

ABSTRACT

The design and implementation of an innovative assistive technology system tailored specifically for individuals living with tetraplegia, a condition characterized by paralysis of all four limbs and torso. The proposed system integrates cutting-edge technologies to facilitate intuitive wheelchair control through eye movement detection while incorporating smart monitoring functionalities to enhance user safety and well-being. The core of the system is a CNN-based eye movement detection module, meticulously trained to accurately interpret and track the user's eye movements in real-time.. This eye-driven control mechanism offers a natural and intuitive interface, empowering users to drive their wheelchair with ease and confidence. In addition to facilitating mobility, the system incorporates smart monitoring features to continuously assess the user's health status and environmental conditions. Utilizing sensors and intelligent algorithms, the wheelchair monitors vital signs, body posture, and potential obstacles in real-time. Through intuitive displays and alerts, users can stay informed about their health status and wheelchair operation, while caregivers can remotely monitor and respond to any issues that may arise. By harnessing the power of CNN-based eye tracking and smart sensing, the system aims to enhance user independence, safety, and quality of life, empowering individuals with tetraplegia to navigate their daily lives with dignity and confidence.