Complex & Intelligent Systems

Development of an Electronic Travel Aid with Artificial Intelligence for Blind People in Public Areas

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Abstract:	Under the global context, blindness and visual impairment (BVI) affects many individuals, limiting their mobility in public indoor environments due to crowds and a lack of accessible signage. The purpose of this paper is the development of an Electronic Travel Aid (ETA) that alerts users of obstacles and enables them to locate these signs in real-time using their hands and/or head. For this purpose, a dataset of signage was created, along with a portable prototype of the system incorporating stereoscopic vision, haptic/audible communication, and models for hand and sign detection. Improvements were achieved in the system's thermal behavior and its ability to generate simultaneous predictions at 9.31 fps using a distributed processing between the VPU and CPU of the system. It was effective in transmitting information to the user and robust against partial obstructions of up to 25% of the signage by the user's finger, maintaining a confidence range in the predictions from 66% to 72%, and reaching 97% in the absence of obstructions.
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