Indoor Blind Navigation System

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The purpose of the project is to build an effective method of navigation for blind people in indoor areas. GPS isn't reliable indoor due to the distortion of signals through buildings. Other indoor navigation systems such as: WI-FI and Bluetooth trilateration provides low accuracy. This results in the inefficiency of detecting users' direction, avoiding dangerous areas and navigation in narrow or complex places. A matrix of RFID tags was used to present points on virtual map. The matrix was placed on ground under a protective cover. Then, an RFID reader with Bluetooth module was attached to each shoe of the user to detect tags and transmit their IDs to a software interface. By comparing the readings of both right and left feet with a predefined 2D array of points, the software detects the location of the user and their direction by applying simple geometry. The accuracy and precision of results depend on the spacing between tags. We left 4cm distance between tags' centers. As the spacings between tags were smaller than feet's dimensions, range of error could be ignored. The project provides an efficient solution for blind people to navigate in indoor areas with more independence and safety. By having accurate location and direction, many applications could be applied to improve the blind's lifestyle such as warning them near obstacles and detecting the number of stairs left to end the staircase.