

RFID Based Indoor Navigation with Obstacle Detection Based on A* Algorithm for the Visually Impaired

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Abstract : The visually impaired individual may use a cane, guide dog or ask for assistance from a person. This study implemented the RFID technology which consists of a low-cost RFID reader and passive RFID tag cards. The passive RFID tag cards served as checkpoints for the visually impaired. The visually impaired was guided through audio output from the system while traversing the path. The study implemented an ultrasonic sensor in detecting static obstacles. The system generated an alternate path based on A* algorithm to avoid the obstacles. Alternate paths were also generated in case the visually impaired traversed outside the intended path to the destination. A* algorithm generated the shortest path to the destination by calculating the total cost of movement. The algorithm then selected the smallest movement cost as a successor to the current tag card. Several trials were conducted to determine the effect of obstacles in the time traversal of the visually impaired. A dependent sample t-test was applied for the statistical analysis of the study. Based on the analysis, the obstacles along the path generated delays while requesting for the alternate path because of the delay in transmission from the laptop to the device via ZigBee modules.

Keywords : A* algorithm, RFID technology, ultrasonic sensor, ZigBee module

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