# KJSIEIT-ETRX-BE-VIII-2020-21 PROJECT PRESENTATION

## Advanced Supermarket Management and Smart Stock Bot System

Inziya Dossa
Hitaishi Joshi
Rohit Mehta
Rahul Yadav

### Abstract

There are a lot of supermarkets booming in the food retail sector who aim to provide a variety of
food products to their customers.

Data can be gathered
dynamically and used to analyze the hidden trends of the customer purchase and to upgrade the
business processes, thus overall bringing good profit.

Real time services can be beneficial to make
spontaneous decisions to efficiently manage and maintain the processes with lesser human
involvement.

Thus technology and data can go hand in hand to fulfill all the business goals and stay ahead of competitors.

### Implementations

The project is implemented using Azure IoT Edge service, which will host ML models and other processes to take the incoming image streams of data and normalize them.

It then runs ML algorithms to check the shelves. ROS and its algorithms are used for robot locomotion

### Methodology

- Robot detects when the items are taken off by the customers beyond a threshold. If so, it moves towards the shelf avoiding obstacles and people along the way to the warehouse
- It stocks up items from the warehouse and moves to the shelves to refill them.
- Data from the billing database and shelf stock monitoring model are taken.
- Various analyses regarding customer purchases and management improvements are made.

### Components

- Azure IoT Edge and Azure Cloud
- Robot Operating System (ROS)
- Power BI
- Raspberry Pi 4
- Model B with 2
- GB Ram
- Cytron Driver
- HAT-MDD10
- Raspberry Pi
- Camera NOIR V2
- Planetary Geared
- motors60mm Double
- Aluminum Omni
- Wheel

### Working

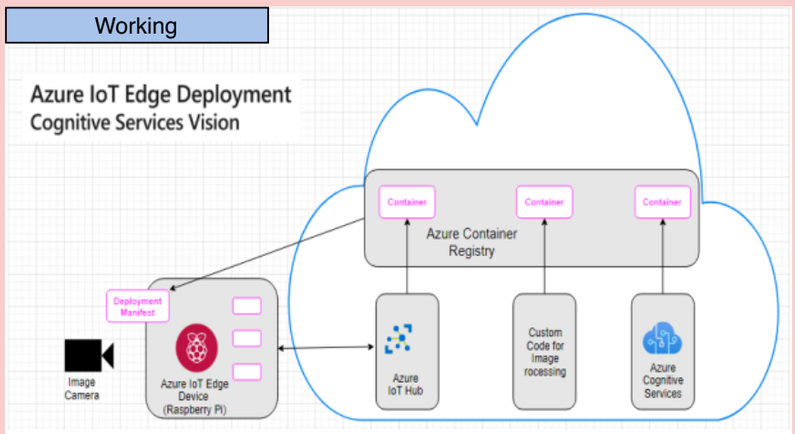


*Figure 2: Azure Image Processing Model*

### Introduction

This project deals with product sale analysis, business-related decisions, stall reloading which is executed by an automatic bot.

This project is designed with a goal of making the existing system more informative, reliable, fast and easier.

The bot deals with the automated refilling of the shelves while the same data can be used for sales analysis.

### Conclusion

The two biggest challenges of stock refilling and management of customer churn that have prevailed in the retail supermarket industry are taken into consideration and an automated and reliable solution is designed.

### Result

Capabilities of the solution include a robot which helps the workers in their task by refilling the stock shelf.

The robot will be activated by a prompt given to it by the smart camera when it detects that the shelf items need to be refilled.

Data of the customer purchases and shelf status will be used to find out customer purchase trends and areas of market potential.

In this way the stock can also be refilled according to the customer needs and thus management of the goods will become easier.

Customer purchase data will also help us in identifying which type of products are more in demand according to seasonal changes and during different times of year.

### Objectives

- Assist the supermarkets in providing a better customer experience.
- Help the supermarkets in analyzing customer purchasing trends.
- Find hidden trends for supermarkets to make strategic business decisions
- Provide solutions to manage the crowd at the store billing counter.
- Use of technology to assist the workers in their routine in the form of a robot.
- Real time monitoring of the stock shelf to alert the workers of quick and timely stock refill.

### References

[1] Pankaj Wajire Department of Computer Engineering & IT College of Engineering Pune(COEP) Pune, Savita Angadi NIAS, IISc Bangalore, Lokesh Nagar IIT Bombay. “ImageClassification for Retail.” 2020 International Conference on Industry 4.0 Technology (I4Tech)Vishwakarma Institute of Technology, Pune, India.

[2] Frank M. Thiesing, Ulrich Middelberg, Oliver Vornberger Department ofMathematics/Computer Science University of Osnabruck. “Short Term Prediction of Sales inSupermarkets.” Proceedings ICNN'95, 27 Nov - 1 Dec 1995, Perth, WA, Vol 2, pp. 1028-1031,IEEE 1995.

[3] Yoann Kubera, Philippe Mathieu, S´ebastien Picault LIFL, University Lille 1 — 59655Villeneuve d’Ascq, France. “An Interaction-Oriented Model of Customer Behavior for theSimulation of Supermarkets.” 2010 IEEE/WIC/ACM International Conference on WebIntelligence and Intelligent Agent Technology.

[4] Manjuprasad Shetty, Vishwasa Nawada, Kirthan Pai, Ranjan Kumar H NMAM Institute oftechnology, NITTE4 Asst. Professor, Dept. of Computer Science & Engineering, NMAM Instituteof technology, NITTE, Karnataka, India.

[5] Rising Odegua Department of Computer Science Ambrose Alli University Ekpoma, Edo state,Nigeria. “Applied Machine Learning for Supermarket Sales Prediction”.