

Voice-Controlled Pick and Place Robot

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Abstract: *This paper presents a detailed study on the design and development of a voice-controlled pick and place robot aimed at enabling physically challenged individuals to perform complex industrial tasks using voice commands. The system leverages modern embedded systems and wireless communication technologies to provide a hands-free, efficient, and intelligent robotic platform. The robot integrates the HC-05 Bluetooth module for receiving voice commands, ATmega16 microcontroller for command processing and control, and ESP32-CAM for visual recognition of objects. The implementation demonstrates a reliable, real-time system capable of object detection, pick-and-place operations, and dynamic navigation. The robot is designed to assist users in environments such as manufacturing units, warehouses, and offices, where it can significantly improve accessibility and autonomy for the differently abled. Experimental evaluations confirm high system accuracy and robustness in various ambient conditions, highlighting its suitability for real-world deployment.*

Keywords: Voice control, Pick and place robot, Bluetooth HC-05, ESP32-CAM, Assistive robotics, ATmega16, Industrial automation, Accessibility

