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## Ubiquitous Computing and Next Generation Communication Systems

In our laboratory, we are working on various research topics to create innovative values via networked services. The following are a few examples of recent researches. You may join our lab. as member of project research, however we also encourage you to pursue your own idea and define the new research domain.

### 1. Ubiquitous Computing based on geographical location

In ubiquitous computing, services are offered based on the recognition of various contexts. Among them, the geographical location of the user is the intrinsic context because we cannot offer any services if don't realize the location of the sensed data, the location of human being and machines which services are provided. From this point of view, we focus on the geographical location and related issues. For example, tracking of user and prediction of future position and behavior of pedestrians, various localization technique using GPS, RFID and other sensors. Integrating these information are also important. On the other hand, location privacy technique whereby geographical position of individuals are hidden is also important. Some of the research projects are conducted with the coordination with Center for Spatial Information Services (CSIS), University of Tokyo.

<Huge test bed system of RFID based positioning near a railway station >



### 2. Ad Hoc networks and sensor networks

Ad hoc networks and sensor networks are attractive because they require no infrastructure and very robust to disasters. We are tackling various related topics as route discovery, power saving protocols, multicasting and geocasting, new addressing scheme suitable for this class of network and hiding the identity of users. Also, regarding sensor networks, we are tackling the issues as modeling of sensor information, robot sensor networks and delay tolerant network, data aggregation scheme.

### 3. User participatory sensing and its applications

The development of smart phones now enable us to sense the urban environment and other contexts. We are now developing various systems for user participatory sensing as follows. Mobile phone Geo-coded images with sensor information and creating user participatory street view. Sensing of urban sound environment and its usage towards the evaluation of urban environments



<Devices for Mobile phone geo-coded images with sensor information >

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