PLASH: A Platform for Location Aware Service with Human Computation

Recent advances in ICT technologies and a steep drop in prices has helped the broad and rapid deployment of various wireless networks. While voice service dominates wireless service, Internet access and multimedia service have gradually gained popularity, boosting the wireless-related industry. The rapid deployment of new network infrastructure — from GSM, GPRS, WiFi, EDGE, and WCDMA, to WiMAX and LTE — cannot be sustained if no new services attract more users to spend even longer online. It is clear now people are aware that ICT should support meaningful applications, not be just a fancy communication tool. The introduction of new services is especially important to the wireless and related industries when infrastructure upgrades are unlikely.

Accordingly, PLASH (Platform for Location Aware Service with Human Computation) has been proposed as a platform to allow fast deployment of various location aware services. PLASH applies Web2.0 and human computation to consolidate the intelligence and efforts of the general public, which is the main difference from traditional intelligent transportation system and location aware services. Therefore, the main concerns of design are different from those of previous systems. In PLASH, users are also participants and contributors. PLASH will investigate the application of human computation in wireless service.
PLASH consists of a multi-layered platform and application systems (see Fig. 1). The platform includes a communication layer supporting V2I (vehicle to infrastructure) and V2V (vehicle to vehicle) communication; a data layer responsible for data representation, storage, and access; and a service layer providing basic services that application systems perform jobs via those basic services. Each layer of the platform communicates via APIs to provide modularization and extensibility. In addition, PLASH allows application builders to develop and contribute their mature applications as a service accommodated in the service layer for others to expand and create more sophisticated applications.

The operating model is divided into two parts: PLASH Application and PLASH Platform, as shown in Fig. 2. Various communication protocols are used to communicate between different layers. HTTP/RESTful (REpresentational State Transfer) is used between the presentation layer, the logic layer, and the access managers in the service layer. Java Message Service (JMS) is used within different components in the service layer between the access managers and the fundamental services; and Java Database Connectivity (JDBC) is used to communicate between the service layer and different databases in the data layer.

To ease the tasks of developing and deploying applications, the platform provides an environment for application builders. In this application-development environment, builders are able to use our Application Specification Language (ASL) and our Graphical User Interface (GUI) to mash-up, create, and share applications/services. In the PLASH application development environment, application builders can design their application layout
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using the interface builder, create different tasks using interface logic, and mash-up different services using our customized service constructor (see Fig. 3). Furthermore, the PLASH application development environment simplifies not only application builders’ tasks and development but also integrations of sub-projects of the PLASH project.

To demonstrate the platform and to collect useful location information from voluntary users, we created a number of applications. One of these is “Map’n Track Friends,” which is for Android, iPhone, and Web browsers (see Fig. 4). It is a location service application that allows users to share and track their own locations, as well as those of friends, family members, and colleagues. Several researchers and professors — including Meng Chang Chen, Jan-Ming Ho, Ling-Jyh Chen, De-Nian Yang, Sheng-Wei Chen, Wang-Chien Lee, and Mi-Yen Yeh — are involved in PLASH project to further contribute novel technologies to support the project’s goals. Those technologies include the Comfort Measuring System for Public Transportation Systems; Location Trajectories Access, Storage, and Application; Travel Route Suggestion Based on Human Computation; Location-Aware Community Common Experience Integration and Summarization System; Data Sharing and Analysis on Taipei e-Buses and Taxis; Trajectory Urban Traffic Mining; and Traffic Modeling and City Travel Route Planning.

For more about PLASH, see http://ants.iis.sinica.edu.tw/plash/.

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