

BlindSense: AI Based Smart Goggles That Provide 6th Sense for the Visually Impaired

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People with visual impairments face significant challenges in recognizing their surroundings, which significantly impact their mobility and daily activities. However, traditional assistive devices for the visually impaired, such as canes and braille displays, have clear limitations, including the need for physical handling and the inability to detect obstacles at a distance. This project is designed to overcome these limitations by utilizing AI technology to create smart goggles. This device is designed as smart goggles with a fully customized PCB. It uses multi-camera depth estimation to analyze the surrounding environment and employs artificial intelligence to provide users with information about obstacles and objects in front of them. Also, the hand tracking and floor detection technology in BlindSense informs users of the existence and status of objects and surfaces they want to interact with and helps them follow braille blocks well. If the user aims to reach an indicated object, the system employs technologies such as SLAM (Simultaneous Localization and Mapping) and guides them to their destination without making contact with obstacles, using haptic feedback and sound. If abnormal movements or collisions are detected, a dedicated app provides personal safety features to help visually impaired people lead safer lives by sending emergency rescue requests and notification messages to their guardians. In conclusion, BlindSense utilizes six AI cameras to implement an obstacle detection system, ensuring safe navigation for the visually impaired. Through an emergency response system, it minimizes damage in the event of a collision, thereby ensuring their safety and autonomy.