Development of a Voice - Controlled Intelligent Wheel Chair System Using Raspberry PI

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Abstract: *An intelligent wheelchair is designed to help physically disabled patients by using speech recognition system to control the movement of wheelchair in different directions. Automatic obstacle detection done using an ultrasonic sonar system which helps the patient to apply a momentary brake in case any obstacle suddenly comes in the way of the wheelchair and also vocally inform patient about obstacle distance from wheelchair.*

The intelligent wheelchair is designed in such a way that it can be controlled easily with minimum effort from the patient and also provides protection from obstacle collision if any voice mistake happens. The extra features like voice search and news listening mode is also available. The leading improvement is the low cost design and more features which allows more number of patients to use this wheelchair.

This project presents the development of a voice-controlled intelligent wheelchair system using Raspberry Pi, aimed at enhancing mobility for individuals with physical disabilities. The system interprets voice commands to control the wheelchair's movements—such as forward, backward, left, right, and stop—offering a hands-free navigation solution. It integrates speech recognition technology, motor drivers, and ultrasonic sensors to ensure safe and intelligent maneuvering. Obstacle detection is incorporated to prevent collisions, thereby ensuring user safety. The proposed system is cost-effective, user-friendly, and serves as a reliable assistive device, with potential for future enhancement through GPS, IOT, and machine learning integration.

Keywords: voice control; wheelchair; Raspberry Pi; speech recognition; motor control; assistive robotics

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