

Where are you now? Location detection systems and personal privacy

Big Brother watches

The spectre of Big Brother from George Orwell's 1984 watching our every move has been steadily realised. The growth in video camera surveillance and in information systems has prompted claims of invasion of privacy. New location detection systems and electronic tags now offer ways to monitor personal behaviour as never before. This note looks at the new technologies.

The tracking of motor vehicles has become a commonplace business for both logistical and security reasons. There are also now devices available for parents to monitor car speed, acceleration and seat belt use by their offspring, broadcast by mobile phone to a home computer¹.

Drivers can navigate using other location systems. Road authorities can use signals from mobile telephone towers to track motorists and monitor congestion.

Meanwhile, a debate continues over the extent to which individual vehicles should be monitored for speeding fines and road pricing purposes. The future use of Radio Frequency Identification Data (RFID; see over) toll tags may eventually enable cost-effective monitoring of road traffic networks by police authorities.

However, there remain questions about the community's willingness to accept this degree of movement tracking. Already in Britain, speed cameras have been targets for destruction by aggrieved motorists, with some media disquiet here too.

More recently, tracking systems have been used to monitor prisoners on home detention. These can trip a detection alarm should the wearer leave home, or contain a device to transmit to a Global Positioning System monitored in the local area.

Parents of straying children can use a tracking device that clips on to a belt, along with a website at home, to monitor their child's movements. The device has a panic button for the child to push as required and allows for receipt of text messages. Another new security tag helps stop the theft of babies from hospitals by means of a monitoring alarm alert.

These technologies primarily allow the tracking of people's physical location. But newer tag systems could link this to personal habits, preferences and financial details. Personal financial transactions do already reveal our spending choices and where we do our business or undertake an electronic transaction.

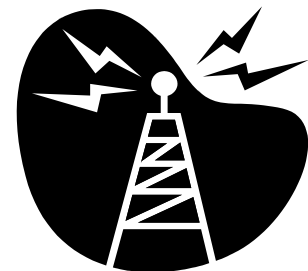
Mobile telephone developments

Location-based computing using wireless systems is a growth industry. The concept involves the use of mobile telephones, personal digital assistants and other accessories capable of tracking their owner's every movement around town.

In Europe, new mobile telephone networks can locate their users and provide directions as required. The degree of accuracy and consistency of application in the new standards now evolving do vary however. It will take time to resolve them all.

The Global Positioning System (GPS) utilises defence satellite location systems combined with local repeater stations to enable persons with portable receivers to locate themselves to within a few metres. Such assisted GPS might be linked to mobile telephone cell referencing systems to improve location detecting performance.

However, once indoors, the tracking technology becomes less reliable, due to wall, floor and ceiling panel interference. It could be that a new combination of wireless and ultra-wideband technologies may enable personal tracking within structures.



Emergency call location

Australia's telecommunications carriers may introduce even more accurate location detection systems to improve responses to mobile phone calls for emergencies. There are cell triangulation techniques that allow authorities to determine the location of mobile phone users.

In the United States, the Federal Communications Commission has mandated that mobile telephone carriers be able to automatically locate anyone making an emergency call to within 50 to 150 metres, by 2006. Carriers might also be able to provide security alerts or weather bulletins to telephone users.

The Australian Communications Authority is currently examining this issue, but expects carriers to introduce tracking technologies for commercial reasons.² Location technologies may be handset-based, network-based or a combination.

Commercial applications might include roadside assistance, map aids, location-based billing, news and information services, as well as advertising of course. While there are practical benefits of helping lost or stranded people, the systems may also be used as marketing tools, directing people to specific commercial outlets.

RFID

Radio Frequency Identification Data (RFID) tags are tiny silicon chips that broadcast a unique identification code, when queried by a reader device using radio waves. At present, they can return such a signal from distances up to a few tens of metres depending on the communicating frequencies and transmitting powers involved. The tags may be as small as rice grains, positioned within ID cards, tokens, wristbands, or even under the skin, as in the use of microchips for pets.

RFID tags are now small and unobtrusive enough to allow their adoption in many applications, but may still be too costly for wide-spread applications. There is a range of proposed standards. Note that the emitted power levels from the tags are too low to be of concern about harmful radiation levels.

Warehouses and retailers use RFID tags to monitor stock movements. Casinos might use them embedded within gaming chips in order to spot thefts and counterfeits, as well as to monitor gambler behaviour. The tagging of airline luggage labels and banknotes is also a possibility.

Manufacturers and shop owners prefer tags to barcodes because the tags uniquely label individual items, rather than just product types, and because they can be read remotely and, theoretically, in high volume.³

One possible application for retail RFID tags would be to send offers to consumers who purchased goods, either by telephone or electronic mail. However, the degree of information overload involved in tracking goods and linking them to consumers might well prove to be a data processing nightmare.

RFID characteristics

RFID tags are categorized as either active or passive. A passive tag, with no power source, can be activated by a reader device that transmits an energy signal to the tag. The tags themselves consist of antennae connected to a silicon chip. Active RFID tags are powered by an internal battery and are typically read/write, i.e., tag data can be rewritten and/or modified.

Passive tags are consequently much lighter than active tags, less expensive, and may offer a virtually unlimited operational lifetime. The trade off is that they have shorter read ranges than active tags and require a higher-powered reader.

Technical challenges face RFID use. The tags can be orientation-dependent, requiring multiple reader systems. RFID signals may be easily blocked by common objects and other radio waves.

Privacy implications

Federal privacy law under the *Privacy Act 1988* and the eleven Information Privacy Principles do not appear to directly address the matter of personal location tracking. Personal identity information and an individual's right to control it might both be compromised by the new systems. Some issues include:

- Does it matter if one can not be located in real time?
- Is the device or its owner being located?
- How, if at all, is this information utilised?⁴

The possible linking of RFID tags on purchased items to personal

credit card details and transaction trails raises privacy concerns.

Possible rules for the use of RFID tags on consumer products include:

- Consumer notification of RFID tags, on purchase;
- Tags able to be easily removed by consumers;
- Tags able to be disabled by default; and
- Tags placed only within packaging not the product.⁵

Do we all desire others to always know where we are located at any time? Should users always be in control of giving out personally identifiable information? One thing is for sure: Big Brother could be watching and tracking us all in the years to come. This raises specific privacy issues, as well as matters of ethics, law, technology and the kind of society that we want to create.

1. www.findafone.com.au
2. Australian Communications Authority, *Location, Location, Location*, ACA Discussion Paper, Canberra, January 2004.
3. D. Crowe & S. Mitchell, 'Cost and privacy will be the big issues', *Australian Financial Review*, 18 May 2004, p. 34.
4. H. Fraser, 'Location based services and privacy: can they co-exist?', *Telemedia*, 5(5), 2001, pp. 77-80.
5. R. Want, 'RFID: A Key to Automating Everything', *Scientific American*, January 2004, pp. 46-55.

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