Automatic Bus Reservation System for the Visually Impaired

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South Korea has a high public transportation usage rate of 77.5% as of 2020, but a survey of visually impaired people found that 82% of respondents ranked buses as the most difficult mode of transportation. This is due to difficulties in locating bus stops, identifying numbers, boarding and alighting, and accessibility. The goal of this research is to develop an automated bus reservation system to improve the accessibility of public transportation for the visually impaired. The initial app was developed in 2023, and seven visually impaired people were interviewed in the first phase to add features such as measuring walking speed, canceling reservations, and automatic reservation with transfer routes. In the second round, we developed and applied a test app that saved touch points in various layouts as X and Y coordinates to study the mobile app UI suitable for the visually impaired. The third test confirmed the system's effectiveness at 92% through 13 user evaluations and satisfaction surveys. The system consists of two apps: one for the bus driver and one for the visually impaired. The bus driver app checks the boarding and alighting reservation information (UUID) in real time through the AWS server. The visually impaired app predicts the stop arrival time considering the user's walking speed and automatically reserves available buses (including transit routes). When the user is at the boarding stop and the bus is within 1 km, the driver app is notified of the blind person's reservation. Voice the bus number using beacons. Developed a customized app for the visually impaired by automating the entire process, including real-time step-by-step voice guidance (using talkback and voice-over) using GPS coordinates.

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