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Geo-Context for Mobile Services - Current-Location Tracking and Routes

An infrastructure is emerging that enables the delivery of location-enabled services to large populations of mobile users. A user typically has a small screen and no standard keyboard, and the user is engaged in some primary activity such as driving safely. These and other reasons make it particularly important to deliver the ``right'' service at the right time, with minimal user interaction. This may be achieved by making services context aware.

The current position of a mobile user is significant as context for a range of mobile services. To supply such services, techniques are needed that enable the tracking of the continuously changing positions of entire populations of mobile-service users. This talk describes approaches to tracking that offer accuracy guarantees for the positions of the moving objects that are stored on the server side. In these approaches, the server and each mobile client share a representation of the client's changing current position, and each client issues an update to the server when its position as given by this shared representation deviates from its GPS position by more than a certain threshold. A key issue is how to represent the changing position of a moving object so that tracking can be done with as few updates as possible.

Next, routes are significant as context. For example, a service that knows the route of a user may alert the user about road conditions, e.g., congestion, construction, and accidents, on the route ahead, while not bothering the user with conditions that do not relate to the user's route. As another example, a service may suggest points of interest near to the user's route, rather than merely to the user's current location. This talk describes key techniques underlying a software component that builds routes for individual users based on traces of GPS coordinates. Aggregated usage information is associated with each route, so that the likely route(s) for a user can be identified and used in mobile services without user interaction.