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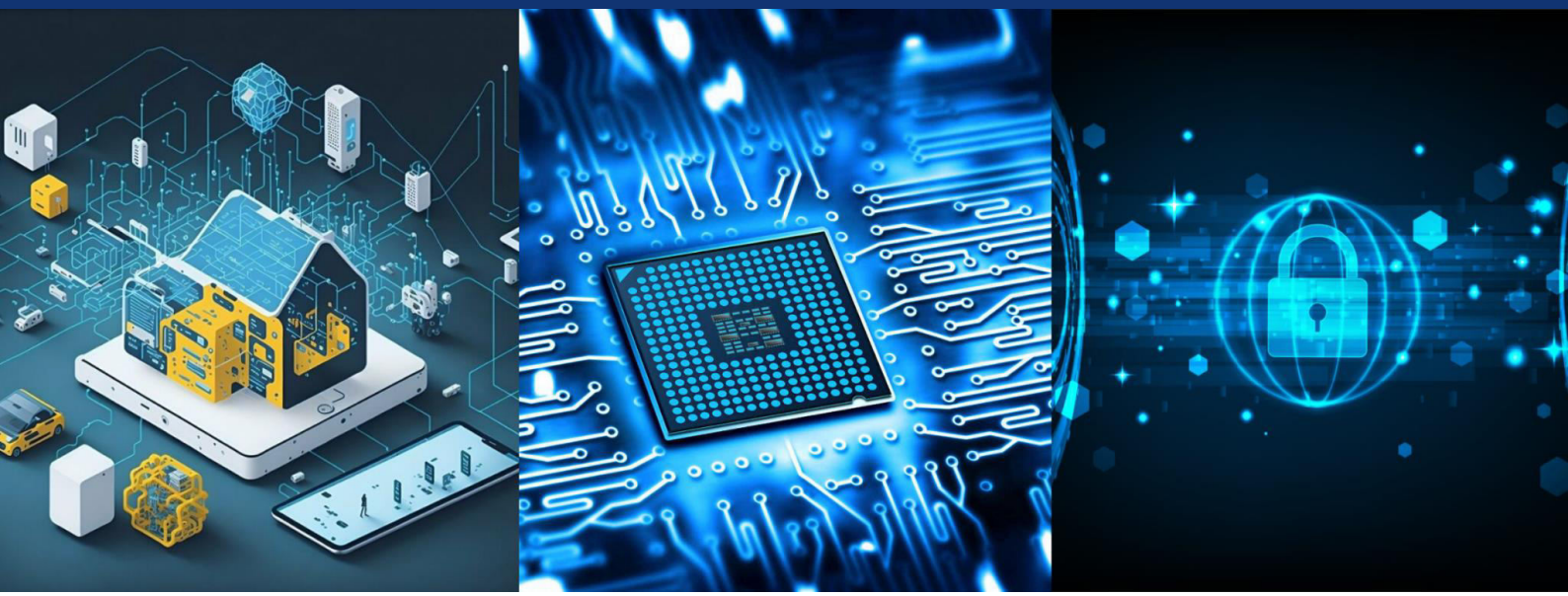

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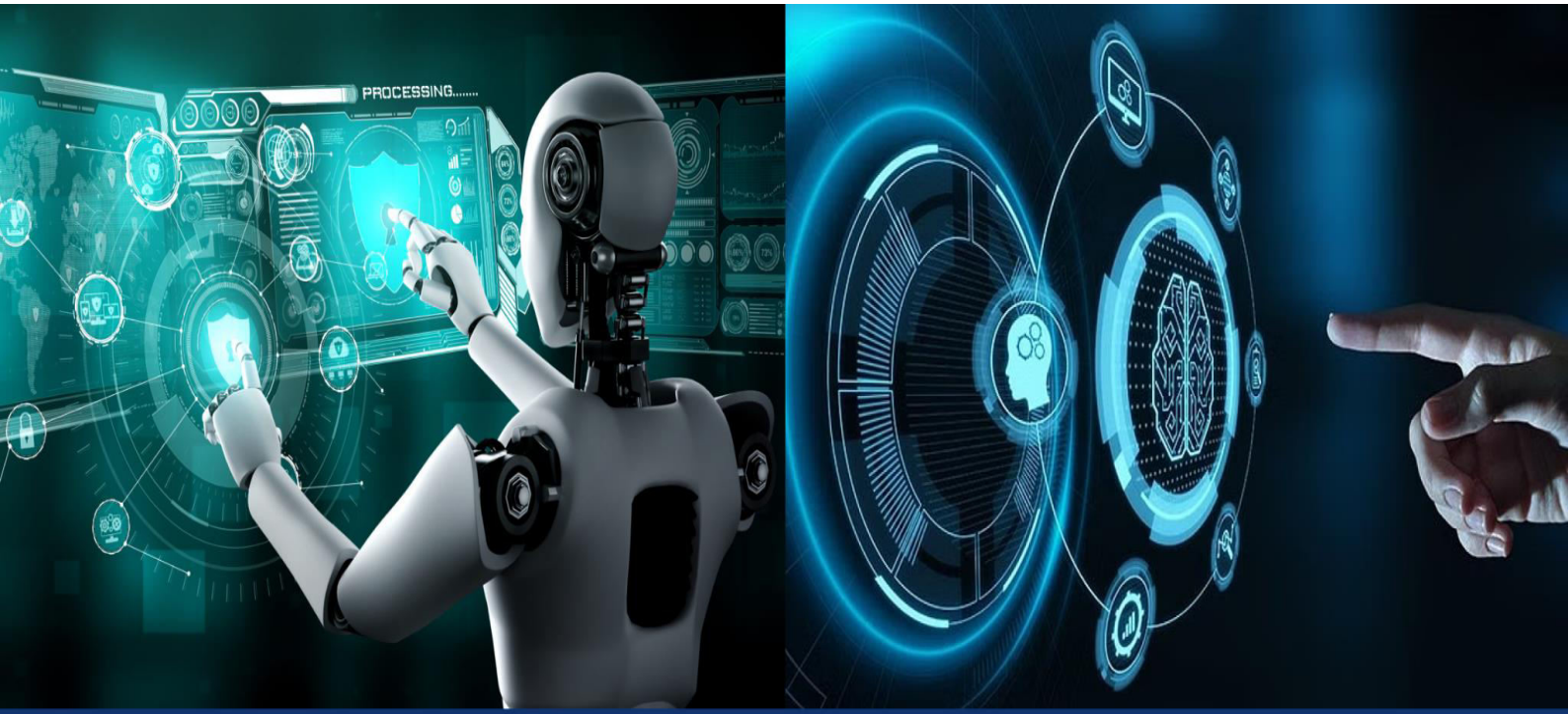

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IOT based Smart Trolley

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ABSTRACT: In this modern twenty-first century almost all families like to spend time shopping in malls, shopping complexes, and retail stores. In all these shops people usually carry trolleys on their own in which they collect the desired items and then locomote the trolley to the billing counter where they have to wait in long queues, but nowadays there is a need to convert the old traditional trolley with a modern automatic trolley, which is exactly our project.[1] The main idea of the project is to automate the process of shopping in such a manner that we will scan the products using RFID attached to the products and an RFID reader attached to the trolley as well as display the total amount on the Android mobile screen.[2]We also have included a feature to send a message to the customer's registered mobile number. This process not only helps in reducing the waiting time in the long queues and moving the trolley automatically but also helps in managing and checking the budget while shopping which indeed provides a huge difference in their shopping experience as well.[4][5]

KEYWORDS: Smart Trolley, IOT, Android, RFID, Ultrasonic Sensors, Arduino.

I. INTRODUCTION

In the world of Internet of Things (IoT), interactions among physical objects have become a reality. Day to day items would now be able to be outfitted with computing power and communication functionalities, permitting objects everywhere to be associated with one another. This has brought a new revolution in industrial, financial and environmental systems and triggered great challenges in data management, wireless communications and real-time decision making [1]. Also, numerous security and protection issues have risen and lightweight cryptographic techniques are in high demand to fit in with IoT applications. There has been a lot of IoT experimentation on various applications such as smart homes, e-health frameworks, wearable gadgets, and so on [2]-[4]. This paper centers around a smart shopping framework based on Radio Frequency Identification (RFID) technology [5]. All things available to be purchased are joined with a RFID tag, so they can be tracked by any gadget outfitted with a RFID reader in the store. This brings the accompanying advantages:

Our project consists of RFID tags that can be attached to the required products, an RFID reader that is used for scanning the products after putting them in the trolley while dropping them in the trolley the product will be scanned by EM-18, an LCD that will be used to show the items added in the trolley along with the total. Also, automated the movement of the trolley with the help of ultrasonic sensors, Arduino, and motors. Using a GSM module which helps us in connecting the mobile phone of the registered customer with the trolley and after the billing is done a message will be sent to the registered customer's mobile number with the total description of the bill.[6][7]

II. LITERATURE SURVEY

Paper 1 -: Smart Shopping Trolley based on IOT with mobile application
Author -: G.Pradeepkumar.
Observation-: In this [1] paper they have made a system model where each cart will have an RFID reader and zigbee trans-receiver implemented on it. Each product in the shop or a mall will also have an RFID tag on it. A supermarket is a place where customers come to purchase their daily using products and pay for that. So there is a need to calculate

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how many products sold and generate the bill for the customer. When we go to a shopping mart for shopping, we have to work to select the right product. Also, after that, it is hectic to stand in line for billing all the goods. Hence, the proposed system is the smart shopping cart system that will keep track of purchased products and also online transactions for billing using RFID and ZigBee. The system will also give suggestions for products to buy based on user purchase history from a centralized system. In this system, every product in Mart will have an RFID tag, and every cart will have a RFID Reader and ZigBee attached to it. There will be a centralized system for the recommendation and online transaction. Moreover, there will also be RFID reader at the

Paper 2-: Secure and Smart Trolley Shopping System based on IoT
Author-: Dr. Subburam, Anitha R
Publisher-: Arpit Jain
Observation-: In this paper the smart trolley is proposed which will audit the purchased product and make payment automatically using RFID tag. It will scan automatically & The billing is made in the cart itself. Nowadays, shopping has become a daily activity in today's world. We can see large queues in many shopping malls waiting for billing. The objective of our project is to overcome the problem of standing in queue and wasting time. To overcome the above problem, we are proposing a smart trolley billing system that will audit the purchased products and the payment is made online automatically using the RFID tag. It will automatically identify and scan the product and the final billing is made from the cart itself .So that customers are free from waiting in a long queue at checkout. It also provides the centralized and automated billing system using RFID. This model is a reasonable and profitable smart shopping cart handled by the IOT innovations. The primary goal is to provide a technology oriented, time saving and commercial oriented system for enhanced shopping experience. This system will also provide suggestions for the products based on user purchased history from a consolidated system. In this system, every product in the mart will have an RFID tag, and every cart will have an RFID Reader attached to it. These features will save time and make shopping easier. Overall we can gain the best shopping experience.

Paper 3 -: Smart Trolley
Author-: Vaibhav Tyagi
Publisher-: IJEDR 2017
Observation-: In this paper the project consists of RFID reader ,motion detection sensor, LCD, push button, switches, Zigbee. This project consists of RFID reader, motion detector sensor, Liquid Crystal Display, push buttons, switches and Zigbee. If the user wants to use smart trolley functions then the start button should be pressed. When a user puts some product in a trolley then its code will be detected using RFID reader and cost of a product added to the list and sensor will sense the direction of motion of the product for fault detection and buzzer will be on if fault detected. At last, the counter with the least number of queues will be detected and displayed on the cart LCD. Then, the final bill will be transferred to the counter having least waiting list using zigbee The billing is made in the cart itself. Nowadays, shopping has become a daily activity in today's world. We can see large queues in many shopping malls waiting for billing. The objective of our project is to overcome the problem of standing in queue and wasting time. To overcome the above problem, we are proposing a smart trolley billing system that will audit the purchased products and the payment is made online automatically using the RFID tag. It will automatically identify and scan the product and the final billing is made from the cart itself .So that customers are free from waiting in a long queue at checkout. It also provides the centralized and automated billing system using RFID. This model is a reasonable and profitable smart shopping cart handled by the IOT innovations. The primary goal is to provide a technology oriented, time saving and commercial oriented system for enhanced shopping experience. This system will also provide suggestions for the products based on user purchased history from a consolidated system. In this system, every product in the mart will have an RFID tag, and every cart will have an RFID Reader attached to it. These features will save time and make shopping easier. Overall we can gain the best shopping experience.

Paper 4 -: IoT Based Smart Shopping Trolley with Mobile Cart Application
Authors-: S Kowshika
Publisher-: IEEE
Observation-: In the current scenario, people are more attracted to buy groceries from Supermarket/Hypermarket. In such a case, finding the essential need of any customer in supermarket consumes more time and after all findings the customer need to wait in the billing queue to complete billing process of the selected product. Currently, due to the covid-19 pandemic, the customers are strictly instructed to maintain social distance but practically it is not possible

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especially in the billing process. To overcome this significant challenge, this research work proposes a smart trolley based on Internet of Things [IoT] with an advanced billing system that makes shopping easier and secured and also avoids standing in long queue. The proposed system consists of a smart trolley attached with LCD display, barcode scanner and a raspberry-pi. This exploratory model is intended to completely eradicate the tedious shopping interaction and administration-related issues. The proposed framework can be undoubtedly implemented at a business scale under the genuine situation.

Paper 5-: IoT-Based Smart Shopping Cart Using Radio Frequency Identification
Author-: Mobeen Shahroz
Publisher-: IEEE
Observation-:Product advice are the important thing elements for convincing the patron in a proper way, to shop for the goods in any e-trade internet site. The online patron score are completely based on every patron real enjoy which could comprise significant and greater person-orientated information. The advice is probably important on cost, feature, formerly bought emblem and plenty of greater parameters. In this paper we purpose to decorate the advice provider by comparing trendy score out of all of the rankings to be had in numerous e-trade internet site for any precise product. The end result is that the quantity of merchandise could be decreased upto atleast one-third of the general quantity of merchandise to have the below class and the person is inclined to buy product. Finally, only a few merchandise is advocated to the person by means of making use of person-supplied filtering capabilities and suggested single five-scale score.

Paper 6-: Smart Cart with Automatic Billing
Author-: Sushi and Zhang
Publisher-: IEEE
It have stated that even though substantial research has been carried out on applications related to Supply Chain Optimization, yet there is insufficiency of understanding of essentials and the advantage of further organizing and managing the data within business intelligence infrastructures that allow distributing, integrating and inspecting RFID data. Although the system has been proposed by them and explained well but they have not implemented the system and therefore, the results coming out of their proposed system is unknown and cannot be compared. The usage of RFID tags and reader makes the system pretty efficient when it comes to the scanning of products.

Paper 7-: Smart trolley and billing system .
Author-: Dr. Subburam, Anitha R
Publisher-: IEEE
if you are to scan 10,000 items, the time taken by a barcode system shall be 53 hours but the time taken for the same number of items by a RFID system is just 2 hours. This goes to explain how productive RFID systems are as compared to the existing barcode system.

III. SYSTEM ARCHITECTURE

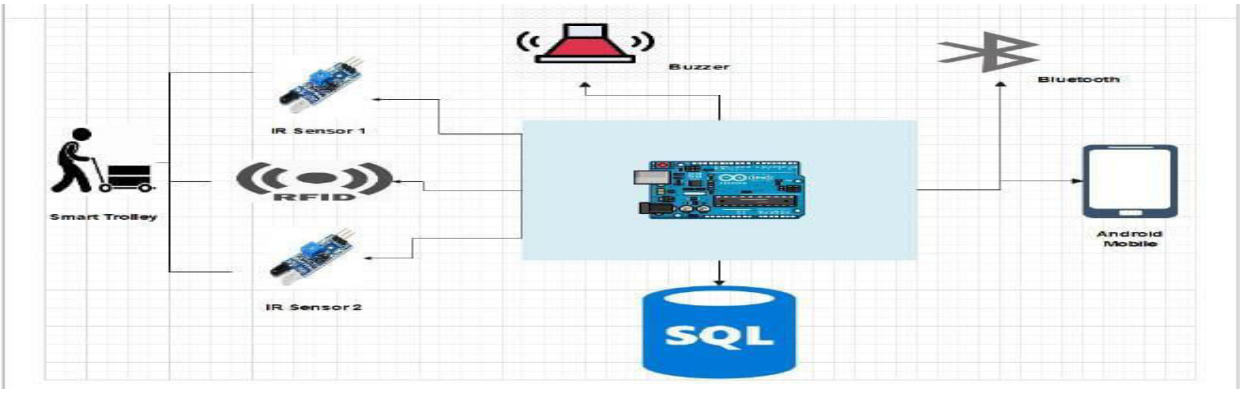

Fig 1. System Architecture

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- We will use Arduino Uno which will be connected to an Android app using Bluetooth
- Hardware will be developed using an IR sensor and RFID scanner/reader. Whenever the user puts the product in a trolley it will send a notification to the Android app.
- The Android app will update the price and provide a recommendation
- At the time of registration in the Android app, we will ask the likes of the user and based on that we will recommend the products.
- When the user checkout Google Pay will be open for payment.

IV. METHODOLOGY

A. Customer Registration and Login
The customer has to first create his account on the app. The customer details will be saved on the web server.

B. Shop Database Maintenance The shop database will contain all the data regarding each component. This is where the information about the product will be stored and manipulated. The customer's account data as well as the billing data will also be stored here.

C. Shopping Trolley Selection Once the user logs in to the mobile app they will have a prompt to scan available shopping trolleys. The shopping trolleys will be identified with an SSID with a specific pattern. Once the user has scanned all the trolleys he can select a specific one. Once selected the mobile phone will be connected to that shopping trolley Bluetooth enabling them to communicate with each other.

D. Shopping with the Shopping Trolley and the Mobile App Once the mobile app and the shopping trolley are connected through Bluetooth the customer can start with the shopping operations.

V. RESULT

In the first case we have install the android app in our mobile system and fill the login details for getting the information of customer accordingly. By using this login details customer can enter withoutuntil next visit. By this credentials we can access the application and identify the customer details.

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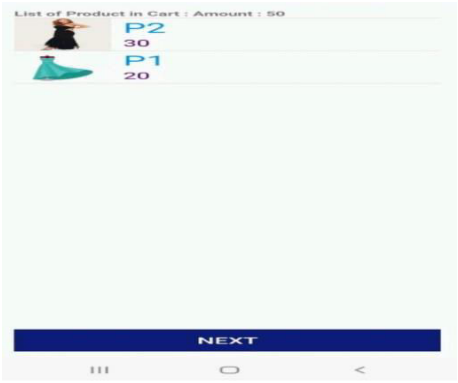
Case 1:

In this case we have entered personal details of customer such as phone number and password which we have given in login details . By using the particular password we can access in the applicationeasily until next visit



In this case as we have entered scanned products and according to that products the recommended items present in the shopping mall will be known to the customer. The various number of products wehave added that credentials is known to us by its counting. so that we can integrate easily that how many products we have added in that and how many we want to remove.In this case we fill the details for billing purpose after choosing the items . Whenever we want to create bill for overall items in the trolley we have to fill all the details in this page and confirm it so that it will go towards PhonePe , Gpay for billing purpose and it will automatically count the over all amount.Here in the above picture we scan every product using RFID reader through internet connection. As we scan the product over here the buzzer and LED will blow out and the product details will be displayin our created applications.

VI. CONCLUSION

We have developed an android app where user can register and login. Once login user can see product list in the mobile. If cart is having one product it will show on app one product with price. Once we have added all the product it will show gpay to do the payment and bill will be shared with email.

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