**Smart Trolley System using RFID**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF

**BACHELOR OF ENGINEERING**

IN

**INFORMATION TECHNOLOGY**

BY

**Swaraj Jinagouda**

**Chris Gonsalves**

**Pratik Bhadane**

UNDER THE GUIDANCE OF

Fr. Dr. John Rose S.J

(Department of Information Technology)



**INFORMATION TECHNOLOGY DEPARTMENT**

**XAVIER INSTITUTE OF ENGINEERING**

**UNIVERSITY OF MUMBAI**

**2022 – 2023**

**Institute Vision**

To nurture the joy of excellence in a world of high technology.

**Institute Mission**

To strive to match global standards in technical education by interaction with industry, continuous staff training and development of quality of life.

**Department Vision**

To nurture the joy of excellence in the world of Information Technology.

**Department Mission**

M1: To develop the critical thinking ability of students by promoting interactive learning.

M2: To bridge the gap between industry and institute and give students the kind of exposure to the industrial requirements in current trends of developing technology.

M3: To promote learning and research methods and make them excel in the field of their study by becoming responsible while dealing with social concerns.

M4: To encourage students to pursue higher studies and provide them awareness on various career opportunities that are available.

**Program Education Objective (PEO)**

**After 3-5 years of graduation, Information Technology Engineering Graduates will be**

PEO1: employed as IT professionals, and shall engage themselves in learning, understanding, and applying newly developed ideas and technologies as their field of study evolves.

PEO2: competent to use the learnt knowledge successfully in the diversified sectors of industry, academia, research and work effectively in a multidisciplinary environment.

PEO3: aware of professional ethics and create a sense of social responsibility in building the nation/society.

**Program Specific outcome (PSO)**

PSO1: Demonstrate the ability to analyze and visualize the business domain and formulate appropriate information technology solutions.

PSO2: Apply various technologies like Intelligent Systems, Data Mining, IOT, Cloud and Analytics, Computer and Network Security etc. for innovative solutions to real time problems.

**Program Outcomes (PO)**

Engineering Graduates will be able to

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

**XAVIER INSTITUTE OF ENGINEERING**

**MAHIM CAUSEWAY, MAHIM, MUMBAI - 400016.**

**CERTIFICATE**

This to certify that

Swaraj Jinagouda (27)

Chris Gonsalves (21)

Pratik Bhadane (06)

Have satisfactorily carried out the MINI-PROJECT work titled “**Smart Trolley System using RFID”** in partial fulfillment of the degree of Bachelor of Engineering as laid down by the University of Mumbai during the academic year 2022-2023.

**Internal Examiner / Guide External Examiner**

**Date:**

**Place: MAHIM, MUMBAI**

**DECLARATION**

I declare that this written submission represents my ideas in my own words and where others’ ideas or words have been included, I have adequately cited and referenced the original sources.

I also declare that I have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which thus have not been properly cited or from whom proper permission have not been taken when needed.

Swaraj Jinagouda (27) -------------------------------

Chris Gonsalves (21) -------------------------------

Pratik Bhadane (06) -------------------------------

**Date:**

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**Acknowledgement**

We would like to thank Fr. Dr. John Rose S.J (Director of XIE) for providing us with such an environment so as to achieve goals of our project and supporting us constantly.

We express our sincere gratitude to our Honorable Principal **Dr. Y. D. Venkatesh** for facilities and encouragement provided to us.

We would like to place on record our deep sense of gratitude to Prof. Meena Ugale, Head of Dept Of Information Technology, Xavier Institute of Engineering, Mahim, Mumbai, for her generous guidance help and useful suggestions.

With deep sense of gratitude, we acknowledge the guidance of our project guide **Fr. Dr. John Rose S.J**. The time-to-time assistance and encouragement by her has played an important role in the development of our project.

We would also like to thank our entire Information Technology staffs who have willingly cooperated with us in resolving our queries and providing us all the required facilities on time.

Swaraj Jinagouda -----------------------------

Chris Gonsalves -----------------------------

Pratik Bhandane -----------------------------

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**CLASS**: BE-IT **SEM**: VII

**COURSE CODE**: ITL 702 **COURSE NAME**: Internet of Everything Lab **AY**: 2022-2023 **SUB IN-CHARGE :** Fr. Dr. John Rose S J

**Lab Objectives:**

The Lab experiments aims:

1. To learn different types of sensors.
2. To design the problem solution as per the requirement analysis done using sensors.
3. To study the basic concepts of programming/sensors/ emulators.
4. To design and implement the mini project intended solution for project based learning.
5. To build and test the mini project successfully.
6. To improve the team building, communication and management skills of the students.

**Bloom’s Taxonomy Levels:**

|  |  |
| --- | --- |
| **1 = Remembering,**  **2= Understanding,**  **3 = Applying,** | **4 = Analyzing,**  **5 = Evaluating,**  **6 = Creating** |

**Lab Outcomes:**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Lab Outcomes** | **Bloom’s Taxonomy** |
| On successful completion, of course, learner/student will be able to: | | |
| 1 | Identify the requirements for the real-world problems. | L1,L2 |
| 2 | Conduct a survey of several available literatures in the preferred field of study. | L1,L2 |
| 3 | Study and enhance software/ hardware skills. | L1,L2 |
| 4 | Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing. | L1,L2,L3 |
| 5 | To report and present the findings of the study conducted in the preferred domain. | L1,L2,L3,L4 |
| 6 | Demonstrate an ability to work in teams and manage the conduct of the research study | L1,L2,L3,L4 |

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**Group No**: 18

**Class:** BE IT **Sem:** VII **A.Y:** 2022-2023

**Course Name:** Internet of Everything Lab

**Name & Roll No:**

1) Swaraj Jinagouda – 27

2) Chris Gonsalves – 21

3) Pratik Bhadane - 06

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mini Project** | | | | | | |
| **LO1: Identify the requirements for the real world problems.**  **LO2: Conduct a survey of several available literatures in the preferred field of study.**  **LO3: Study and enhance software/ hardware skills.**  **LO4: Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.**  **LO5: To report and present the findings of the study conducted in the preferred domain.**  **LO6: Demonstrate an ability to work in teams and manage the conduct of the research study** | | | | | | |
| **Rubrics For Mini Project Work** | | | | | | |
| **Roll No.** | **Name of the Student** | **Problem Statement (05)** | **Creativity &**  **Quality of Work done (04)** | **Punctuality &**  **lab ethics (02)** | **Performance/ Presentation (04)** | **Total (15)** |
| 27 | Swaraj Jinagouda |  |  |  |  |  |
| 21 | Chris Gonsalves |  |  |  |  |  |
| 06 | Pratik Bhadane |  |  |  |  |  |

Fr. Dr. John Rose S J

SUB IN-CHARGE

**Lab Outcomes:**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Lab Outcomes** | **Bloom’s Taxonomy** |
| On successful completion, of course, learner/student will be able to: | | |
| 1 | Identify the requirements for the real-world problems. | L1,L2 |
| 2 | Conduct a survey of several available literatures in the preferred field of study. | L1,L2 |
| 3 | Study and enhance software/ hardware skills. | L1,L2 |
| 4 | Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing. | L1,L2,L3 |
| 5 | To report and present the findings of the study conducted in the preferred domain. | L1,L2,L3,L4 |
| 6 | Demonstrate an ability to work in teams and manage the conduct of the research study | L1,L2,L3,L4 |

# LO-PO-PSO MAPPING

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| LO1 | 3 | 3 | 2 | 3 | - | - | - | 3 | - | 2 | - | - |  |  |
| LO2 | - | - | - | 3 | - | 2 | - | 3 | 2 | 3 | - | - |  |  |
| LO3 | 3 | - | - | 2 | 3 | - | - | 3 | - | - | - | - |  |  |
| LO4 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 3 |  |  |
| LO5 | 3 | - | - | - | - | - | - | 3 | 3 | 3 | 3 | 2 |  |  |
| LO6 | 3 |  |  | - | - | - | - | 3 | 2 | 3 | 2 | 2 |  |  |

**Smart Trolley System using RFID - PO/PSO Mapping**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| **Smart Trolley System using RFID** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**XAVIER INSTITUTE OF ENGINEERING**

**Department of Information Technology**

Class: BE IT Sem: VII A.Y :2022-2023

Course Name: Internet of Everything Lab

Group No. 18

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chapter 3: Review of Literature** | | | | | | |
| ITL702.2.Conduct a survey of several available literatures in the preferred field of study. | | | | | | |
| **Rubrics for Laboratory work** | | | | | | |
| **Roll No.** | **Name of the Student** | **Knowledge / Understanding (5)** | **Contents (4)** | **Presentation (4)** | **Punctuality & Lab ethics (2)** | **Total (15)** |
| 27 | Swaraj Jinagouda |  |  |  |  |  |
| 21 | Chris Gonsalves |  |  |  |  |  |
| 06 | Pratik Bhadane |  |  |  |  |  |
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**CHAPTER 3**

**REVIEW OF LITERARURE**

In **[1] (2017)**, the authors talk about a smart trolley with cutting-edge RFID is suggested to help customers as they shop. It offers a number of advantages, including enabling users to locate items quickly without asking a salesperson for help finding them, informing customers of the total cost of goods purchased, and enabling customers to manage their spending while shopping. The major goal of this study is to determine the findings of a user survey on a smart trolley with an inventive RFID implementation. The research examined three factors: time use, cost management, and product design. Customers chose these components as indicators to emphasise the significance of implementing smart trolleys. Budget control had the most positive consumer comments, according to the mean. This is because the new smart trolley might help customers buy expenses as they shop, improving their cash flow.

In **[2] (2018),** the author talks about the objective which is to create technology that can satisfy all client requirements while streamlining the billing procedure and saving the customer time. It is suggested that customers process things themselves and bill them in the trolley rather than spending a lot of time in line. Following a brief scan, the clients must put the items to the cart; once they have, the total will be shown. The customer can also sign in to the app, which will show a list of every item added along with its quantity. After that, the client can utilise the app to make a digital payment.

In **[3] (2019),** the authors talk about reducing human effort, eliminating the line, and shortening the time required for billing keeping these factors as their key design goals. The prototype is made up of elements including RFID tags, which are used to identify products, RFID readers, which scan products as they are placed in a cart and display the results on an LCD screen. Data is therefore sent into the server at the billing counter.

In **[4] (2020)**, the authors suggest to create a smart trolley that can handle shopping and billing. By doing this, the consumer can enter the store without stopping, load up the smart trolley with their purchases, and then leave. He receives the electronic bill in the mail and may view the specifics of his transaction on the store's website. They used an Arduino board, an RFID reader, an RFID tag, an LCD display, an ESP8266 Wi-Fi module, a database manager, and a website to retain customer and product information that can be viewed by the admin from anywhere in the world. The trolley can communicate with the global network using this IOT-based system.

In **[5] (2020),** the authors have made a Smart Shopping Cart which is built on the Internet of Things (IoT). It includes RFID sensors, an Arduino microcontroller, a Bluetooth module, and a mobile application. Wireless connection is necessary for RFID sensors. Each product has an RFID tag attached to it, and an RFID reader that efficiently receives the information from the tag is the other component. Each product's information then appears on the mobile application after this. The consumer can quickly customize the shopping list via the mobile application. The server is then wirelessly sent the shopping information, and billing is generated automatically. This experimental prototype aims to do away with lengthy shopping processes and service quality problems. Future commercial scale testing and implementation of the suggested technology are easily doable under realistic conditions.

In **[6] (2021),** the authors’ major goal is to make customers' buying experiences as simple as possible. The goal is to reduce the amount of time spent waiting in the billing area. So, in order to create a smart trolley, they designed an embedded system that combines RFID and IOT. The system will be installed in every trolley that has an RFID reader as part of the implementation. The mall's merchandise will all have RFID tags on them. The price of those items will be remembered after the code mimicked in the trolley is recognized. The invoicing will be completed in the trolley itself and displayed on LCD as we arrange the products. Finally, utilising IOT wireless modules at the billing counter, the whole bill data will be sent to the PC. The concept of a smart trolley saves time and labour. IOT will effectively store all of the data. The use of RFID in the trolley will be inexpensive and very effective in place of a bar code scanner in the billing portion.

In **[7] (2022),** the authors talk about the IoT-based smart trolley which has a sophisticated billing system and is equipped with an RFID tag, LED display, barcode scanner, and Raspberry Pi. The LED display shows a list of the items and their prices. Online payment options are available. The consumer may shop efficiently and generate revenue for the merchants. Shopping using an IoT-based trolley is incredibly simple and secure because to Bluetooth connections to mobile applications that display purchases on the phone's screen and let users pay bills directly from the app.

**[8]** describes how the authors created a smart shopping cart with characteristics for facial recognition and information retrieval. In order to provide a comfortable shopping experience, they have also implemented an automatic invoicing system to prevent lines at checkouts. The Internet of Things has also been integrated into the cart to create a clever system that helps the customers.

In **[9]**, the authors were successful in building a low-cost, clever, and fully working system to make customers' shopping experiences convenient and comfortable. Due to its effective tracking capabilities and security characteristics, they used RFID technology. The system implemented functionality including setting a budget, adding and removing products, recommending products, and adding and subtracting the cost of the product based on whether it was in the basket or not.

In **[10],** the authors created a smart shopping cart by adding RFID readers to a shopping cart and utilising ZigBee wireless technology to connect them to a central server. By scanning the merchandise, it enabled automatic bill production, which was then sent to a central department for billing. This system's limitation to only accepting payments in person over the counter hurt user experience.

In **[11]**, the authors developed a concept model that used ZigBee and RFID tags attached to the products to transmit bills to a central server. Again, the problem is that there aren't any other ways to pay the bill besides the conventional counter payments. The customer waits in lines since the worker is supposed to collect the bill as soon as they are recognized.

**[12]** describes the notion of an enhanced shopping trolley with RFID readers on each cart and RFID tags on each product. After the goods has been scanned, all relevant information about the product is shown to the customer on the LCD screen. The intention was to assist customers in avoiding lengthy lines, but it also presented the risk of theft and crashes.

In **[13],** the authors succeeded by establishing a centralised system for automatic billing. A Product Identification Device (PID) comprising an RFID reader, LCD, EEPROM, microcontroller, and ZigBee module was installed in every trolley. The ability to go cashless provided by this technology was its greatest benefit, since it effectively eliminated the need for lines.

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Class: BE IT Sem: VII A.Y :2022-2023

Course Name: Internet of Everything Lab

Group No.

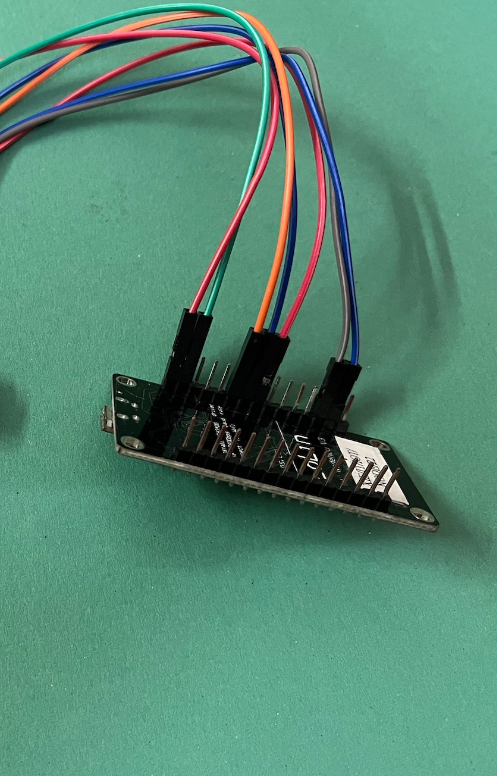
|  |  |  |  |  |  |  |
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| **Chapter 4: Implementation Methodology** | | | | | | |
| LO1: Identify the requirements for the real world problems.  LO2: Conduct a survey of several available literatures in the preferred field of study.  LO3: Study and enhance software/ hardware skills.  LO4: Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.  LO5: To report and present the findings of the study conducted in the preferred domain.  LO6: Demonstrate an ability to work in teams and manage the conduct of the research study | | | | | | |
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**CHAPTER 4**

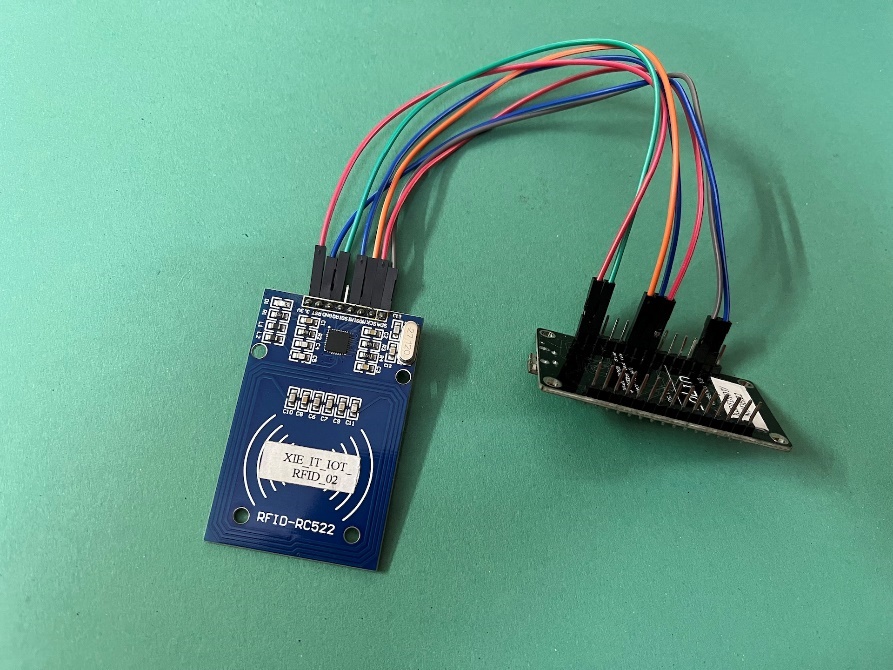
**Implementation Methodology**

4.1 Design

Step 1: Connect all the pins of NodeMCU with jumper wires



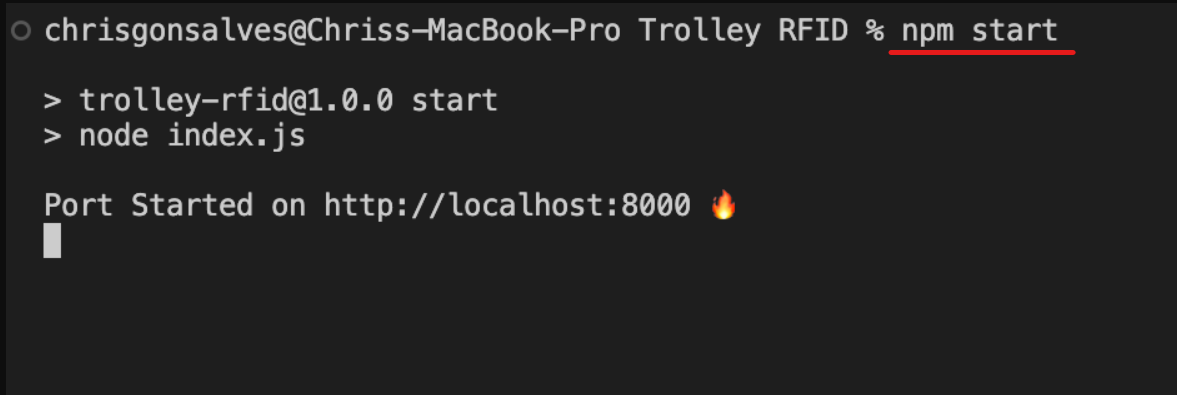
Step 2: Connect these jumper wires to the pins of RFID Reader correctly and in an orderly manner



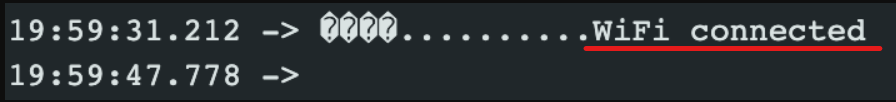
Step 3: To connect to a network, start the **server URL** of the NodeJS



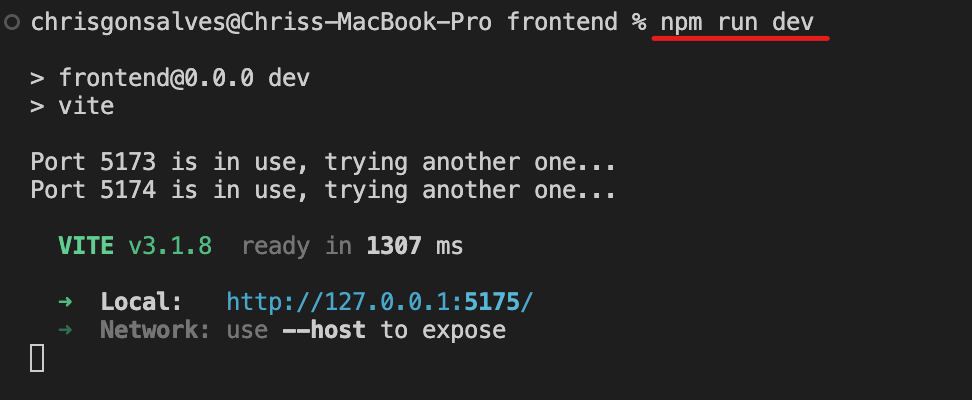
Step 3.1: To start the backend, type ‘**npm start**’



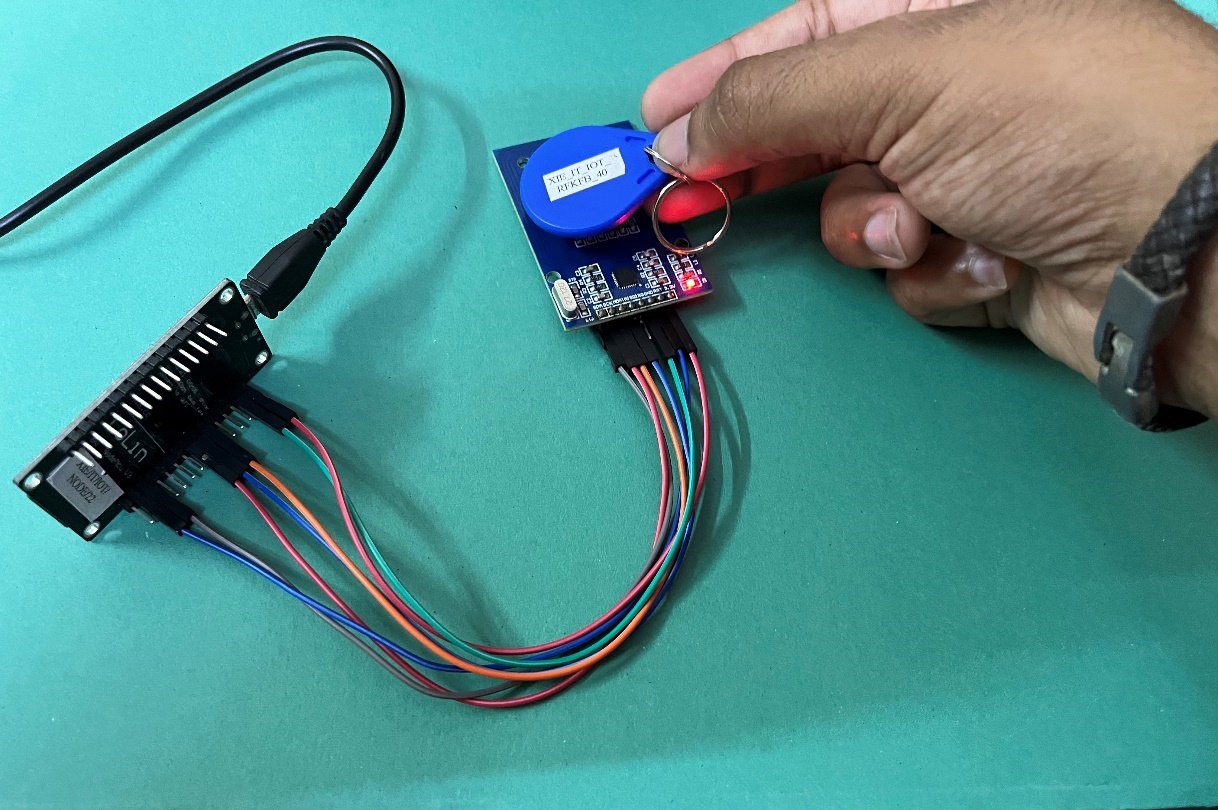
Step 4: Wait for the NodeMCU to connect to the network



Step 5: To start the frontend/website, type ‘**npm run dev**’



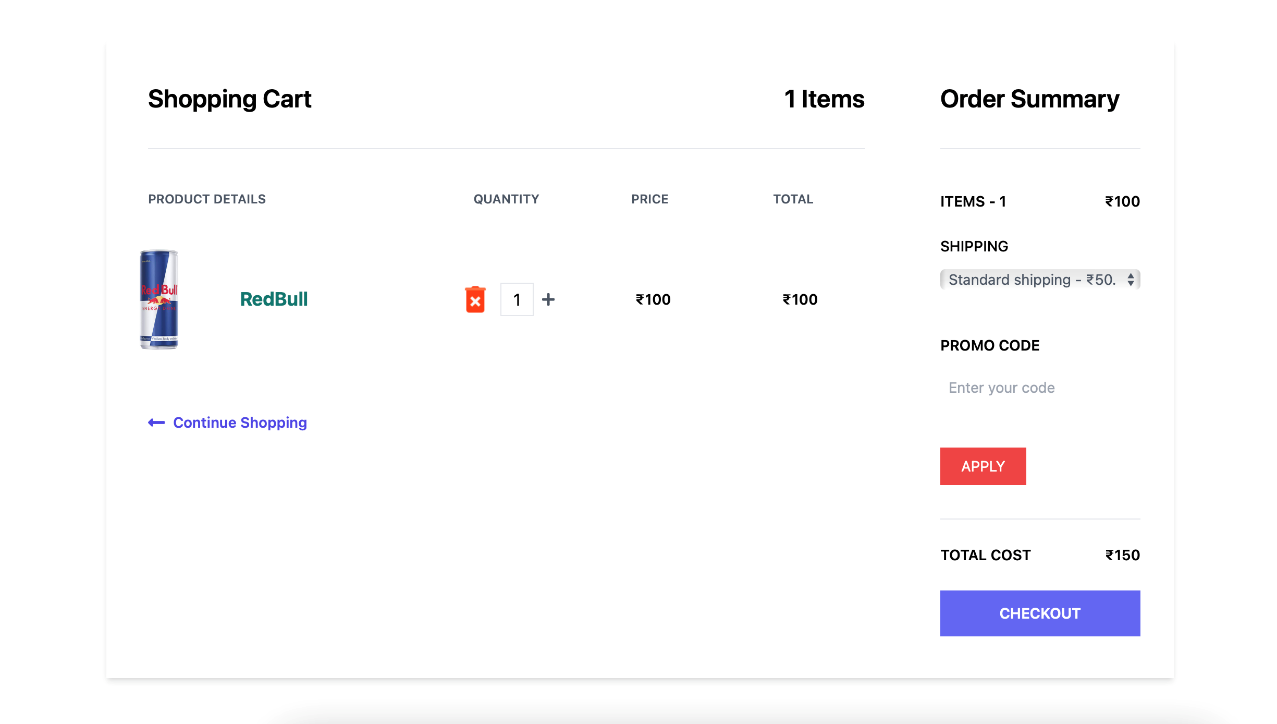
Step 6: Scan the RFID Tag with RFID Reader



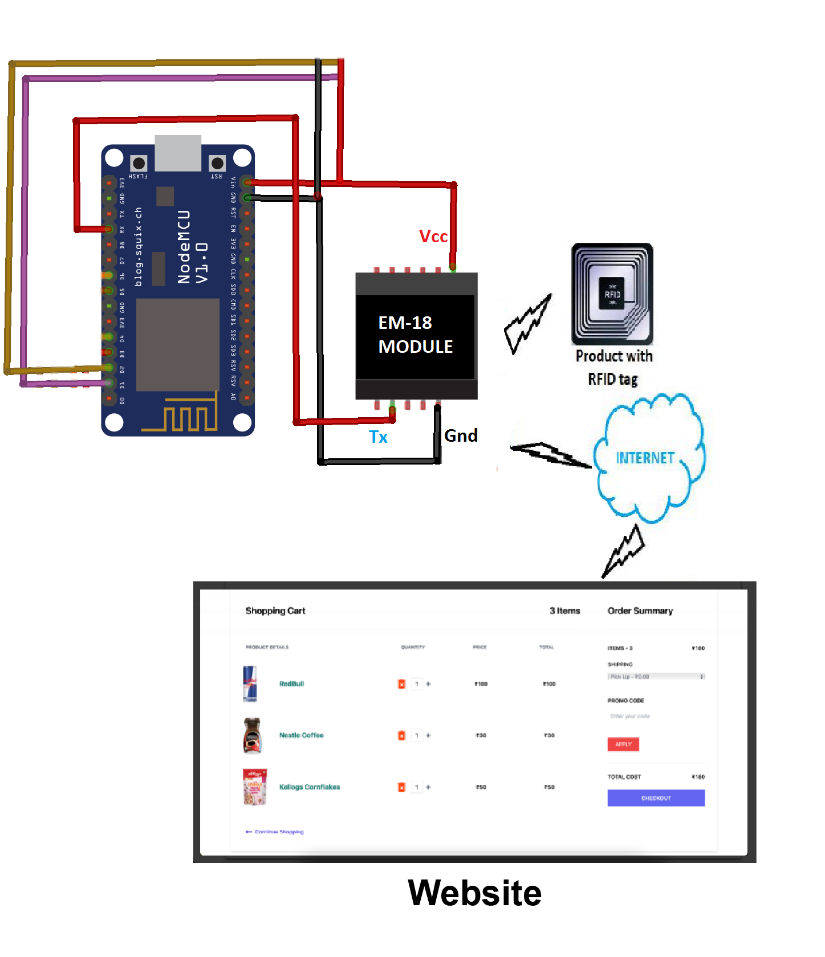
Step 7: The result is shown in the form of JSON file



Step 8: Data is shown on the website



Block diagram/ Flowchart of proposed system



* 1. Hardware, Software Requirements.

|  |  |
| --- | --- |
| Arduino  NodeMCU  RFID Scanner  RFID Tags  Jumper Wires  USB Cable | Editor: VS Code, Arduino IDE  Browser: Chrome / Brave |

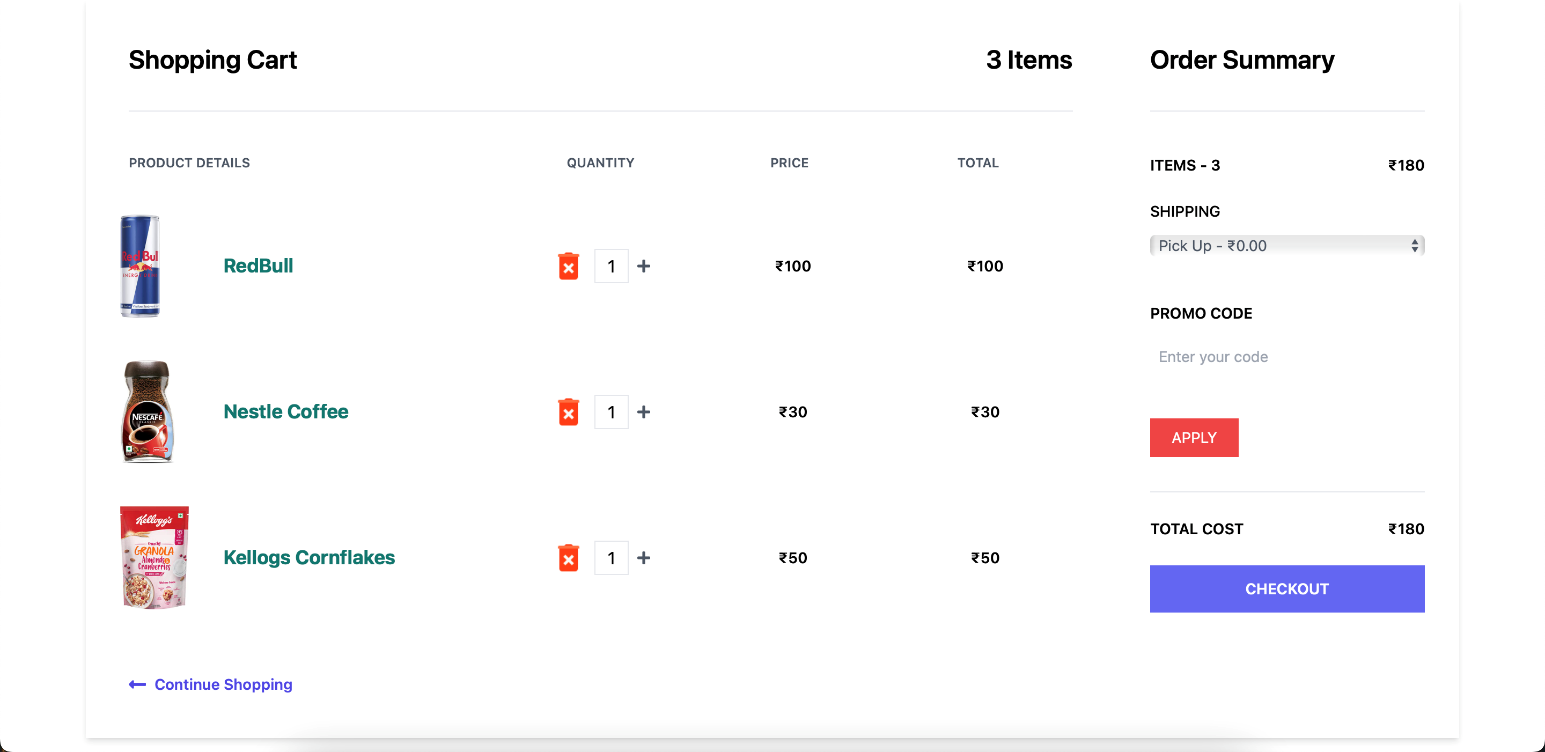
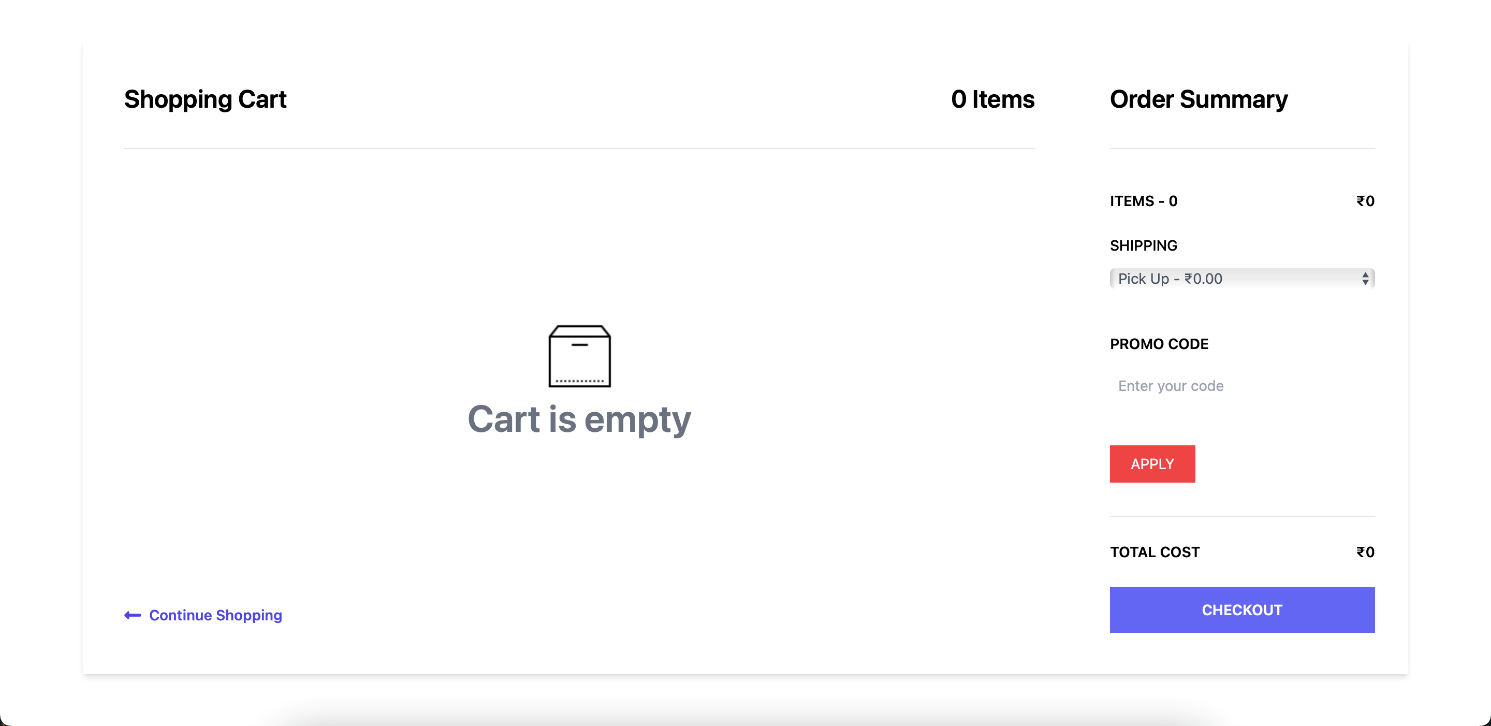
Technologies Used:

NodeJS

ExpressJS

Arduino-JSON library (C++)

Svelte

* 1. **Diagram for the website:**
  2. 
  3. 
  4. Code

**Arduino:**

#include <ESP8266WiFi.h>

#include <WiFiClient.h>

#include <ESP8266HTTPClient.h>

#include <ArduinoJson.h>

#include <SPI.h>

#include <MFRC522.h>

#define SS\_PIN 4 //

#define RST\_PIN 5 //D1

// WiFi Credentials

const char\* ssid = "xie10";

const char\* password = "123456789";

const char\* server\_url = "http://192.168.137.180:8000";

// StaticJsonBuffer<200> jsonBuffer;

DynamicJsonBuffer jsonBuffer;

// Set up the client objet

WiFiClient client;

HTTPClient http;

// Create MFRC522 instance.

MFRC522 mfrc522(SS\_PIN, RST\_PIN);

int statuss = 0;

int out = 0;

// Buzzer Setup

// int frequency=1000; //Specified in Hz

// int buzzPin=2; //D3

// int timeOn=1000; //specified in milliseconds

// int timeOff=1000; //specified in millisecods

void setup() {

Serial.begin(9600); // Initiate a serial communication

SPI.begin(); // Initiate SPI bus

mfrc522.PCD\_Init(); // Initiate MFRC522

// WiFi Setup

delay(3000);

Serial.begin(9600);

WiFi.begin(ssid, password);

while (WiFi.status() != WL\_CONNECTED) {

delay(500);

Serial.print(".");

}

Serial.println("WiFi connected");

delay(1000);

}

void loop() {

// Look for new cards

if (!mfrc522.PICC\_IsNewCardPresent()) {

return;

}

// Select one of the cards

if (!mfrc522.PICC\_ReadCardSerial()) {

return;

}

//Show UID on serial monitor

Serial.println();

Serial.print("UID tag :");

String content = "";

byte letter;

for (byte i = 0; i < mfrc522.uid.size; i++) {

Serial.print(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " ");

Serial.print(mfrc522.uid.uidByte[i], HEX);

content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));

content.concat(String(mfrc522.uid.uidByte[i], HEX));

}

content.toUpperCase();

Serial.println();

if (content.substring(1) == "39 3D 9E B8") //change UID of the card that you want to give access

{

Serial.println("Item 1 Added!");

Serial.println("Price : $100");

JsonObject& values = jsonBuffer.createObject();

values["itemname"] = "RedBull";

values["price"] = 100;

// values["imgLink"] = "https://m.media-amazon.com/images/I/51Bp30CR3IL.\_AC\_UL640\_QL65\_.jpg";

http.begin(client, server\_url);

http.addHeader("Content-Type", "application/json");

char json\_str[100];

values.prettyPrintTo(json\_str, sizeof(json\_str));

int httpCode = http.POST(json\_str);

if (httpCode > 0) {

if (httpCode == HTTP\_CODE\_OK || httpCode == HTTP\_CODE\_MOVED\_PERMANENTLY) {

String payload = http.getString();

Serial.print("Response: ");

Serial.println(payload);

// tone(buzzPin, frequency);

// delay(timeOn);

// noTone(buzzPin);

// delay(timeOff);

}

} else {

Serial.printf("[HTTP] GET... failed, error: %s", http.errorToString(httpCode).c\_str());

}

http.end();

delay(1000);

Serial.println();

statuss = 1;

}

else if (content.substring(1) == "87 04 D5 60") //change UID of the card that you want to give access

{

Serial.println("Item 2 Added!");

Serial.println("Price : $50");

JsonObject& values = jsonBuffer.createObject();

values["itemname"] = "Kellogs Cornflakes";

values["price"] = 50;

// values["imgLink"] = "https://m.media-amazon.com/images/I/91KZBHX-d-L.\_AC\_UY436\_QL65\_.jpg";

http.begin(client, server\_url);

http.addHeader("Content-Type", "application/json");

char json\_str[100];

values.prettyPrintTo(json\_str, sizeof(json\_str));

int httpCode = http.POST(json\_str);

if (httpCode > 0) {

if (httpCode == HTTP\_CODE\_OK || httpCode == HTTP\_CODE\_MOVED\_PERMANENTLY) {

String payload = http.getString();

Serial.print("Response: ");

Serial.println(payload);

// tone(buzzPin, frequency);

// delay(timeOn);

// noTone(buzzPin);

// delay(timeOff);

}

}

else {

Serial.printf("[HTTP] GET... failed, error: %s", http.errorToString(httpCode).c\_str());

}

http.end();

delay(1000);

Serial.println();

statuss = 1;

}

else if (content.substring(1) == "05 D0 7F 22") //change UID of the card that you want to give access

{

Serial.println("Item 3 Added!");

Serial.println("Price : $30");

JsonObject& values = jsonBuffer.createObject();

values["itemname"] = "Nestle Coffee";

values["price"] = 30;

// values["imgLink"] = "https://m.media-amazon.com/images/I/71DpoMAG6pL.\_AC\_UL640\_QL65\_.jpg";

http.begin(client, server\_url);

http.addHeader("Content-Type", "application/json");

char json\_str[100];

values.prettyPrintTo(json\_str, sizeof(json\_str));

int httpCode = http.POST(json\_str);

if (httpCode > 0) {

if (httpCode == HTTP\_CODE\_OK || httpCode == HTTP\_CODE\_MOVED\_PERMANENTLY) {

String payload = http.getString();

Serial.print("Response: ");

Serial.println(payload);

// tone(buzzPin, frequency);

// delay(timeOn);

// noTone(buzzPin);

// delay(timeOff);

}

}

else {

Serial.printf("[HTTP] GET... failed, error: %s", http.errorToString(httpCode).c\_str());

}

http.end();

delay(1000);

Serial.println();

statuss = 1;

}

else {

Serial.println(" Invalid Item... Please Try again. ");

delay(3000);

}

}

**Index.html:**

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8" />

<link rel="icon" type="image/svg+xml" href="/vite.svg" />

<meta name="viewport" content="width=device-width, initial-scale=1.0" />

<title>RFID Trolly</title>

</head>

<body>

<div id="app"></div>

<script type="module" src="/src/main.js"></script>

</body>

</html>

**Counter.svelte**

<script>

let count = 0

const increment = () => {

count += 1

}

</script>

<button on:click={increment}>

count is {count}

</button>

CONCLUSION

The proposed RFID system provides a good replacement for the barcode scanning system. By using the RFID system, the customer has to just scan the item with its RFID tag to add the item to the customer’s cart. The customer can then view his purchases on the website through which he can also add/remove

the items in the cart. Users can also be aware of the total bill amount during the time of purchase which will prevent them from over shopping. The website will provide the grand total of the purchased items by which the customer can pay the cashier at the billing counter. This feature is not available in the barcode system and has an additional disadvantage that the customer has to wait in queues to get their items scanned. The RFID system allows quick checkout which saves times of the customer and increases the profitability of the business. This makes the overall process efficient and streamlined.

FUTURE SCOPE

In future, the proposed system can be improved by:

1. Making our website responsive for easy accessibility on mobile devices.
2. Transferring the bill to mobile without printing(we can use the GSM module).
3. Containing a machine in the trolley for online transaction of payment.
4. Including Voice Assistance.
5. Adding a display on the Smart Trolley to verify the items added in the cart.

**CHAPTER 5**

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**APPENDIX**

**And Paper published**

**Attach paper published on this project**