

Chapter 3

Location Privacy

Matt Duckham
University of Melbourne, Australia

ABSTRACT

In this chapter, the author raises a number of issues surrounding the ever-growing capabilities of geoinformatics. Location privacy can be defined as the claim of individuals to determine for themselves when, how, and to what extent information about their geographic location is communicated to others. Location privacy has become an especially important issue in geoinformatics because of the emergence of location-aware computing. This implication of the interaction between these technology and personal rights is explored in this chapter.

INTRODUCTION

A person's geographic location is personal and sensitive information that needs to be protected. Unprotected information about where a person is located can be misused in a number of ways, including:

- **Causing personal harm:** Information about a person's location may be used to cause that person harm. For example, a variety of criminal activities, such as stalking or even physical assault, require that individual's location is known to the criminal.
- **Inferring other personal information:** Geographic location fundamentally limits many of the activities a person can be engaged in. For this reason, location can be used to infer other personal information about an individual. For example, the information that Anna is regularly located in a hospital oncology unit might be used to infer that Anna is suffering from cancer. An insurance company might then unfairly use this inference to deny health insurance to Anna.

Location privacy can be defined as *the claim of individuals to determine for themselves when, how, and to what extent information about their*

DOI: 10.4018/978-1-4666-2038-4.ch003

Location Privacy

geographic location is communicated to others. Location privacy is a special type of *information privacy*. Information privacy is usually defined as the “claim of individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others” (Westin, 1967, p. 7). As Figure 1 shows, information privacy is just one of several types of privacy. Privacy in general is regarded as a fundamental human right, recognized in Article 12 of the UN Universal Declaration of Human Rights (1948).

PRIVACY IN LOCATION-AWARE ENVIRONMENTS

Location privacy has become an especially important issue in geoinformatics because of the emergence of location-aware computing. Location-aware computing environments combine high-power mobile computer platforms, like personal digital assistants (PDAs) or cellular phones; location-sensing technology, like global positioning system (GPS); and wireless communication, like WiFi or Bluetooth. Using location-aware computing environments it is possible to track an individual’s location in real-time, and

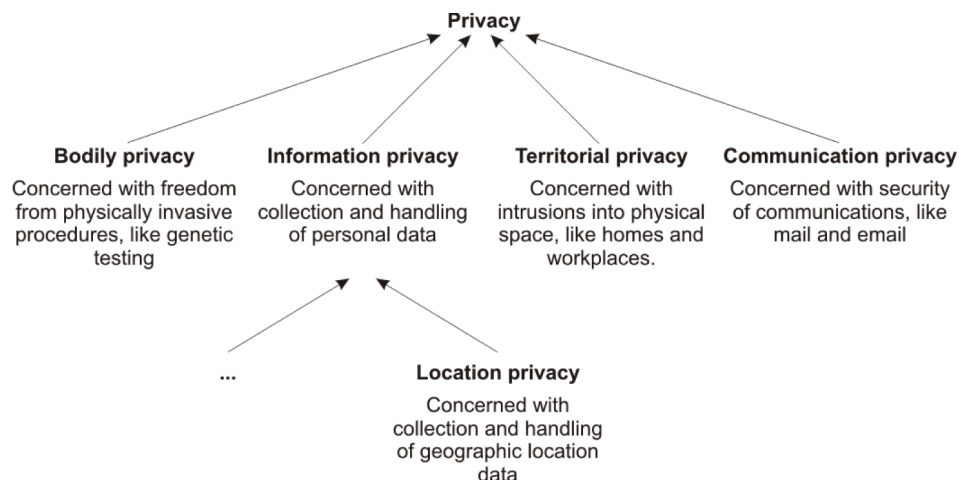
communicate that information to interested parties anywhere in the work (e.g., via the Internet).

Users of location-aware technology can potentially take advantage of many new and highly beneficial location-based services. Examples of increasingly common location-based services include navigation and emergency response systems. People using location-based services must reveal information about their location to a service provider. One of the first location-based services, the AT&T “Find Friends” service, enabled friends and family to share information about their location to each other via their mobile phones (Strassman and Collier, 2004).

In some situations individuals may not even be explicitly aware that their location is being tracked. For example, not all cell phone users are aware that cellular phone systems must track the approximate location of service subscribers in order to route calls to and from subscribers’ mobile handsets. With respect to location privacy, three types of location-sensing technique can be distinguished (Kaasinen, 2003):

1. **Client-based positioning systems:** use a person’s mobile device to compute that person’s location. Client-based position systems may be used without revealing location

Figure 1. Classification of types of privacy, after Rotenberg and Laurant (2004)



4 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/location-privacy/70431

Related Content

Identifying Spatio-Temporal Clustering of the COVID-19 Patterns Using Spatial Statistics: Case Studies of Four Waves in Vietnam

Anh-huy Hoang and Tien-thanh Nguyen (2022). *International Journal of Applied Geospatial Research* (pp. 1-15).

www.irma-international.org/article/identifying-spatio-temporal-clustering-of-the-covid-19-patterns-using-spatial-statistics/297517

Academic Performance of Texas Public Schools and Its Relationship with Students' Physical Fitness and Socioeconomic Status

He Jin and Yongmei Lu (2017). *International Journal of Applied Geospatial Research* (pp. 37-52).

www.irma-international.org/article/academic-performance-of-texas-public-schools-and-its-relationship-with-students-physical-fitness-and-socioeconomic-status/181575

Semantically Enriched POI as Ontological Foundation for Web-Based and Mobile Spatial Applications

Hardy Pundt (2012). *Universal Ontology of Geographic Space: Semantic Enrichment for Spatial Data* (pp. 186-206).

www.irma-international.org/chapter/semantically-enriched-poi-ontological-foundation/64000

The Image of Historic Urban Landscapes: Representation Codes

Giuseppe Amoroso (2016). *Geospatial Research: Concepts, Methodologies, Tools, and Applications* (pp. 344-372).

www.irma-international.org/chapter/the-image-of-historic-urban-landscapes/149500

Indicators of Land Degradation Vulnerability Due to Anthropogenic Factors: Tools for an Efficient Planning

V. Imbrenda, M. D'Emilio, M. Lanfredi, M. Ragosta and T. Simoniello (2013). *Geographic Information Analysis for Sustainable Development and Economic Planning: New Technologies* (pp. 87-101).

www.irma-international.org/chapter/indicators-land-degradation-vulnerability-due/69050