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AUTOMATED SHOPPING TROLLEY

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Abstract-In this project, we implement the automatic goods carrier navigation and the billing system in the shopping malls. The structure of the goods carrier consists of the robotic structure and keypad which is used to navigate the robotic goods carrier along the particular way.The keypad is used to give the commands to the controller where the robotic carrier has to move on. Keypad has the inbuilt product code reader.The use of product code reader is to read the bar codes of all products to define the name and price of the products. Depending on the signal from the reader, the controller display the name and price of the each product by using the LCD display. The wireless billing system is made up of the zigbee communication module.

Keywords-Microcontroller, Navigation System, Zigbee Module, Product Code Reader, Embedded Systems.

I. INTRODUCTION

Shopping mall is a place where people get their daily necessities ranging from food products, clothing, electrical appliances etc. Now day's numbers of large as well as small shopping malls has increased throughout the global due to increasing public demand & spending. Sometimes customers have problems regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers.

To overcome these problems stated above and to improve the existing system, we have designed a SMART TROLLEY USING RFID. This can be done by simply attaching RFID tags to the products and a RFID reader with a LCD display on the shopping trolley. With this system customer will have the information about price of every item that are scanned in, total price of the item and also brief about the product. This system will save time of customers and manpower required in mall and cost associated with the product.

As soon as the shopping is over the user comes near the billing section . The total bill will display on the billing computer by using ZIGBEE wireless technology.

II. LITERATURE SURVEY

Nowadays, if a consumer would like to buy something at a shopping mall, consumers need to take the particular items from the display shelf and then queue up and wait for their turn to make payment. Problem will surely arise when the size of a shopping mall is relatively huge and sometimes consumers don't even know where certain items are placed.

Besides, consumers also need to queue for a long time at the cashier to wait for turn to make payment. The time taken for consumers to wait for the customers in front of the queue to scan every single item and then followed by making payment will definitely take plenty of time.

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This condition will surely become worst during the season of big sales or if the shopping mall still uses the conventional way to key in the price of every item by hand to the cash register. On the other hand, consumers often have to worry about plenty of things when going to the shopping mall.

For example, most consumers will worry the amount of money brought is not enough to pay for all the things that wanted to be bought until it comes to our turn to pay at the cashier, consumers might also worry that whether certain food product available at the shopping mall are suitable for vegetarian since most of the food product might not be stated clearly.

It will be a great convenience if the information of items that are available in the shopping mall can be obtained. It will be a great improvement on the existing system if the technology of RFID and ZIGBEE is implemented. Consumers will be able to get information of all the items at shopping mall, total up the prices of items as they shop, and save unnecessary time at the cashier.

1.EXISTING SYSTEM

1.Originally the architecture to build a ubiquitous item identification network commenced at the former Auto-ID Centre, now the Auto-ID Labs with the process of standardization issues currently managed by EPC global Inc. The Auto-ID Centre's vision was to create a "Smart World" by building an intelligent infrastructure linking objects, information, and people through computer networks oblivious to the users. The creation of the intelligent infrastructure demanded the ability to identify objects automatically and uniquely with the backbone of the infrastructure provided by a ubiquitous computing system leveraging the internet for global connectivity. The components forming the intelligent infrastructure are commonly referred to as an EPC Network where the term EPC (Electronic Product Code) is a result of the unique object identification scheme employed by the system. This new infrastructure enables object-centric computing that will allow universal coordination of physical resources through remote monitoring and control by both humans and machines. While the applications of this technology are wide spread the EPC Network is expected revolutionize supply chain management.

2. WISP is a wireless, battery - free platform for sensing and computation that is powered and read by a standards-compliant Ultra-High Frequency (UHF) RFID reader. The notable features of the device are a wireless power supply, UHF backscatter communication, and a fully programmable ultra-low-power 16-bit flash microcontroller with analog to digital converter. We have implemented UHF-RFID powered and red light sensor, temperature sensor, accelerometer, and strain gauge. We believe these are the first reported UHF powered accelerometers and strain gauges. We have also implemented the RC5 algorithm on WISP, which we believe is the first strong cryptographic algorithm to be implemented on a UHF RFID tag.

III. PROPOSED SYSTEM

The structure of the goods carrier consists of the robotic structure and the colour sensor, which is used to navigate the robotic goods carrier along the particular way. The keypad is used to give

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the commands to the controller for where the robotic carrier has to move on. And also it has the product code reader inbuilt. The use of product code reader is to read the bar codes of all products to define the prices of the products. Depend on the signal from the reader, the controller display the price of the each product by using the LCD display. The wireless billing system is made up of the zigbee communication module.

1. ADVANTAGES

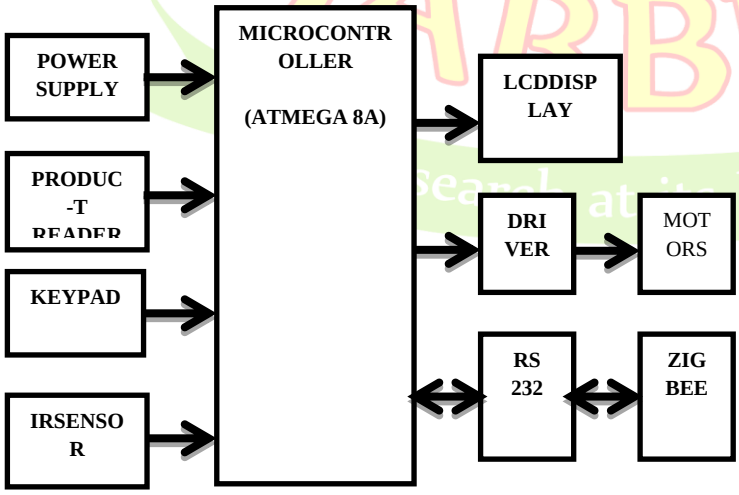
- Accurate and complete data collection; and Better utilization of employee's time.
- There are five major areas where RFID can be effectively used in a port cargo terminal:
- Access Control;
- Container Security;
- Container Identification and Location;
- Activity Tracking;
- Regulatory Compliance.

Some of these applications offer benefits to the terminal/port operator; either directly or as added services for shippers. Other benefits must be seen more as a means of simplifying compliance with increasing governmental security regulations and record keeping requirements.

2. BLOCK DIAGRAM &CIRCUIT DIAGRAM

BLOCK DIAGRAM:

TROLLEY SECTION



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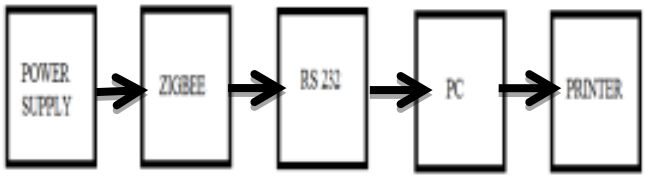
BILLING SECTION



CIRCUIT DIAGRAM

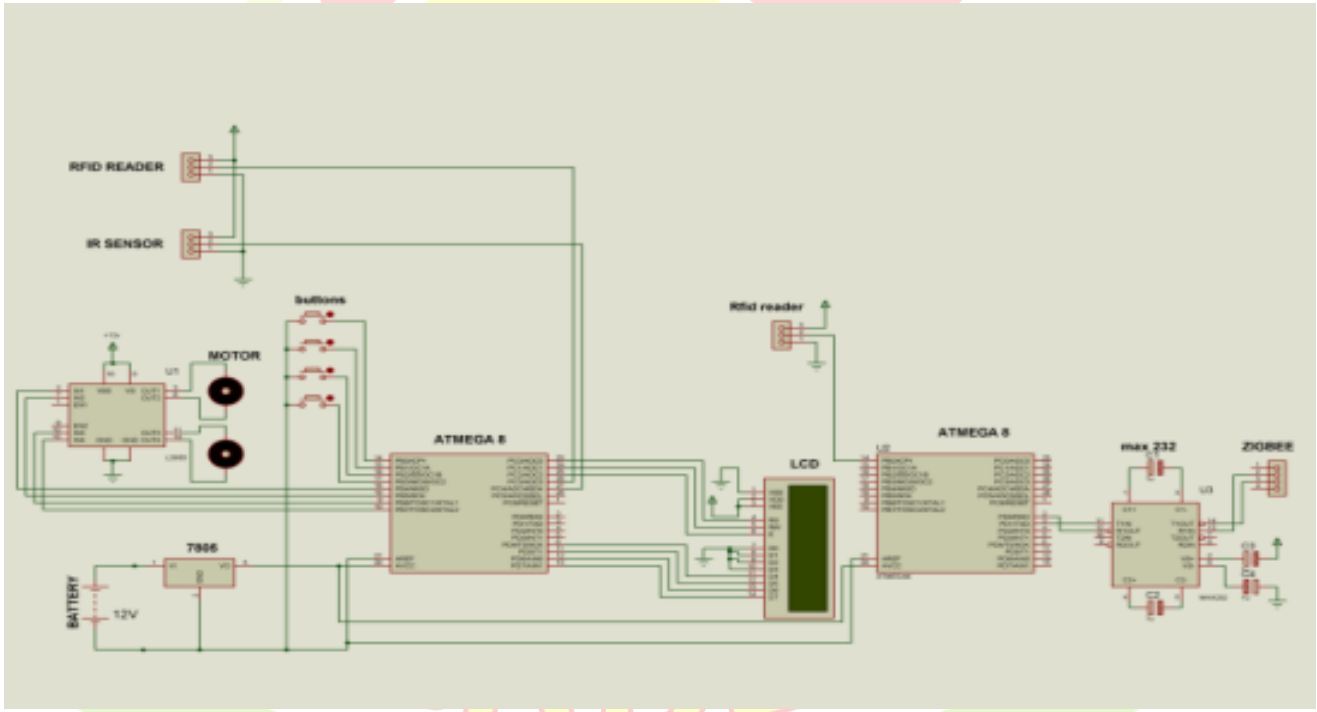


Fig .1: Circuit diagram of Trolley Section

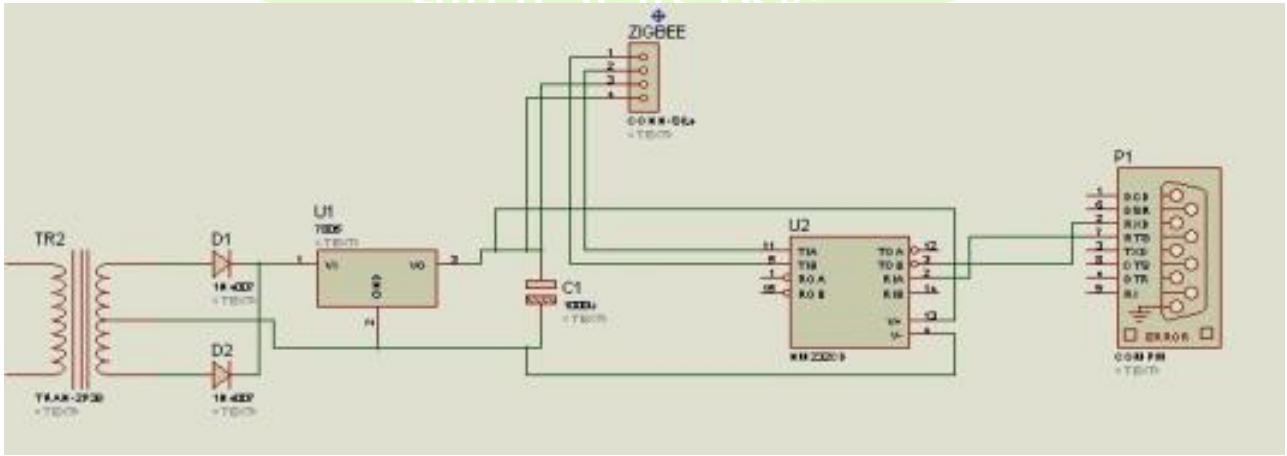


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Fig.2: circuit diagram of Billing Section

3.PIN CONFIGURATIONS

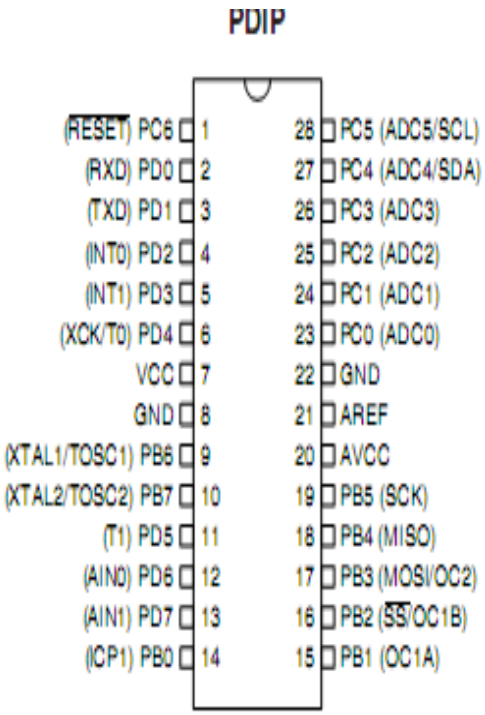

Fig.3:Pin Diagram

4. POWER SUPPLY

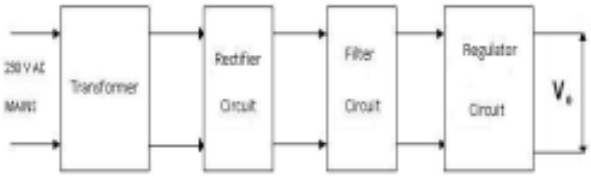

Fig. 4: Block diagram of power supply

5. LCD

A liquid crystal display (LCD) is a thin, flat display device made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them,

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light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other.

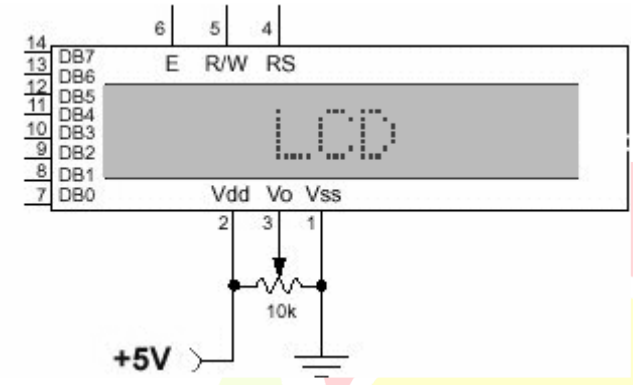

Fig.5: Pin Diagram of LCD

6. ZIGBEE PROTOCOL

802.15.4 – ZigBee Physical Layer

ZigBee is a wireless technology developed as an open global standard to address the unique needs of low-cost, low-power wireless M2M networks. The ZigBee standard operates on the IEEE 802.15.4 physical radio specification and operates in unlicensed bands including 2.4 GHz, 900 MHz and 868 MHz

The 802.15.4 specification upon which the ZigBee stack operates gained ratification by the Institute of Electrical and Electronics Engineers (IEEE) in 2003. The specification is a packet based radio protocol intended for low cost, battery operated devices. The protocol allows devices to communicate in a variety of network topologies and can have battery life lasting several years.

6.1 The ZigBee Protocol

The ZigBee protocol has been created and ratified by member companies of the ZigBee Alliance. Over 300 leading semiconductor manufacturers, technology firms, OEMs and service companies comprise the ZigBee Alliance membership. The ZigBee protocol was designed to provide an easy to use wireless data solution characterized by secure, reliable wireless network architectures.

7. RADIO-FREQUENCY IDENTIFICATION

Radio-frequency identification (**RFID**) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object. Some RFID tags can be read from several meters away and

beyond the line of sight of the reader. The application of bulk reading enables an almost-parallel reading of tags.

A number of organizations have set standards for RFID, including the International Organization for Standardization (ISO), the International Electro technical Commission (IEC), ASTM International, the DASH7 Alliance and EPCglobal. (Refer to Regulation and standardization below.) There are also several specific industries that have set guidelines including the Financial Services Technology Consortium (FSTC) has set a standard for tracking IT Assets with RFID, the Computer Technology Industry Association CompTIA has set a standard for certifying RFID engineers and the International Airlines Transport Association IATA set tagging guidelines for luggage in airports.

RFID can be used in many applications. A tag can be affixed to any object and used to track and manage inventory, assets, people, etc. For example, it can be affixed to cars, computer equipment, books, mobile phones, etc. The Healthcare industry has used RFID to reduce counting, looking for things and auditing items. Many financial institutions use RFID to track key assets and automate compliance. Also with recent advances in social media RFID is being used to tie the physical world with the virtual world. RFID in Social Media first came to light in 2010 with Facebook's annual conference.

RFID is a superior and more efficient way of identifying objects than manual system or use of bar code systems that have been in use since the 1970s. Furthermore, passive RFID tags (those without a battery) can be read if passed within close enough proximity to an RFID reader. It is not necessary to "show" the tag to the reader device, as with a bar code. In other words it does not require line of sight to "see" an RFID tag, the tag can be read inside a case, carton, box or other container, and unlike barcodes RFID tags can be read hundreds at a time. Bar codes can only be read one at a time.

In 2011, the cost of passive tags started at $0.05 each and special tags, meant to be mounted on metal or withstand gamma sterilization, can go up to $5. Active tags for tracking containers, medical assets, or monitoring environmental conditions in data centres all start at $50 and can go up over $100 each. Battery Assisted Passive (BAP) tags are in the $3–10 range and also have sensor capability like temperature and humidity.

7.1 RFID tags

RFID tags can be either passive, active or battery assisted passive. Passive RFID does not use a battery, while an active has an on board battery that always broadcasts or beacons its signal. A battery assisted passive (BAP) has a small battery on board that is activated when in the presence of a RFID reader.

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Most RFID tags contain at least two parts: one is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions; the other is an antenna for receiving and transmitting the signal.

IV. CONCLUSION

By means of this paper we intent to simplify the billing process, make it swift & increase the security using RFID technique. This will take the overall shopping experience to a different level. Different parameters such as the system parameters of smart trolley like products name, products cost, product weight etc. are continuously display. Thus with the help of the conclusion we can say that

1. Automatic billing of products by using RFID technique will be a more viable option in the future.

2. The system based on RFID technique is efficient, compact and shows promising performance.

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[2] 'J.S.Awati', '2012', 'Smart Trolley'.