An Optimization Technique for Smart-Walk Systems Using Stream Data Analysis

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Abstract

Various RFID-based smart-walk systems have been developed for guiding disabled people. The system sends appropriate message whenever the disabled people arrived at a specific point in a building. We propose *universal design concept* and *optimization techniques* for the smart-walk systems. The mobile phone communicates with the server via wireless access pointer if a handicapped person sets the destination via voice by using the mobile phones in public organizations. Then, the server explores the current location of the user and finds the path toward the destination and calculates the weight value by risk arising from each path, and provides voice and/or text guidance in an appropriate language via the mobile phone to help them reach the destination most safely. The system sets off alarm if the user drifts away from the perception range of tag to help the user to stay in the perception range. It can process the guidance request of the handicapped people via mobile phone in real time on the network.

Universal design concept can be adopted for supporting various kinds of disabled such as a blind person, a hearing-impaired person, or a foreigner in a system. It can be supported by storing appropriate messages set in the message database table depending on the kinds of the disabled. *System optimization* can be done by analyzing operational log(stream) data accumulated in the system. By combining operational log data and users' profile into a data warehouse for multi-dimensional analysis, we can get useful decision information in real time. Multi-dimensional analysis can derive customer's usage patterns and breakaway patterns from the operational log, and this information is very usefyl for optimizing the system gradually. Various conditional patterns can be found by using the multi-dimensional analysis based on the integrated data warehouse and OLAP (on-line analytical processing).

Various experiments have been done for visually-handicapped people, and we got useful information for system optimization. The main contributions of the paper can be summarized as follows.

- Various kinds of difficulties can be supported by a single system based on universal design concept and advanced IT technology.
- The system can be optimized gradually by analyzing accumulated streaming information in a data warehouse.
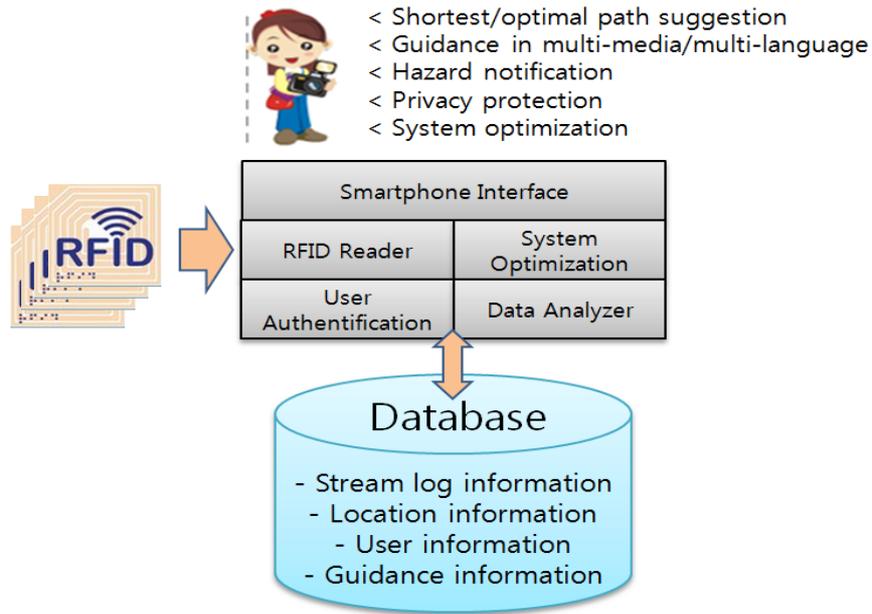
<Fig. 1> System Architecture

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Wan-Sup Cho received Ph.D. degree from KAIST (computer science) in the year 1996. He was a visiting scholar at the Database Center in University of Florida (2001~2012) and researcher at ETRI (Electronics and Telecommunications Research Institute) in Korea (1996~1997). Currently, Dr. Cho is a professor of Department of Management Information Systems in Chungbuk National University. He is also department chair of Business Data Convergence at graduate school. His interesting area includes *databases, bioinformatics and health science, Big data computing, Business intelligence.*