# Smart Shopping Cart

DATA TRANSMISSION USING RFID SYSTEM ON SMART SHOPPING CARTS FOR CHECKOUT PROCESS EFFICIENCY IN SUPERMARKETS AT INDONESIA

## Background

A lengthy queue upon doing checkout in supermarkets is an unpleasant situation for customers and has a chance of significantly decreasing their loyalty level. According to the survey done by Box Technologies and Intel, 86% respondents avoids a store that requires them to queue starting from 5~10 minutes. Moreover, 70% of them states that they wouldn't be returning once aware that they would be required to queue in the said store upon doing checkout. The cause of the lengthy queue was discovered to be the manual scanning of barcodes during checkout as it has to be done one by one as well as ensuring it is within the line of sight. Checkout efficiency is necessary because the time used for queuing can be used to do other routines and activities in life. In the development of a more optimal supermarket service, the IoT concept using RFID system is the solution believed to be most cost-efficient and most easily implemented compared to other IoT contenders such as UWB RTLS and Computer Vision.

## Purpose

1. Speed up checkout process by eliminating manual barcode scans so queues at the cashier would be reduced.

2. Develop an accurate, realtime monitoring self-scanning process for items during shopping.

## Benefits

1. Reduce queues to shorten queues.
2. Retain or improve customers' loyalty level to the supermarkets.
3. Develop a more efficient shopping system that doesn't require changes in a pre-existing shopping flow.

## Tools

Arduino Uno is fitted with 2 other modules that enable transmission of data yielded by RFID tag, to be sent to the server and database, and provided to the customers' smartphone application and webapp for the cashier.

## Results and Conclusion

Customers may shop using a shopping cart that is fitted with RFID reader with the base of Arduino, which enables them to scan an RFID tag attached on the product then send the coresspond-ing item information with the help of ESP8266Mod module that has the WiFi capability to connect to the supermarket's network, allowing the server to receive information about the item that was placed in the cart after scanning. Provided the information, the server that is connected to the database developed using PostgreSQL will ensure that the list of items in the cart is accurate by doing realtime synchronization to the database. The server also synchronizes the data shown in the smartphone application in the hands of the customers to the data in the database. This REST service in the server is developed using Node.js.

On the application that is used as an interface while shopping, customers may see their list of scanned items, modify to delete items if ever any way removed, view the price of the item as well as the subtotal of their shopping list that is updated realtime by the server that is interconnected with the database in the supermarket's network. Checkout is done by the customer via the application by pressing the checkout button and showing a generated code to the cashier to finish the transaction after doing payment.

Smart Shopping Cart enables self-scanning that eliminated barcode scanning in the cashier during checkout, achieving efficiency starting from 14.28% and can be developed further.

BINUS UNIVERSITY ONLINE LEARNING

SCHOOL OF COMPUTER SCIENCE

Advisor:
Hanry Ham, S.Kom., M.Eng.

Authors:
Martinus — NIM: 2001613881
Metta Saridewi Wahab — NIM: 2001613894
Yudi — NIM: 2001614000