ABSTRACT

An effective and efficient parking management system is an important requirement in various places such as shopping centers, offices and other public facilities. With the increasing number of vehicles, difficulty in managing parking becomes a significant problem. This research focuses on developing an automated car classification system to improve the efficiency and safety of parking management, but the main problem faced is crowded and disorganized parking, which makes shopping center customers uncomfortable and difficult to find parking spaces.

The solution offered in this study involves the use of Internet of Things (IoT) technology and machine learning to automate car classification. The system employs cameras connected to Raspberry Pi to capture images of cars entering the parking area. These images are then processed using a machine learning model trained to classify cars into three categories: A, B, and C. This implementation aims to reduce classification errors and improve the efficiency of parking management.

Test results show that the system has a classification accuracy of 70.7% in laboratory testing and 68.4% in field testing. The highest precision was found in class B (1) and the highest recall was in class C (1). Despite these limitations, car classification automation has great potential for application in parking management. Further development will focus on increasing system flexibility and performance.

Keywords: Parking Management, Automation, IoT, Machine Learning, Car Classification