

## **ABSTRACT**

In today's digital era, technological developments have changed various aspects of human life, including the way we shop. Supermarkets and other retail stores are constantly looking for ways to improve customer experience and operational efficiency. One of the main problems faced is long queues at the checkout, which often causes inconvenience to customers and limits the overall efficiency of the store.

For development in the retail world, there are several solutions that have been considered in this Capstone design by comparing several solutions proposed through system assessment so that one solution that presents an innovation is selected, namely Smart Shopping Cart based on object recognition and motion detection which aims to improve the efficiency and convenience of shopping in retail stores. The system combines object recognition and motion detection technology in a single algorithm that can automatically recognize retail products that are inserted or removed from the shopping cart by customers. This system integrates information technology into the shopping cart to make the shopping process efficient, convenient, and interactive for customers. In addition, this Smart Shopping Cart is connected to the cloud which is supported by website technology and mobile applications that can be used by users during shopping activities.

Based on the tests carried out, Smart Shopping Cart has a good performance. the best mAP obtained for the entire class was 98.7% in the 100th epoch training process. Smart Shopping Cart received positive ratings from users with an average SUS score of 80. The Smart Shopping Cart successfully passed the specified test scenarios, demonstrated optimal performance and met the needs and expectations of the users. However, there are obstacles to the performance of object detection and motion detection if the lighting intensity in the environment around the shopping cart is <100-1000 Lux.

Keywords: Smart Shopping Cart, Object Recognition, Motion Detection, Shopping Efficiency, Customer Experience.