SMART CONVENIENCE STORE

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INTRODUCTION

Smart Convenience Store is developed to increase automation systems in convenience stores to overcome the efficiency of a convenience store. This product will help convenience store owners manage the store interm of monitoring and buying in their store. There are three main features in the system which are product classification, detection and recognition, real-time people counting for security purposes, and price calculation and checkout.

PROBLEM STATEMENT

Manual product scanning can take a long time, and customers may have to wait in a long line, particularly during peak hours.

Customers with allergies have a difficult time going through the product ingredients because they are not highlighted on the packaging. During business hours, the administrator must keep an eye on the store's CCTV.

OBJECTIVES

Manual product scanning may take a quite long time and customers need to wait in a long queue especially during peak hour.

Customers with allergy have a hard time to go through the product ingredients as it not highlighted on the packaging.

Admin must keep an eye on the store's cctv during operation time.

MODULE DEVELOPED

PRODUCT DETECTION AND RECOGNITION MODULE

Customer will only need to put all their designated area and a camera will detect and recognise them at once.

AI COOP: SMART CONVENIENCE STORE

data training and model testing, YOLOv5, Python.

CALCULATION AND CHECKOUT MODULE

AI COOP: SMART CONVENIENCE STORE
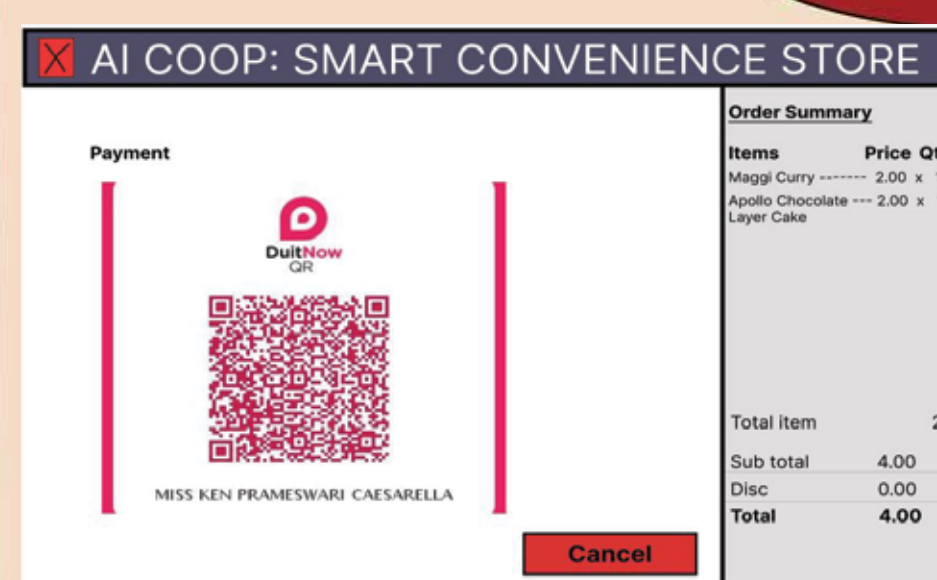
The price of the accumulate product will be add up and the system will print out the receipt.

database connection, Python, tkinter.

PRODUCT ALLERGEN MODULE

PRODUCT INFORMATION SCANNER

Customer can easily identify allergen contain in their desired product or its price using the barcode scanner.

Android Studio, Java, Firebase Database.
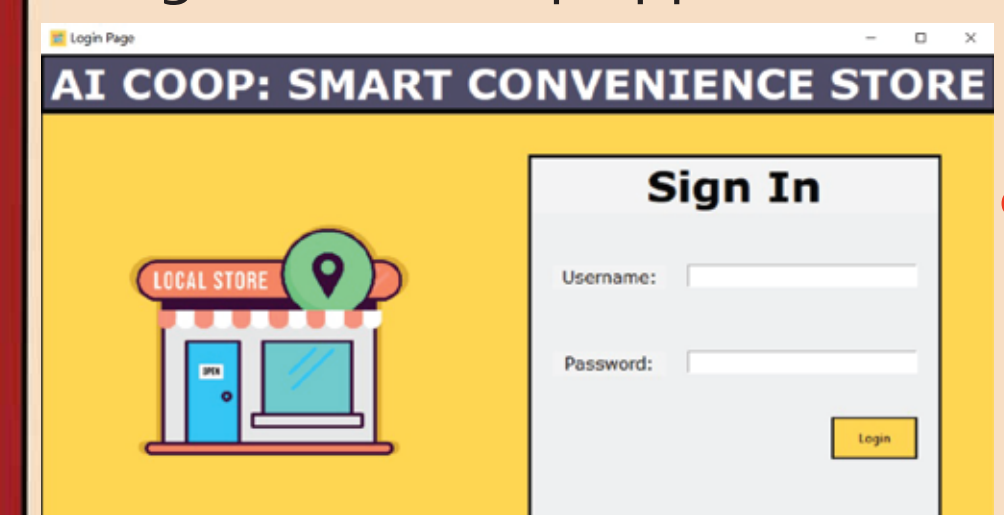
REAL TIME PEOPLE COUNTING AND SECURITY MODULE

The system will count number of people entering or exiting as well as keeping update on the people who are still inside the store.

AI COOP: SMART CONVENIENCE STORE

Status: Waiting Total people inside:
People Count: 0   Total People Inside: 0   Close People Counter

database connection, Python, tkinter, MobileNetSSD.

DESKTOP MODULE

Login for desktop application.

AI COOP: SMART CONVENIENCE STORE

Sign In
Username:
Password:
Login

database connection, Python, tkinter.

METHODOLOGY ARTIFICIAL INTELLIGENCE TECHNIQUE

Allergen Scanner and Price Checker

Mobile vision API, google android dependecies, barcodeDetector package is used to integrate barcodes.

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Real-Time database — Firebase

Big Bang Grilled Seaweed (50g)

Product Recognition and Detection

YOLOv5 model to recognise and detect the product using camera.

Real Time People Counting and Security

MobileNetSSD

Object detection model that find the output bounding box from the input using forward convolutional neural network to classify given object based on predefined classes.

RESULTS ACCURACY OF ARTIFICIAL INTELLIGENCE TECHNIQUE

YOLOv5

mAP_0.5
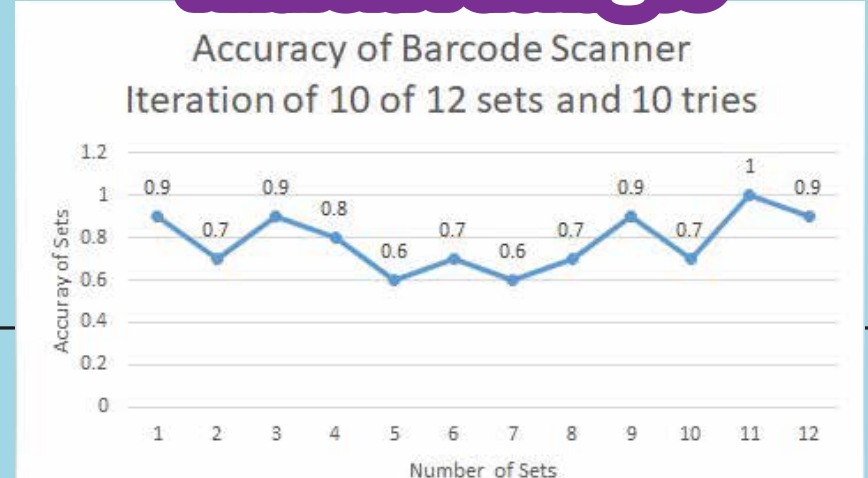tag: metrics/mAP_0.5
0.994
0.99
0.986
0.982

mAP refers to the comparision of the ground-truth bounding box to the detected box and returns a score. The higher the score, the more accurate the model is in its detections.

MobileNetSSD

Number of successful detection out of 10 tries per run
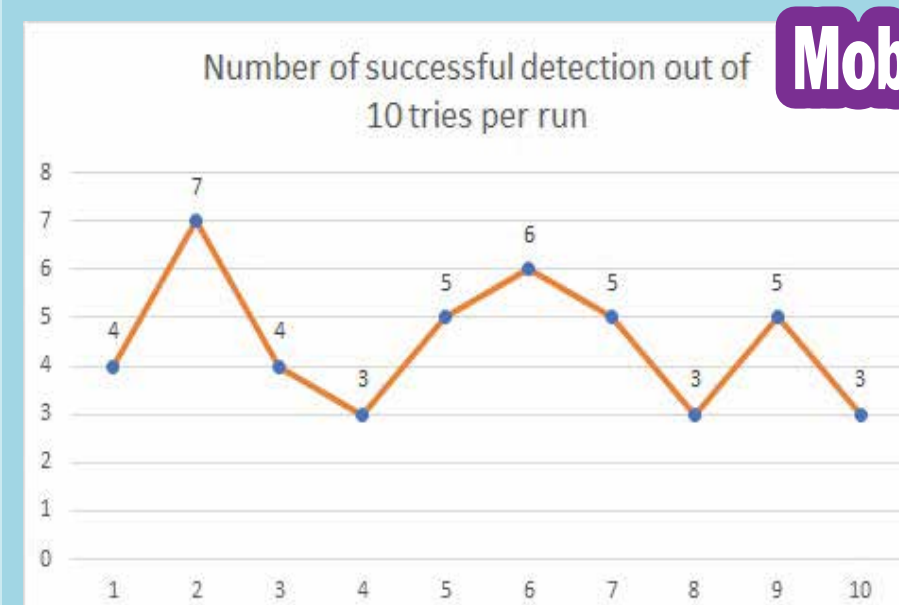
The accuracy of People Counting Module using MobileNetSSD is 0.45.

Android Packages

Accuracy of Barcode Scanner Iteration of 10 of 12 sets and 10 tries

The accuray for the detection using Barcode Scanner with the help of Android Studio pre trained packages is 0.78.

CONCLUSION

Smart Convenience Store facilitates store management and customer shopping experience. This store will optimize the use of staff and in the recent trend which young generation more prefer go to marts like CU and Family mart. This Smart Convenience Store is suitable for convenience stores of a co-operative for a company, university, and 24 hours mart. For future planning upon entering, the customer scan QR codes with their phones, and AI does the rest. Cameras track customer movement down the aisles and weight sensors built into shelves do the same for store products. Just grab what they want, drop it into their backpack, and head home.

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