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Human Following and Auto Billing Load Checking Smart Shopping Trolley

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Abstract: *This paper presents the design and implementation of an intelligent shopping trolley system aimed at enhancing the retail experience through automation and smart technology integration. The system leverages an ESP32 microcontroller as the central unit to control and coordinate various sensors and modules, including IR sensors for user tracking, an ultrasonic sensor for distance measurement, an RFID reader for automatic item identification and billing, and a load cell for real-time weight monitoring. DC gear motors, controlled via a motor driver, enable the trolley to autonomously follow the shopper, while a buzzer and LCD display provide safety alerts and purchase feedback, respectively. The system ensures seamless navigation, efficient checkout, and overload prevention, significantly reducing the need for manual intervention. This smart trolley architecture improves user convenience, operational efficiency, and overall shopping experience in modern retail environments.*

Keywords: Smart shopping trolley, ESP32 microcontroller, RFID billing, autonomous navigation, load monitoring

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