Location based services - a bridge too far for data linkage privacy concerns?

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Abstract

Location is a critical aspect of both privacy and surveillance, and an intrinsic attribute of travel and movement under communications enablement. A detailed record of locations allows all sorts of other information to be linked together, adding to information about the subject and his or her associates in the same way that a unique identifier allows dataveillance to be expanded so swiftly and extensively. This time by allowing the linking of both the activities and records of many different people together. Location technologies have far outstripped both public awareness and legal and policy attention. Addressing this gap will require careful use of precise language to ensure that unexpected side effects do not occur when this is finally faced up to, and the present paper explores both this essential language and some of the applications and linkages that need addressing. A wider public and policy understanding of the implications of the expanding capacities to track, record and monitor location is an urgent need, as it is very difficult to reverse capacities once integrated into a wide range of commercial, enforcement and intelligence systems - as is already happening. A decade ago, technologies that could provide information about the location of a motor vehicle, or a computer, or a person, were in their infancy. A wide range of tools are now in use and in prospect, which threaten to strip away another layer of the limited protections that individuals enjoy. While steady moves to identify, trace and record locations of things and animals has long been established, the application to people is now gaining momentum, and requires a reappraisal.

An understanding of the landscape of location and tracking technologies, and of the issues that they give rise to, depends on establishing a specialist language that enables meaningful and unambiguous discussion to take place.

Location-based aspects of mobile phones, public transport smart cards and Automatic Number plate Recognition are used to illustrate the emergent prospective and retrospective issues. The central concern is that the multiplying technologies for real time and retrospective location tracing have advanced far beyond the legal and privacy frameworks that we have in place. In combination with unique identifiers (for people or vehicles) the potential for remarkably intrusive data assembly and use has become a reality that has not been catered for. Neither public expectations not policy exists to handle the social impacts of this wonderfully unobtrusive surveillance technique, and both are necessary if the benefits are to continue to be realised without either significant losses to civil society or a substantial backlash once it becomes known.

Even when appropriate policies and legislative backing have been developed, the confusions between privacy and identity, and what comprises a sufficient yet not enduring identity to preserve privacy will need to be carefully communicated.

This paper commences with a brief overview of key concepts underlying the subsequent discussion. One cluster of relevant concepts comprises real-world entities (particularly humans and vehicles), identities, and pseudonymity and anonymity. A second cluster comprises the concept of location and the process of acquiring it, and the concept and process of tracking.

Building on these ideas, the paper briefly surveys the privacy impacts of location technologies, in order
to set the scene for subsequent papers, and to provide a basis for addressing the possibility of privacy protecting middleware for systems currently being developed and deployed. One's location is potentially very sensitive personal data. But the tracking of people's movements both real-time, and retrospectively, lifts the threat to a much higher level and has become a form of function creep that has already become established practice in some quarters.

For example the recording of patterns of movement allows social networking mapping - and association and linkage of those, possible unknown to you, who frequent the same locations.. without your knowledge. These and other intelligent and surveillance techniques become economic and highly effective once individuals start to use LBS.. there are significant implications for both transport data collection and indirect impacts on travel behaviour that need to be anticipated as a result: for example anonymity assurance may be substantially negated by the integration of different people LBS records... however useful for travel analysis and modelling these might be. Any movement towards personal carbon budgets and monitoring will encounter these issues at a very early stage, for example.

Keywords: Location, GPS, RFID, surveillance, privacy, tracking, retrospective, carbon budget, middleware, anonymity, protocols, geospatial, transport, intelligence, embedded identity, travel, location use correlation.