Guiding System For Smart Shopping Of Visually Impaired People

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ABSTRACT

Disability is the state of someone in which one has to depend upon others for their very own desires. Visual impairment is one of the disabilities of an individual. To date numerous strategies have been proposed to enhance the existence fashion of visually impaired and blind people. Still purchasing merchandise in the grocery store without others help is hard one for them. The paper describes a gadget that provides the guidance for them to become aware of and buy their products in the supermarket. RFID reading technology is applied. The audio commands will assist them within the grocery store primarily based at the actual time conditions. It provides obstacle detection to navigate inside the supermarket without colliding with any 3-d object. To make the grocery store in a better manner the billing machine is computerized. Hence it eliminates the existing queuing system inside the grocery store. The last goal of this device is to take away others aid for visually impaired people in purchasing and offer them a convenient and complicated environment. On implementing this system, it facilitates the blind human beings purchasing, store the patron's time and promotes business sales. And using IOT product charge is compared with market charge.

Keywords: RFID reader, Computerized Bill, Obstacle Detector

1. INTRODUCTION

In this smart world, nobody will end up the day without using any reasonably embedded system product. It makes our human life terribly smarter and to feel comfy. In worldwide, the great regret factor is visual impairment. Based on the statistics of the World Health Organization (WHO) in 2012, 285 million people are visually challenged in the world. Among them 39 million people are blind and 246 million have low power vision. About 90% of them are living in developing countries. A shopping mall is a place where people get their daily necessities ranging from food products, clothing, electrical appliances etc. Sometimes customers have issues relating to the unfinished data about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is needed within the ancient billing system to enhance the quality of shopping experience to the purchasers. Now day"s numbers of large as well as small shopping malls have increased throughout the globe due to increasing public demand &

spending. At the time of festivals, special discounts, holidays, etc. there is a huge rush in the shopping mall. At present, many supermarkets still adopt traditional shopping mode and bar code scanning, which is a waste of manpower and material resources. Also, a long time waiting to pay and the tire of pushing shopping cart all make clients suffer a lot and may cause passenger volume go down. Consequently, the needs to help reduce queuing time for customers to check-out and to free people from pushing the shopping carts hard have been an urgent issue to tackle. So here the paper introduces a system to reduce and possibly eliminate the total waiting time of customers and can avoid manpower. Here the system mainly meant for blind people, it provides obstacle detection. Also, the system helps to find the required products from the shop. Here it uses QR code technology to identify the product and to determine the position of the item as well as the person. The rate and name of each product taken by the person are added to the bill, in addition, it is displayed in the LCD and is announced using the speaker. The billing can be done within this trolley. IOT connected helps to compare the rate with outside market price and also the shop keeper can have complete access to details of the product purchased by the person.

1. LITERATURE SURVEY

As per our knowledge, only a few papers were found in the literature for the automated shopping trolley for supermarket using RFID.

The automated shopping trolley for supermarket billing system implemented by Sainath (2014), using the barcode technology the customers used to scans the products. The bill will be forwarded to the central billing system where the customer will pay them by showing a unique id. The limitation of barcode scanning needs line of sight for scanning and it ought to be fastened inside its boundary.

Cash register lines optimization system using RFID technology by Budic (2014), the system was developed for smart shopping using RFID. The RFID is utilized for scanning product and also the data is kept within the database that may be paid online or during a central bill. It also uses a web application to maintain entire shopping details. It requires maintenance of a web application server. No necessary steps are taken for the product that is accidentally dropped into the trolley by the client.

IOT based intelligent trolley for shopping mall by DhavaleShraddha (2016), applied RFID technology for billing throughout purchase in shopping malls and IOT is employed for bill management by means that of ESP module. The payment details will be sent to the server by which the central billing unit will deal with the customers payment. The ESP module will be operating as a short distance Wi-Fi chip for wireless communication. But there is a drawback which includes constraints such as distance and interference. The server will be busy if customers are high and internet connectivity should be stable for finishing the process.

Smart shopping trolley using RFID by KomalAmbekar (2015), implemented smart way of a shopping trolley with RFID and Zigbee by which bill is generated by a scan of

products in the reader and bill transmitted to central billing department by that bill may be paid at the counter that could be a major issue for the client.

Smart shopping cart with customer- oriented service by Hsin-Han Chiang (2016), they established an idea of an automatic billing system and programmed shopping trolley where they used face recognition for client authentication. It is not simple straightforward} method as face recognition of shoppers throughout shopping hours won't be easy and correct as malls can be crowded. Many errors are potential whereas using recognition for authentication.

Smart RFID based Interactive Kiosk Cart using wireless sensor node by NarayanaSwamy (2016), they used RFID technology for the smart automated shopping. They used a dedicated website for billing maintenance and for user interaction. Every user with the unique id accesses the web server for the bill payment and invoice information. Internet service is mandatory in this type of service. So the method could fail because of internet instability and server error issues may additionally occur due to high load.

Shopping and automatic billing using RFID technology by Vinutha (2014), she implemented an automatic billing with server end. This scans product by radio frequency identification then the bill is generated at the server finish that is then communicated to the client. This requires server maintenance and internet connectivity each for the client and market keeper.

Smart shopping cart with automatic billing and Bluetooth proposed by Prateek Aryan (2014), it is a method that billing is completed during a trolley and then it is transferred to the Android mobile of the user via Bluetooth. Every customer cannot be expected to have a Smartphone and Bluetooth can have connectivity issues and the range is less.

Automated smart trolley with smart billing using Arduino by Suganya (2016) developed a model of automatic shopping with Arduino and an android application which again requires the network to be connected always. Android operated mobiles might or might not be present with each client. Network instability leads to delay in the billing.

2. EXISTING SYSTEM

Disability is the state of a person in which one has to depend on others for their own needs. Visual impairment is one of the disabilities of a human being. To date, numerous methods had been proposed to enhance the lifestyle of visually impaired and blind people. Still purchasing products in the supermarket without others support is the tricky one for them. The existing system uses the Quick Response code (QR code) technology is implemented to identify the product. The audio instructions can assist them within the grocery store supported real-time situations. This system is to eliminate others support for visually impaired individuals in shopping and supply them a convenient and sophisticated atmosphere. On implementing this system, it facilitates blind people shopping, saves the customer's time and promotes business sales.

3. PROPOSED METHODOLOGY

The planned methodology is that the automatic billing for a client throughout searching based on RFID supported with different easy technologies. In shopping malls or supermarkets, the products are supplied with RFID tags rather than barcodes. The shopping trolleys include the setup containing RFID reader, IR sensor, and door with motor, relay, GSM module, LED, CLCD, Keypad and a push button. Smart RFID cards are given to customers for his or her distinctive identification. Figure 1 shows the block diagram of proposed methodology.

This IOT primarily based trolley has following applications: 1) Automatic billing at shopping center 2) Helps to owners. There are two sections namely transmitter section and receiver sections. First initialize the power of kit then it is ready to use for the customer. If client needs to buy any product then he/she should place the product within the trolley. As soon as the product falls within the trolley the RFID scanner read the RFID Tag place on the product. This RFID reader is connected to the microprocessor. Microprocessor crosschecks the knowledge get from RFID reader and data within the memory of the microchip. If the data get a match then the price of the product, name of product and the total bill display on the LCD.
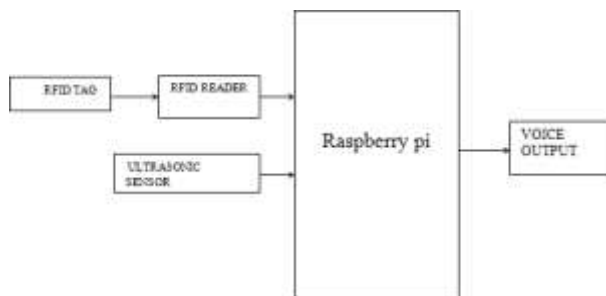

Figure 1: Block Diagram

If a user needs to get rid of any product then he/she merely remove that product from the trolley then LCD again display the name of product, show once more display the name of the product, cost of the product and the total bill. Trolley is supplied with esp that has same functions as ZIGBEE and Ethernet. ESP transfers the information to the main server which is in the range. This main server has its own cloud from that owner will access the data from anyplace and anytime with the assistance of user ID and password. This is the idea of the internet of thing (IOT).

3.1 HARDWARE COMPONENTS

3.1.1 RASPBERRY PI

Figure 2: Raspberry Pi Model B

The Raspberry Pi might be a series of little single-board computers developed within the UK by the Raspberry Pi Foundation to market teaching of the basic subject in schools and in developing countries. The original model became way more well-liked than anticipated, commercialism outside its target marketplace for uses like artificial intelligence. It doesn't embrace peripherals (such as keyboards and mice) and cases. However, some accessories area unit closed in several official and unofficial bundles.

The organization behind the Raspberry Pi consists of two arms. The first 2 models were developed by the Raspberry Pi Foundation. After the Pi Model B as shown in the figure 2 was discharged, the inspiration got wind of Raspberry Pi

mercantilism, with Eben Upton as a business executive, to develop the third model, the B+. Raspberry Pi Trading is responsible for developing technology while the Foundation is an educational charity to promote the teaching of basic computer science in schools and in developing countries.

According to the Raspberry Pi Foundation, over 5 million Raspberry Pis were sold-out by Gregorian calendar month 2015, creating it the popular British pc. By November 2016 they'd sold-out eleven million units, and 12.5m by March 2017, creating it the third popular "general purpose computer". In July 2017, sales reached nearly 15 million. In March 2018, sales reached 19 million. Most Pis are made in a Sony factory in Pencoed, Wales; some are made in China or Japan.

3.1.2 ULTRASONIC SENSOR

Figure 3: Ultrasonic Sensor Generation of ultrasonic by

magnetostriction and power manners by which - acoustic grinding - Non-harming Testing - beat reverberation framework through transmission and reflection modes - A, B, and C - examine shows, Medical applications – Sonogram

• The word ultrasonic combines the Latin roots ultra, which means „beyond" and sonic, or sound.

• The sound waves having frequencies higher than the audible vary i.e. above 20000Hz are called ultrasonic waves.

• Usually, these waves are referred to as high-frequency waves.

• The broad sectors of society that often apply ultrasonic technology ar the medical profession, trade and therefore the military.

PROPERTIES
• They have high energy content.
• Similar to normal sound waves, ultrasonic waves get reflected, refracted and absorbed.
• They will be transmitted over giant distances with no considerable loss of energy.
• If an appointment is formed to create stationary waves of ultrasonic in a very liquid, it is a grating. It is called an acoustic grating.
• They turn out intense heating result once passed through a substance.

3.1.3 RFID CARD

Radio-recurrence ID (RFID) as shown in the figure 4, utilizes attractive fascination fields to precisely set up and track labels associated with things. The labels contain electronically-put away data. Uninvolved labels gather vitality from a nearby by RFID peruser's questioning radio waves. Active tags have an area power supply (such as a battery) and should operate many meters from the RFID reader. Unlike a barcode, the tag needn't be at intervals the road of sight of the reader, so it may be embedded in the tracked object. RFID is one technique of automatic identification and knowledge capture (AIDC).

RFID tags are used in many industries. For example, AN RFID tag connected to AN automobile throughout production may be wont to track its progress through the assembly line; RFID-tagged prescription drugs may be half-track through warehouses, and implanting RFID

microchips in eutherian mammal and pets allows identification of animals.

Since RFID tags are also connected to cash, clothing, and possessions, or established in animals and other people, the chance of reading personally-linked data while not consent has raised serious privacy considerations. These considerations resulted in commonplace specifications development addressing privacy and security problems. ISO/IEC 18000 and ISO/IEC 29167 use on-chip cryptography strategies for intractability, tag and reader authentication, and over-the-air privacy. ISO/IEC 20248 specifies a digital signature organization for RFID and barcodes providing knowledge, supply and skim technique credibility. This work is completed at intervals ISO/IEC JTC 1/SC thirty-one Automatic identification and knowledge capture techniques. Tags also can be utilized in retailers to expedite checkout and to forestall larceny by customers and workers.

In 2014, the globe RFID market was value US$8.89 billion, up from US$7.77 billion in 2013 and US$6.96 billion in 2012. This figure includes tags, readers, and software/services for RFID cards, labels, fobs, and every one different kind factors. The value is predicted to rise to US$18.68 billion by 2026.

Figure 4: RFID Cards

3.1.4 EM-18 READER MODULE

Pin Number	Description
VCC	Should be connected to positive of the power

	source.
GND	Should be connected to ground.
BUZZ	Should be connected to BUZZER
NC	No Connection
NC	No Connection
SEL	SEL=1 then o/p =RS232 SEL=0then o/p=WEIGAND
TX	DATA is given out through TX of RS232
DATA1	WEIGAND interface DATA HIGH pin
DATA0	WEIGAND interface DATA LOW pin

The EM-18 RFID Reader module as shown in the figure 5 working at 125 kHz is a modest answer for your RFID based application. The Reader module accompanies an on-chip radio wire and can be controlled up with a 5V control supply. Catalyst the module and interface the transmit stick of the module to receive a stick of your microcontroller. Demonstrate your card inside the perusing separation and the card number is tossed at the yield. Alternatively, the module can be arranged for additionally a Weigand yield.

Figure5: EM-18 RFID READER MODULE

3.1.5 EM-18 Pin Configuration
EM-18 is a nine pin device. Among 9pins, two pins aren't connected, therefore we tend to primarily ought to consider seven terminals.
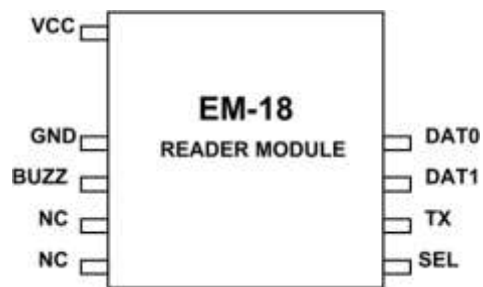
Figure 6: EM-18 Pin Configuration

EM-18 Features and Specifications
- Operating voltage of EM-18: +4.5V to +5.5V
- Current consumption:50mA
- Can operate on LOW power
- Operating temperature: 0ºC to +80ºC
- Operating frequency:125KHz
- Communication parameter:9600bps
- Reading distance: 10cm, depending on TAG
- Integrated Antenna

4. RESULT AND DISCUSSION

Using this smart shopping system the product is scanned by the visually impaired person"s using the RFID cards are converted into voice by Raspberry Pi with which the audio is heard by the particular person. The result is displayed as for the convenience using the VNC viewer.
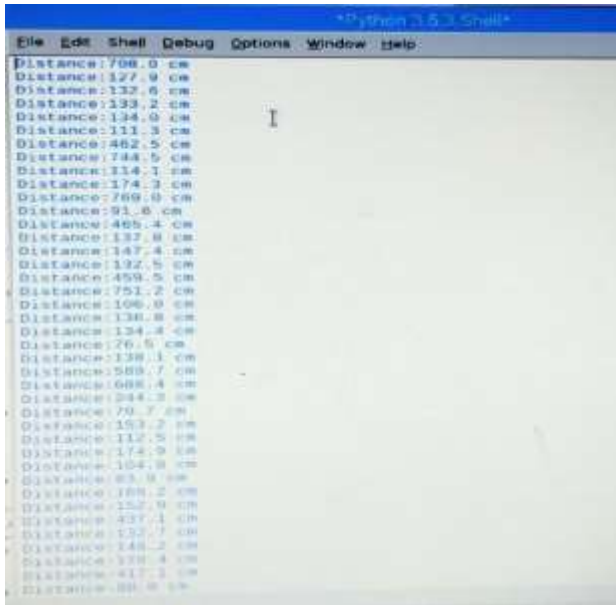
Figure 7: The Output of the Ultrasonic Sensor

The ultrasonic sensor is used to navigate the visually challenged person in the super market if the person reached the end of the rack near the wall the ultrasonic sensor guide him as to move right or left. The obstacle is detected by the ultrasonic sensor only if it is in the distance of below 50 centimeter then it starts to guide move left or right to that person which is shown in the figure 7.

Figure 8: Number of product purchased and total amount

If the particular person is willing to finish the purchase he needs to scan the end card which is provided by the shopping mall. After scanning the end card using the RF reader module the person will get the number of products purchased list as an audio and the total amount of that purchased list which is displayed as figure 8.
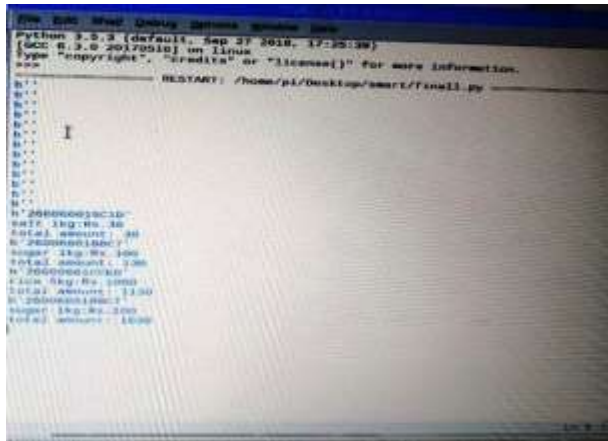

Figure 9: Removing the unwanted product in the total amount

After finishing the purchase if the person willing to remove the unwanted products in their shopping list which is already added in the total amount is removed by scanning the unwanted product"s RF tag. The person removed the product 2 by scanning the product"s RF tag again so the amount of the product 2 is reduced in the total amount which is shown in the figure 9.

Figure10: Providing the name of the rack

Without help of other the visually challenged person came to know the racks in the supermarket by scanning the racks RF tag in their RF reader module. The figure 10 represents the vegetables rack in the supermarket which is provided as an audio to the visually impaired person this is done by scanning the RF tag of that particular rack.

Figure11: The Webpage of Billing

If the person willing to finish the shopping he would scan the end card in the RF reader. Then the particular person"s Raspberry pi IP address the billing section the total amount of that particular person will be display as shown in the figure 11 in the billing section.

ADVANTAGES
1. Does not need any special training.
2. The client will get throughout info at the time of searching.
3. Can guess precise quantity at the time of shopping.
4. Save time
5. More efficient because of the use of RFID
6. Reduce rush at the billing counter.
7. Freeing staffs from repetitive checkout scanning

6. CONCLUSION
The smart shopping trolley application creates an Automated Central Billing System (ACBS) for supermarkets

and malls. Using pid (product identification), customers won't be got to wait close to money counters for his or her bill payment. Since their purchased product information is transferred to the central billing system, customers can pay their bill through credit/debit cards as well. The proposed smart shopping trolley system intends to assist shopping in-person which will minimize the considerable amount of time spent in shopping as well as

to the time required in locating the desired product with ease. The customer just needs to speak the name of the product, and the cart will automatically guide him/her to the product/s locations. The system planned is extremely dependable, authentic, trustworthy and time- effective. There will be a reduction in salary amount given to employees and also a reduction in theft since it reduces the manual tasks.

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