Smart Shopping Card

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Abstract—**This paper introduces SMART SHOPPING CARD, an easily accessible shopping card which makes shopping easier and simple. It has been designed using RFID, arduino, zigbee module, lcd display and keypad. The RFID technology is used as it helps in identifying as well as tagging and arduino is used as a microcontroller that is brain of the system. This card helps in reducing time of the customer during shopping. The system do not involve more of finance as well as labour work. Accessing the system for a customer is easy so no labour as such is required. Moreover, zigbee module used in the system helps in keeping account as well as stock information. The system can be further improved with addition of more features which makes shopping more simple and efficient.**

Keywords—*Arduino, RFID technology, LCD display, keypad and zigbee module.*

I. INTRODUCTION

Shopping is something on which a human spends most of his time every day. According to the researches done by researchers it is seen that people spend 23% of their lives on buying different products, that means we spend more than 150 hours per month and 2000 hours per year on shopping. In any condition, better or worse people will always need their necessities to live a comfortable life. They need food, groceries, clothes and other stuff for living. Since shopping is an important part of necessities of human, so it is necessary to optimize a better and comfortable way to do shopping. Today shopping can be simplified into two categories: 1) shopping in-person 2) shopping absentia. Shopping in absentia includes online shopping, tele-shopping etc where the shopper is not physically present in the shopping area. Shopping in-person involves shopping in shopping area where the person has to select the products according to the need. In shopping absentia, the person doesn't have to face a lot of issues as compared to that in shopping in-person. When a person enters a grocery store then he has to face lots of problems. He has to carry a cart for keeping the material in it. So he has to roam all around the store to collect the stuff which requires a lot of time. Then after the collection of the material he has to stand in queue for the billing. He has to communicate with the shopkeeper which sometimes leads to fights. So a system is the need of the alarm to improve the way to do shopping. We need to organize a proper system in which people can buy their necessities in a proper comfort manner. A system in which their time during shopping is saved and they don't have to wait in queues. They should not feel shopping necessity as a headache. The proposed smart card system assist shopping in-person which will reduce the time spent in shopping and helps in store management too. The proposed system is based on very few technologies: 1) RFID for product identification 2) Zigbee for wireless communication with the shop server 3) Integrated system with display 4)Arduino . All these are being discussed in details in further sections. In this paper, we discuss design, working and conclusion of the smart card. In design, we discuss all the technologies used in building the card and in working section, we discuss the proper working of the smart card from how it reduces the shopping time till its contribution in store management. In conclusion, we discuss about the advances that can be done in the card to make it more commercial and helpful. The development opportunities are also focused so that it makes pleasurable shopping experience for the shopper and also makes the management of store easier.

II. SURVEY

While doing the survey we found that mostly people prefer leaving malls instead of waiting in line for checkout. People find it difficult to search for the required product too. After getting the product they have to stand in big queues for billing to be done .In recent years it has been seen that technologies has been used for overcoming these

public issues. Barcodes are found to be used today in every product. Barcodes are the universal technology used for retail products, stores that own barcode reader can process barcode and imprint it on the product. The most important fault with barcode scanning is that the product has to be at line of sight of the reader to get the barcode imprinted on the product scanned. The University of Arkansas Information Technology Research Institute, in 2009 came up with the business value of RFID item- level tagging for day to day operations at major luxury retailers. They demonstrated that overall inventory accuracy improved by more than 27 percent, under stocks decreased by 21 percent, and overstocks decreased by 6 percent. The study also compared how long it took to count items using RFID vs. a barcode reader. With RFID, scanning 10,000 items took two hours; scanning with a barcode reader took 53 hours. This translated into an average of 4,767 counted items per hour using RFID, and 209 items per hour using a barcode system—a 96 percent reduction in cycle-counting time. Public awareness of RFID was heightened in recent years when the U.S. Department of Defense (DoD) and retail giant Wal-Mart required their suppliers to use RFID technology. Bill McBeath in April 2013 said, to survive in 2013 and beyond, retailers need to make it easy for consumers to buy anywhere, receive anywhere, and return anywhere. The key to this cross-channel order promising is the ability, in real-time, to locate and allocate available inventory from any location, whether in the store, in DCs, in transit, or on order from the manufacturer. This requires having a very accurate, real-time, item-level picture of inventory at all these sources. RFID has proven to improve perpetual inventory accuracy in stores dramatically, by 20%-30%. JC Penney improved perpetual inventory accuracy from 75% to 99% in categories using RFID.

Khushi arora and parnika gupta, under the guidance of Mrs. Shefali chopra in their paper RFID and ARDUINO based shopping card described the implementation of a system to allow a simple and easy way of shopping. When arriving at the supermarket counter, the consumer issues a shopping card by getting it charged with some amount of money. The card is accessible to the RFID and ARDUINO designed system. The system consists of all the data of the items in the supermarket. The consumer only has to interact with the monitor designed with the transparent technologies. In the paper, we display the efficient and cost effective way of shopping for the consumer as well as the seller.

III. PROPOSED SYSTEM

We discuss the "SHOPPING CARD" designed to assist a person in everyday shopping in terms of reduced time spent while purchasing a product. Moreover this product helps the owner of the shopping area by reducing the cost involved in workers as the card requires less of man labor as compared to other way of shopping. The main objective of this project is to provide a technology oriented, low cost, scalable and rugged system for shopping in-person. The system consists of 4 key components 1) RFID technology 2) Arduino, 3) Integrated system with display and 4) Zigbee for wireless communication with shop server. Traditionally, RFID was used to track inventory along supply chains, retailers placed RFID tags onto pallets. The usage of barcode for product identification presents several limitations: only the product's class is identified; information is static; allows one single reading at a time; requires line-of sight; has low range and security. RFID technology is more resistant, safer, identifies products in a unique way, can provide other types of information, can make several simultaneous readings, doesn't need line-of-sight and it has a high range Now this automatic system hardware and software. Arduino acts as a brain of the system. Despite of other microcontrollers, arduino is not limited to windows only infact it runs on windows, macintosh OSX and linux operating systems. The zigbee module used helps in server and car communication. And even helps in creating a record of the product. The display helps in knowing the operation to be taken place and even acts as a medium of communication for the customer as proved later. overcomed the problem of line of sight of the reader. RFID gave 99.5% accurate result. Moreover the system is able to lower the labor cost giving significantly increase in inventory visibility. With RFID customers can enjoy speedier checkouts and greater convenience. Arduino used is an open source prototyping platform based on easy to use

IV. SYSTEM ARCHITECTURE
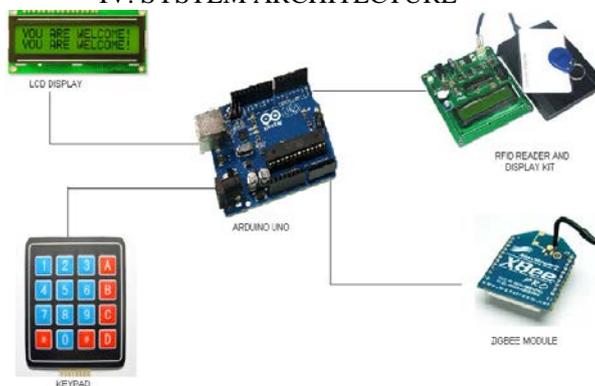
The modules components used in the architecture of the system are :
1) RFID technology
2) Arduino
3) Zigbee module
4) Lcd display
5) Keypad

   1. RFID TECHNOLOGY

1) RFID stands for radio frequency identification. It is the wireless use of electromagnetic fields to transfer data, for the purpose of automatically identifying and tagging tags attached to the objects. The tags contain electronically stored information. And some tags are powered by electromagnetic induction for magnetic fields produced near the reader. Unlike the barcodes, tag does not necessarily need to be within the line of sight of the reader and may be embedded in the tracked object. RFID is one method of automatic identification and data capture. RFID provides a way for organization to identify and manage tools and equipments without manual data entry. RFID is being adopted for item level tagging in retail stores. This provides electronic article surveillance and self checkout process for consumer

2. ARDUINO

The UNO is a microcontroller board based on ATmega 328P. It has 14 digital input/output pins, 6 analog inputs, a 16 MHZ quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to control a microcontroller, simply connect it to a USB cable or power it with a AC to DC adapter or battery to get started. UNO can be programmed with Arduino software. The UNO has number of facilities for communicating with a computer, Uno board and other microcontrollers. So, these functions of ARDUINO UNO acts resourceful for the shopping card.

3. ZIGBEE MODULE

The technology defined by the zigbee specification is intended to be simpler and less expensive than the personal area networks such as Bluetooth or wifi. Applications include wireless light switches, electrical meters for in-hopme displays, traffic management systems and other consumer and industrial equipment that requires short range low-rate wireless data transfer. Its low power consumption limits transmission distances from 10-100 meters line of sight depending upon power output and environmental characteristics. Zigbee device can transmit data over a long distance by passing it through a mesh network of intermediate devices to reach more distant ones. Zigbee is typically used in low data rate applications that require long battery life and secure networking.

4. LCD DISPLAY

A liquid crystal display is a flat panel display or other electronic visual display that uses light modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images with low information content, which can be displayed or hidden such as present words, digits and 7 segment displays such as in a digital clock. LCDs are used in wide applications of computer monitors, televisions, instrument panels, aircraft cockpit display and signage. The LCD screen is more effective and can be disposed of safely than CRT.

5. KEYPAD

A keypad is a set of buttons arranged in a block or pad which usually bear digits and symbols and a complete set of alphabetical letters. If it mostly contain numbers then it can also be called numeric keypad. Keypads are found on many

alphanumeric keyboards and on other devices like calculators, push button telephone, combination locks and digital door lock which require mainly numeric input.

V. WORKING

1.When the customer enter the mall , the customer need to get the shopping card recharged with required amount of money.

2.The space with the items have a number of RFID readers, the customer need to show the item tag on RFID for reading.

3.The customer will be asked for the number of such item required then using keypad he need to enter the needful information.

4.The reader will tell the total amount of the items and the customer with the help of card and keypad enter the amount so that the payment from the card get deducted .

5.This whole data of customer get stored in the main counter of mall to avoid mishappenings through zigbee module   used in the complete circuit

V.BENEFITS OF SHOPPING CARD

1.Reduces time by not letting the customer wait in queue for payments.

2.Reduces the requirement for workers in a shopping centre which is good for owners as they do not have to invest more in salaries.

3.Easy to check stock of the items since the purchased data get gathered in the web.

4.Easily accessed by anyone of any age.

5.Reduces the chances of cheating.

6.The card is renewable as it can be charged as much as required by the customer.

VI. CONCLUSION

Waiting in a queue for billing of the item intakes a lot of time. Not only this, the mall need to invest more in salaries of the workers working in the mall for making the bill and keeping the stock. With this proposed card all such problems get solved with low investment and time as it does not involve more of electronics which is costly. We are further working on this system by modifying the shopping card and trying in making it more resourceful with more additional features like use of credit cards. We are trying to add credit card feature with the RFID reader so that the payment option increases. We are working on this to make it more commercial.

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