nation-states.

During the last few decades, there has been rapid democratisation of geographic information and maps. Sawicki and Craig (1996) distinguish

three ways in which this movement is apparent. First, the locus of computing power and data access is broadening. Second, the level of skills to turn raw geospatial data into geographic information has become less demanding. Third, the locus of applications has moved closer to the citizenry. Geographic information systems moved from mainframes and the UNIX operating system onto personal computers and the Windows operating system. From research and government, GIS spread into the business sector. The PARC Xerox Map Server and Virtual Tourist brought maps to everyone's PC in the late 1990s, followed by online map Web sites such as MapQuest and Multimap. In 1997, Brandon Plewe noted that "the Internet holds promise for exponential increases in the efficiency and effectiveness of the ways in which we obtain, use and share geographic information in all its forms" (Plewe, 1997). In July 2002, 7.1 million European users visited one of the many online map Web sites (Nielsen//NetRatings, 2002). Google Maps, introduced in February 2005, reached almost 1.7 million visitors in that month (Buchwalter, 2005).

Although maps are more widely used than ever, the production of geographic information, and especially mapping, is still highly concentrated among national mapping agencies and the GI industry. But this oligarchy is soon to be dissolved, for we see the third aspect of the democratisation of geographic information–the locus of applications moving closer to the citizenry–becomes apparent now that location-aware mobile devices are coming within everyone's reach. GPS units are not only available to surveyors anymore, as cheaper devices are sold for outdoor recreation. Also, small GPS antennae can communicate with other devices over Bluetooth, and there are already mobile phones and personal digital assistants (PDAs) for the consumer market that have GPS-chips built in.

At the same time, digital maps have become portable. Various mobile phone operators have started to deliver location-based services to mobile devices. Mobile phones come with route planning applications, thus making in-car navigation systems redundant. Maps are not only delivered to the desktop, but also to mobile phones and PDAs, requiring new visualisations as the screen size, resolution, and use patterns differ significantly.

Collaborative mapping is an initiative to collectively create models of real-world locations online that anyone can access and use to virtually annotate locations in space (McClellan, 2003). The value of the annotations is determined by physical and social proximity, the former expressed in distance, the latter in "degrees of separation." Thus, the informational value and the pertinence of spatial annotations is not only dependent on physical distance, but also dependent on the trust relationship between individuals or groups of people through social networks: the "Web of Trust" (Espinoza, Persson, Sandin, Nystrom, Cacciatore, & Bylund, 2001).

However, there is a discrepancy between physical and social proximity. Privacy and personal freedom become highly important issues when one's location is related to their social behaviour. On the other hand, the fear of surveillance that accompanies positioning is already gradually reducing in society (Ahas & Mark, 2005). Furthermore, this discrepancy can be mediated by users themselves by storing annotations and tracks locally, thus creating distributed repositories, and by explicitly setting the level of privacy on each of these annotations and tracks. Finally, users themselves remain in control of their social identification–their preferences and social network–while they make use of collaborative mapping services, whereas, for example, the social positioning method aggregates these social characteristics to study the space-time behaviour of society (Ahas & Mark, 2005). Collaborative mapping services are therefore less pervasive in the privacy of their users because users negotiate the trade-off between the benefits of the service and their privacy concerns.