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Design and Implementation of Hand Gesture Controlled Wheelchair for Physically Challenged People

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Abstract: *Mobility issues can greatly impact the autonomy and overall well-being of people with disabilities. Traditional wheelchair control systems, such as manual or joystick-based methods, often demand substantial physical effort or fine motor control, making them unsuitable for individuals with severe impairments. This research introduces a hand gesture-controlled wheelchair using an accelerometer-based motion detection system to interpret hand gestures for directional control. The system combines Micro-Electro-Mechanical Systems (MEMS) sensors, embedded hardware, and wireless modules to ensure accurate and efficient operation. Leveraging real-time signal processing and rapid gesture recognition, the wheelchair achieves reliable and precise control while minimizing false detections and environmental disturbances. Experimental validation confirms the system's accuracy, robustness, and ease of use, offering an affordable and practical mobility solution for physically challenged individuals.*

Keywords: Hand Gesture-Controlled Navigation, Smart Wheelchair, MEMS Sensors, Human-Machine Interaction

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