NICT, Fujitsu develop indoor guidance technology for the blind using ultra wide band positioning, smartphones

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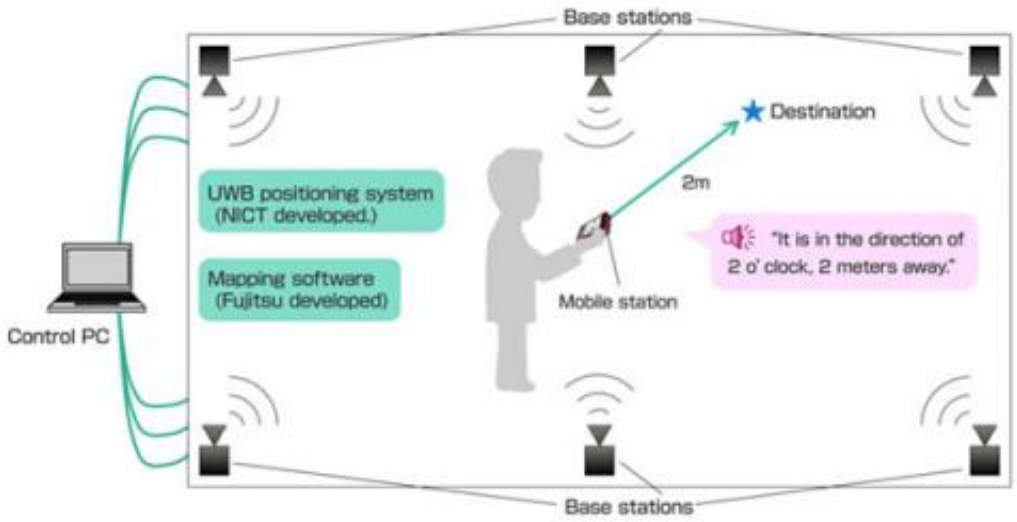

Japan's National Institute of Information and Communications Technology (NICT) and Fujitsu today announced their joint development of an indoor support system for the blind that uses ultra wide band (UWB) technology and a smartphone. The system is able to provide real-time positioning data, even indoors where GPS cannot be used, and provide audio instructions on the distance and direction to a destination to help guide the blind.

This guidance support system for the blind reduces inconveniences facing the blind and is expected to pave the way to major R&D advances in other guidance support systems. The system will be demonstrated at Wireless Technology Park 2012, held July 5-6 at Pacifico Yokohama.

Currently there are systems under development that use GPS with mobile terminals to provide audio instructions to an outdoor destination. GPS, however, cannot be used indoors. Accordingly, NICT and Fujitsu decided to use a UWB positioning system, which can provide highly precise positioning indoors, in real time with a granularity of less than several tens of centimeters.

The newly developed support system for the blind takes advantage of the ability of impulse radio UWB (IR-UWB) technology to measure distances. It is configured with several base stations positioned in an indoor area as part of the infrastructure, several mobile stations—one for the user and others for destinations—and a PC that controls the entire system.

The base stations first measure the distance between each of the mobile stations (for the user and the destinations) and the base stations with a margin of ranging error of less than 30 centimeters, and the control PC calculates and gives the positioning data based on the ranging results in real time. The obtained position data is then sent to the user's mobile station. Furthermore, the position data is sent via Bluetooth to a smartphone, where the user's location and the location of the destination are simultaneously displayed using a special mapping application. The user is guided to the destination by audio instructions on direction and distance. As the user moves, the location information, map display, and audio instructions are updated.

- The IR-UWB uses frequencies in the 7.25-10.25GHz band in Japan, the developed system has been certified by TELEC.

- The smartphone used is a Fujitsu-manufactured docomo NEXT series ARROWS X LTE F-05D released from NTT DoCoMo, and the mapping application was developed for Android 2.3.

NICT and Fujitsu plan to make further advancements to push forward the technology for assisting the blind by building a system with additional sensors that can detect obstacles on the road. Moreover, this highly precise positioning technology is notonly useful for the blind but also can be used to improve the safety of people in moving or to provide indoor guide services. For example, it could be used to guide visitors inside of local government buildings or hospitals to improve public safety and security. It could also be used in museums, libraries, and shopping malls, where contents could be tailored to a user's location. These are just a few of the comprehensive support service applications that could be developed to enhance user enjoyment and convenience.

Provided by Fujitsu