

Title:

A study on finding virtual items by foot through AR Shogi game

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We present our new study on investigating how hard the dual task is for visually impaired people when they have to move around. This is a preliminary study towards the implementation of practical navigation system that will be served to support visually impaired people.

To evaluate the behavior of the visually impaired people in such situation, we introduced an entertaining game - AR Shogi. Shogi is a kind of Japanese chess and it is popular among visually impaired people too.

We set up a Shogi board on a solid floor by the size of about 5 meters by 6 meters, where 5 by 6 (totally 30) cells are formed. Each cell has a 90 cm square artificial turf so that a subject can recognize he/she touch one cell. The turfs are placed by the interval of 40cm. 30x30 cm RF antenna with the thickness of 5mm are placed under the center of each turf, and 30x30 cm cushion is placed in between to enhance the tactile feedback.

The subject put a shoes with a special sensor that reacts when it comes on top of the RF antenna. Once he/she comes to the center of the cell, the system tells there is a piece in the cell or not, and if it exists, it also tells the name of the piece too.

A game player (subject) is asked to find out the whole status of the board at first stage. The player should find out all the 30 cells, but his/her foot on the center of the cell, and remember where the pieces are. It means the player is asked to conduct dual task; remember the board and pieces and self-localization inside the board. As the feedback of finding a cell is done by voice through a loud speaker in the game field, the player also needs to concentrate on listening the voice. The stage is over once he/she is sure to

remember the whole status of the board correctly. It is checked by asking them the board status.

This is a game play, but the tasks the player should handle in the game surely happens when he/she will walk out with an intelligent navigation system; localizing himself/herself in the town, remember the point he/she passed, and listening to the voice from the navigation system.

We have conducted the experiment with more than 10 visually impaired subjects who are good players of Shogi. They play shogi usually by using a software which dictates the position and the name of pieces on the Shogi board. This means they are good at remembering the whole board without walking / localizing.

All the actions were taken by video and the system logs were recorded digitally. We also made subjective survey on them after the game play is over. We have found this kind of dual task is more hard than we expected. We are analyzing the recorded dataset and some more interesting results will come.