

# Smart Basket : The Modern era IoT application

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## ABSTRACT

Smart basket is a technology that uses Arduino and RFID. During pandemic times like Covid-19 there gets the crowd in the grocery marts, and the customer must wait in queue for final billing. But there may be high risk during these times of spreading the disease, so Smart basket brings an ideal solution for getting the final billing done. Using Arduino and RFID tag customer gets a final bill through the web app which gives a list of products scanned by the smart basket. The customer can remove the products which he further wishes to eliminate from his basket and delete the item from the final bill in the web app which can result in savings too. This smart basket also reduces manpower as the traditional method of buying the products involves a long time, with RFID tag the same thing is performed in a modern way.

**Keywords** : Arduino, RFID tag, RFID reader, Shopping cart, Wireless Communication.

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## I. INTRODUCTION

Smart basket is a technology used inside small grocery shops to big malls. With the use of an RFID tag and RFID reader, shopping is made easy. During times like pandemic or festive, there is a lot of crowds in malls. Overcrowding is the biggest issue in continents like Asia and Africa. But with evolving, IoT technology new solution devices are made each month. With Arduino, the technologies had a huge impact on human lives. With the use of Arduino and RFID technology, we had made a Smart basket that will use a Wi-Fi module. The customer must scan a

product on an RFID reader, the products in near future will come with In-built RFID tag chips on the product. The product details will be read by the RFID reader and a web application will be there where these scanned product details will be present. The customer must pay the final bill in any mode of payment and generate E-receipt. This way the Smart basket is avoiding overcrowding in the malls while customers must scan a product on the go. In past this technology had evolved a lot and yet must bring some new changes. We had discussed and used RFID technology and Node MCU(ESP2866). In this following paper, we had presented a survey on

different techniques used in Smart Basket over the years. Methodology and conclusions had been explained. Section 2 explores the literature review of the following paper. Section 3 demonstrates the proposed model and in the last section we had discussed the conclusion and future scope of Smart Basket using IoT technology.

## II. LITERATURE SURVEY

### 1. Smart Shopping Cart using RFID & Zigbee.

The smart basket technology had evolved a lot in the recent years, one such technique used was Zigbee device. This device is based on IEEE 802.15 standard. Zigbee is a device which transmit data covering longer distances. It passes data through intermediate devices to reach more longer ones i.e., devices, resulting in a mesh network. The RFID and Zigbee technology brought an automated billing system. The proposed system was as follows: Inside a shopping mall, each shopping cart was designed in such a way that each shopping basket would contain a RFID device i.e., to identify product. This was the product identification device which contained the microcontroller. As the customer would proceed to buy products the customer has to scan the product through RFID reader, the RFID reader reads the product details through the RFID chip. The basket containing product identification device also contains microcontroller, LCD, an RFID reader, EEPROM, and ZigBee module. The information read by the RFID reader is stored inside the EEPROM and this data is sent to billing system by Zigbee module.

RFID is the radio frequency identification which is the on-going technology and progressing each day. It has been helping the IoT industry grow more and more towards sustaining environment and automation. The technology is old but with latest trends in technology world RFID chips are made for ease of use of the humans. This technology is

bringing and will change the supply-chain industry and logistics.

Zigbee is a network device which is built on top the IEEE 802.15.4 standard. Creating a mesh network and transmitting the data to distant device is done by Zigbee module. It provides wireless networking protocol at low cost with low data rate and power consumption which helps toward automation of remote-control applications.

### 2. Smart Trolley using RFID.

In this product the RFID technology was used with IR technology. The infra-red technology is another technology which was used in past years to get the Smart trolley work inside the mall. The system also contains ARM processor like in past microcontroller for processing of the desired data. The concept of smart shopping cart there was a use of IR sensor and ARM processor which made alert for the customer whether a product has been removed. This was introduced due to theft and fraud or any disputes between customer and shop owner. , and smart shopping trolley but depending upon growing technology, need of the market and hardware cost each year the products must bring some changes. In this product.

This product used a RS232 protocol which helps in the processing for billing purpose along with ARM processor. The working was simple and like past products but with ease of use. The customer must scan the RFID tag i.e., a chip on RFID reader the details of the product will be sent to system memory. As the customer scans the product there will be a option to check whether the product is available or not on LCD display. If the product is found the basic details such as name and price on LCD display. The product details are processed in a way where ARM processor and the protocol i.e., RS232 will work to calculate and process the data. The IR sensor

mentioned before is used for counting purpose i.e., to count the number of products. The sensor will emit the rays in continuous fashion and help in storing the products in ARM processor. After completion of the shopping, there is a button which when pressed indicates the final billing of the products on a web-based interface.

### III. PROPOSED WORK

The goal of the system is to deliver a system that is easy to work and generate automated invoices. Making this system easily accessible and deliver the shopping system with low-cost hardware, which will bring an ideal solution both for consumers and retailers. The basket will contain the sensor module with a circuit such that when an item is placed it will be scanned with an RFID reader, the product should include an RFID tag. When the item is scanned, and RFID has completed its work, the microcontroller will store the data using SPI protocol with and Node MCU [4] will help this data to store in the system. In this way, the sensor module will have Arduino embedded in the circuit with all necessary hardware components.

When the customer enters the shopping mall, he/she will take the basket. [3] The basket has the sensor module which contains an RFID reader per customer taking that basket, with customer inspecting the products they must scan the product through RFID tag and the RFID tag will send this detail to the RFID reader, which relates to Arduino (Arduino contains inbuilt microcontroller) now the Node MCU Wi-Fi module (ESP2866) will communicate with the database using SPI protocol and the products will be stored on the webpage of the shopper's website. The scaling and automation help in regulating the process easy and the bill is generated fast.

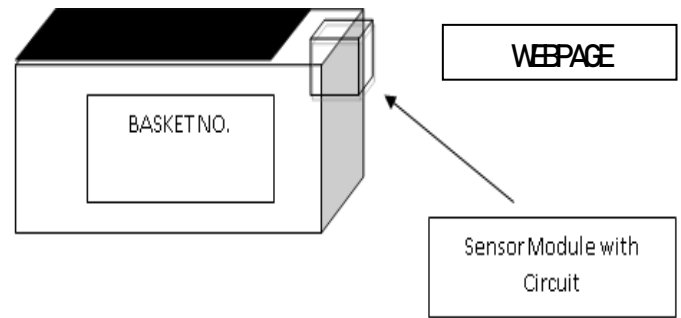


Figure 1: Design of setup.

### IV. CONCLUSION

Considering the latest changes in IoT technology there are number of trends which are helping the world to grow a better place, so the Smart Basket IoT application will bring a change and make a new trend in retail shopping. This will become a necessity in the upcoming future for shopping and retail marketing industry, as it performs the fast billing. Further the cost of the Hardware module will decrease with new evolving technology, resulting in making more IoT embedded hardware. Smart Basket will help the marketing industry to build more hardware with less cost. The automation industry will upgrade the IoT products so this product will work seamlessly resulting less manpower.

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