

# A Smart Shopping System for Visually Impaired

Anjali Rajan<sup>1</sup>, Anusree Subran<sup>2</sup>, Devika Narayanan<sup>3</sup>, Marziya Moidennsha<sup>4</sup>, Nazla CS<sup>5</sup>

Assistant professor of ECE, IES College of Engineering, Chittilapilly<sup>1</sup>

Department of ECE IES College of Engineering, Chittilapilly<sup>2</sup>

Department of ECE, IES College of Engineering, Chittilapilly<sup>3</sup>

Department of ECE, IES College of Engineering, Chittilapilly<sup>4</sup>

Department of ECE, IES College of Engineering, Chittilapilly<sup>5</sup>

**Abstract:** Life of an individual depends on basic five senses in which ability of vision is probably the most important one. Fulfilling the daily tasks of life becomes extremely hard for them. This can lead to difficulties which can only be temporarily subdued by some assisting personal and cases exist where certain situations might be fatal, not only for the individual but also anyone in the surrounding environment. The World health organization (WHO) statistics indicate that a large amount of people experience vision losses because of which they encounter many difficulties in everyday jobs. To date numerous method have been processed to enhance the lifestyle of visually impaired and blind people. Here, our goal is to structure a modest, secure shopping trolley for blind people, which assist them in grocery shopping. It provides guidance to identify and purchase their products. Which contains a Raspberry Pi, as well as an RFID reader, a headset and motors. The person's speech is used as input, through Raspberry pi, input will drive the motors to the desired direction. RFID tags are provided for product identification and the detailed information of the item is send to the person via headset. All things in the trolley are logged in the IoT and printed at the bill section.

**Key words:** RFID, Ultra sonic sensor, DC servo motor and Bluetooth.

## I. INTRODUCTION

In recent days shopping at malls is becoming a daily activity and there is a number of people at shopping malls on holidays and on special discount days. People can buy so many different products and keep that in trolley and after compilation of purchasing products using barcode scanner which consumes the time. To avoid the long queue. Independant shopping without human intervention is a dream for blind people. System that provides guidance for visually impaired people to identify and purchase their products. This work assists visually impaired persons with grocery shopping. The robot module (trolley) contains a Raspberry Pi, as well as an RFID reader, a headset, and motors. The person's speech (part where the person wants to go) is used as input, and this information is sent to the Raspberry Pi through Bluetooth. According to the specifications, the Raspberry will send a command to the driver IC, which will then drive the motors in the desired direction. All of the objects in the section will be RFID- tagged. The RFID scanner will detect (read) the tag whenever an item is picked and dropped into the cart. This will be relayed to Raspberry Pi, which will then send audio output (item name and price) to the person via headset. In addition, all things in the trolley are logged in the IOT and printed at the bill section. The Ultra-sonic sensor is also used to detect obstacles for the blind individual to move forward. Disability refers to a person's inability to fulfil their own desires without the help of others.

One of an individual's limitations is visual impairment. Several solutions have been proposed to date to improve the quality of life for visually impaired and blind people. Purchasing groceries without the assistance of others is still a difficult task for them. The paper describes a device that helps them become aware of and purchase their products in the supermarket. RFID (radio frequency identification) reading technology is used. Based on the current time conditions, the audio orders will assist them in the grocery store. It uses obstacle detection to allow you to traverse the store without clashing with any 3- dimensional objects.

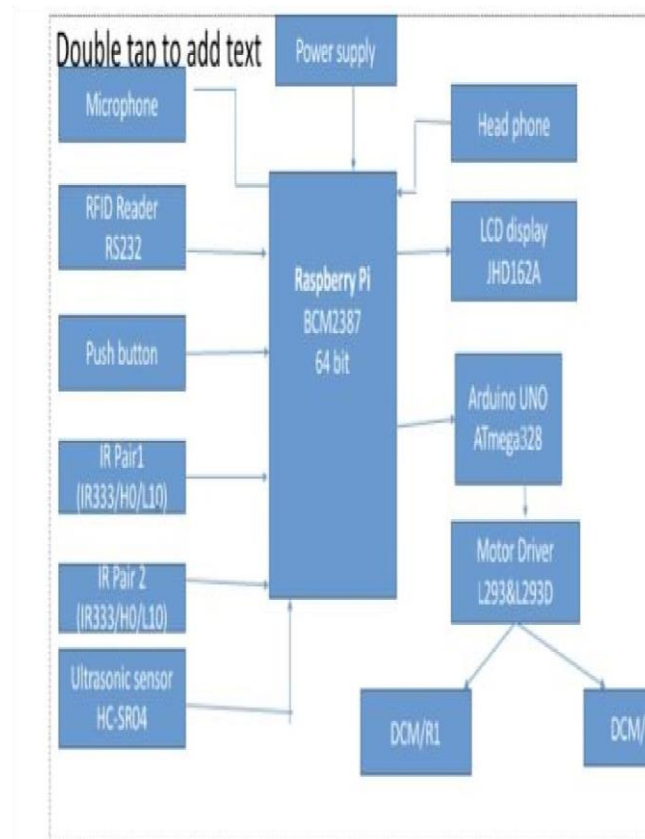
The billing machine has been computerised to improve the food store. As a result, the existing grocery shop queuing system is eliminated. The device's final purpose is to eliminate other shopping aids for visually impaired persons and provide them with a convenient and complicated environment. When this technology is used, it makes purchasing easier for blind people, saves patron time, and increases business sales. And the cost of an IoT product is compared to the cost of a market product.

## II. EXISTING SYSTEM

Originally the architecture to build automatic item identification in network commenced at the former AutoID Center, now the Auto-ID Labs with the process of standardization issues currently managed by EPCglobal Inc. The Auto-ID Centre motto is to create a smart automatic intelligent Environment system which automatically identifies the price, specification and all details of the product. It creates an Electronic virtual reality vision to blind and handicapped Person for smart shopping. The creation of the smart automatic intelligent environment infrastructure identifies the demands to identify objects automatically and uniquely ubiquitous computing system leveraging the internet for global connectivity. In existing method, they use bar code readers and bar code scanners to identify the product once if the bar code is not clear it cannot identify the product. In day to day products also increasing from different vendors so its difficult to create a unique id for each product using barcode. The components forming the intelligent infrastructure are commonly referred to as an EPC identification Network where the term EPC (Electronic Product Code) is a result of the unique object identification system.

By using the EPC unique ID present in RFID tag will provides automatic Identification of Physical Quantities and it intimates to blind persons through the voice message and it will display the name, price, specification of the product in LCD Display. Here we are using a WISP RFID reader it is a battery free platform for sensing and computation, it has 16-bit flash microcontroller, wireless power supply, low power UHF communication RFID reader. We have implemented UHF-RFID powered and red-light sensor, temperature sensor, accelerometer, and strain gauge.

## III. BLOCK-DIAGRAM



select the products, when the user selects any products through keypad it give the commands to the controller and make the robotic trolley move on to the exact location.

The purpose of product code reader is a hand-held input device used to capture and read information contained in the product RFID-tag.

#### IV. PROPOSED METHOD

Our proposed method introduces the trolley moves automatically. The structure of the trolley consists of the robotic structure. The proposed method has Ultrasonic Sensors to find the length and distance of target product materials. through the air medium using wireless sensor technology. The DC servo motor is attached to the trolley, which is used to move the robot to reach the exact location of the product in the shopping mall . The keypad is used to Depending on the product information signal from the Product ID -reader, the controller displays the price of each product in the LCD display. The proposed system has the feature of automatic billing when a customer carries a trolley full of items through RFID antennas. The WISP RFID reader antenna will scan the multiple UHF – RFID tag's and from the tag it get the unique EPC code, with that code it will identify the product price and generates the bill Automatically

#### V. WORKING PRINCIPLE

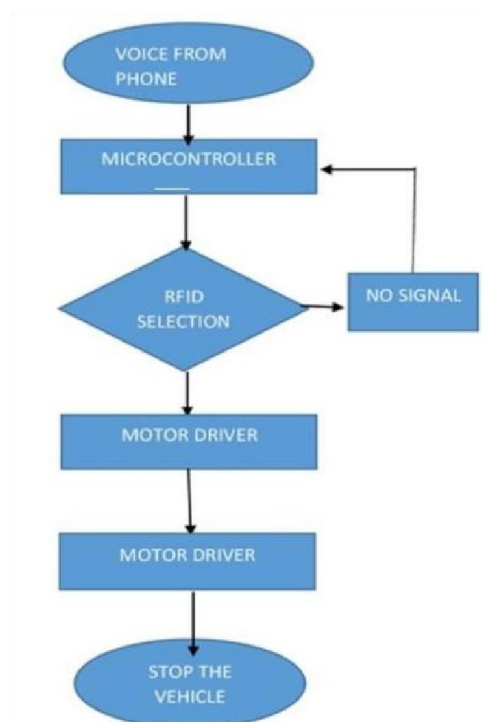
Here the RFID technology is mainly used. The RFID tag is attached to the product and RFID reader is attached to the trolley. RFID tag is used instead of barcode. It will be directly read by the trolley. Then trolley is automatically moved in customer requirements. DC power supply to supply voltage to each block.

Customer said the product name through the Bluetooth after the trolley moves automatically. Then the product price and details are displayed by the LCD. And also the product details are given through the voice playback module. Then the ultrasonic sensor is used for obstacle detection. It helps the blind to navigate inside the supermarket.

Here the battery is the power source for the entire block or devices. The microcontroller acts as the central processing unit. Here we have used the Atmel microcontroller ATmega8 .The infrared sensor is used find the path and the circuitry for finding the correct path is built and interfaced with the microcontroller.

The Bluetooth module acts as the communication device between the microcontroller ATmega8 and the user's mobile phone. and closing of basket lid is done by a servo motor. When the product is dropped into cart the product details will be added to the bill.

Flow chart for receiver module



At same time by pressing remove switch the basket lid will be open so that the person can take back the product. And the amount of the product will be deducted from the bill. So that the person can decide whether to add or remove the product.

Finally the shopkeeper can access every details of purchase and also details of remaining products in the shop using website. And finally billing can be done within the cart itself.

## **VI. IMPLEMENTATION PLATFORM**

Hardware Requirements:

- Battery
- Microcontroller – AT mega 8A
- LCD display – 16x2
- Infrared sensor
- Rfid reader
- Bluetooth
- Voice play board
- Speaker
- Motor driver
- motor

Software Requirements:

- Platform - AVR STUDIO
- In System Programmer - ProgISP 172
- Compiler – Win AVR

Advantages

Unique product identification and it provides complete data collection like price ,name , quantity using the RFID tag placed in the product.

RFID is placed in 5 major terminal places:

- Access Control
- Billing section
- product Identification and Location
- location Tracking
- customer relationship grievance counter.

The above RFID application will give importance to a terminal port officers as a Direct services or as Extra service. It simplifies the government Security regulations and record maintains requirements.

## **VII. RESULT**

- ✓ The main aim was to design and build a prototype and implementation of a shopping trolley for blind people.
- ✓ The hardware and software were well integrated together.
- ✓ The hardware is able to detect the obstacles and RFID reader reads the product details.
- ✓ Voice system is also enabled such that all the details of the product can be heard through Bluetooth. Billing system is also automated.

## **VIII. CONCLUSION**

The proposed smart automatic trolley carrier navigation and billing system intent to help blind people handicapped , old age and normal customer in the billing process, product cost, price and quantity identification ,Automatic tracking using cloud based RF-ID technique performs efficient and excellent in the shopping mall and reduces all the burdens faced in the existing method. In day to day life the product cost also increases and decreases it makes the system

database to be updated frequently. The proposed method finally created a practical electronic virtual reality vision to the blind people in the shopping mall.

### REFERENCES

- [1] "Automated shopping trolley for supermarket billing system "International Conference on Communication, Computing and Information Technology (ICCCMIT-2014)
- [2] "A Novel Video Processing based Cost Effective Smart Trolley System for Supermarkets using FPGA"-2015 International Conference on Communication, Information & Computing Technology (ICCICT).
- [3] "IoT based Smart Shopping Cart Using Radio Frequency Identification"- Preparation of Papers for IEEE TRANSACTIONS and JOURNALS.
- [4] "An Enhanced Shopping Model for Improving smartness in Markets Using SABIS Architecture"-IEEE WiSPNET 2016 conference.
- [5] "Smart shopping trolley for supermarket using rechargeable smart card"-International Journal of Scientific & Engineering Research Volume 8, Issue 7, July-2017
- [6] "SysMART Indoor Services: A System of Smart and Connected Supermarkets"-2018 IEEE Canadian Conference on Electrical & Computer Engineering (CCECE).
- [7] "A Smart Shopping System for Visually Impaired"-International Journal of Innovative Technology and Exploring Engineering (IJITEE).rd
- [8] "Smart electronic trolley for shopping mall"-3 IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT-2018).
- [9] "A Smart Trolley for Smart Shopping"-2021 at 08:26:23 UTC from IEEE Xplore. computing and innovative technology in engineering(ICACITE). [10] "Smart trolley"-2021 International Conference on advance