Developing Kinect Positioning System (KPS) and the potential applications

Advanced Indoor Positioning System using Kinect

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ABSTRACT

This paper shows the mechanism and the potential applications of KPS. KPS, named after Kinect Positioning System, is an epoch-making system that makes it possible to develop new approaches to educational technology as teacher training, special support education, sports coaching, etc.

Most of the existing indoor positioning systems are not feasible in that they do not achieve enough accuracy in position detection despite their required large scale devices. Some systems are proposed, in which the position is detected by taking pictures of the target person with a video camera and recognizing the face and the position of slippers is detected by the floor covered with a large amount of RFID tags. However, they have many problems. For example, taking face pictures may cause some privacy issues, or the large scale special devices require big budget and preparation. Those difficulties are hard to solve.

In 2009, the authors developed WPS, a highly accurate indoor positioning system that uses Wiimote a controller of game machine Wii. WPS, which only needs low-cost equipment and easy settings, can detect indoor local positions more accurately. It is, the authors believe, the best indoor position detection system to deal with privacy issue.

WPS is utilizing a device of tracking infrared rays, which requires the installation of an infrared photophore on the shoulder of the target. We solved the difficulties by developing the advanced indoor positioning system, KPS. KPS can detect the indoor position of the target using Kinect without an infrared photophore. Kinect can detect the target using its skeleton. Therefore, it is not necessary to install any device on the target. In addition, KPS can cover a wider range of WPS using one Wiimote. That realizes easier settings freed from constraints of WPS.

KEYWORDS: KPS, Kinect, easy settings, high accuracy, low cost