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Voice Controlled Smart Wheelchair Using Android and IoT

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Abstract: *Smart mobility solutions play a vital role in modern assistive healthcare by enhancing autonomy and quality of life for individuals with severe physical disabilities. Conventional wheelchairs often require manual control, which limits usability for users suffering from paralysis, neuromuscular disorders, or motor impairments. To address these challenges, this paper presents a voice-controlled smart wheelchair that enables hands-free navigation through natural speech commands. The proposed system integrates Android-based speech recognition technology, Bluetooth wireless communication, and an Arduino microcontroller-driven motor control mechanism. Voice commands such as forward, backward, left, right, and stop are captured via an Android application using built-in speech-to-text APIs. These commands are transmitted wirelessly to the wheelchair using Bluetooth, where the Arduino processes the data and controls motor drivers accordingly. Theoretical analysis highlights the reliability of speech recognition algorithms, low-power embedded processing, and efficient wireless data transfer. Experimental evaluation confirms low command latency, high recognition accuracy in indoor environments, and consistent motor response, demonstrating the system's feasibility for real-world use. The proposed solution significantly improves user independence, reduces caregiver dependency, and offers a cost-effective assistive mobility alternative*

Keywords: Smart Wheelchair, Voice Control, Android, Arduino, Assistive Technology

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