

ABSTRAK

Kemajuan teknologi mendorong kebutuhan akan perangkat medis yang efisien, termasuk troli medis otomatis untuk mendukung tugas perawat dan dokter di rumah sakit. Troli medis konvensional yang masih digerakkan manual sering menimbulkan ketidaknyamanan seperti kelelahan dan penurunan fokus. Untuk mengatasi hal tersebut, dirancang sebuah troli medis otomatis berbasis metode YOLO yang mampu mengikuti pergerakan pengguna secara *real-time*. Sistem dilengkapi *web camera* dan marker ArUco sebagai penanda visual pada pengguna yang memakai kaos merah. Mini PC Jetson Nano digunakan untuk menjalankan algoritma YOLO, sedangkan mikrokontroler ESP32 mengendalikan motor penggerak melalui sinyal koordinat yang dikirim via *Bluetooth*. Sensor jarak dan kamera digunakan untuk memastikan pergerakan troli tetap aman. Hasil pengujian menunjukkan bahwa sistem deteksi kaos merah dengan marker ArUco mencapai akurasi 100% dari 10 percobaan. Namun, pada pengujian pergerakan troli, hanya 9 dari 10 percobaan berhasil, sehingga akurasi sebesar 90%. Secara keseluruhan, akurasi sistem mencapai 93,84%. Nilai ini menunjukkan kinerja sistem sudah cukup tinggi, meskipun masih perlu penyempurnaan agar mendekati standar akurasi ideal $\geq 95\%$.

Kata kunci: YOLO, ESP32, Jetson Nano, *Web Camera*, Marker ArUco, *Object Tracking*.

ABSTRACT

Technological advances are driving the need for efficient medical devices, including automated medical trolleys to support the work of nurses and doctors in hospitals. Conventional, manually operated medical trolleys often cause discomfort such as fatigue and decreased focus. To address this, an automated medical trolley based on the YOLO method was designed that can track user movements in real time. The system is equipped with a web camera and an ArUco marker as a visual marker for users wearing red shirts. A Jetson Nano mini PC is used to run the YOLO algorithm, while an ESP32 microcontroller controls the drive motors via coordinate signals sent via Bluetooth. Proximity sensors and a camera are used to ensure the trolley's movement remains safe. Test results showed that the red shirt detection system with the ArUco marker achieved 100% accuracy out of 10 trials. However, in the trolley movement test, only 9 out of 10 trials were successful, resulting in a 90% accuracy rate. Overall, the system achieved 93.84% accuracy. This value indicates that the system's performance is quite high, although it still needs improvement to approach the ideal accuracy standard of $\geq 95\%$.

Keywords: YOLO, ESP32, Jetson Nano, Web Camera, ArUco Marker, Object Tracking.