Automatic Goods Carrier Navigation and Billing System

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ABSTRACT

Purchasing and shopping at big malls is becoming daily activity in metro cities. People purchase different item and put them trolley. After completion of purchases, one needs to go to billing counter for payments. At billing counter the cashier prepare the bill with the help of bar code reader which is very time consuming process and results in long queue at billing counter. In this proposed system, we have to 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 RFID reader, which is used to navigate the robotic goods carrier along the particular way. The keypad is used to give 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.

Keywords: Zigbee, RFID and Product code reader.

1. INTRODUCTION

Programmers build up with the software applications every day in order to augment efficiency and productivity in a mixture of the situations. A system is a way of working and organizing or doing one or more tasks according to the fixed plan, program, or set of rules. A system is also an arrangement in which all its units assemble and it work together according to the plan or program. An embedded system is one of the computer-hardware with software embedded it as one of its most important component. It is dedicated based computer system for an applications or product. It may be either an independent system or to be a part of larger System. Its software usually embeds in Read Only Memory it does not need any secondary memories in a computer. These systems are designed with a single 8-bit or 16-bit microcontroller, they have a little hardware and software complexities and it involve board level of design. There may be even battery operated. While developing an embedded software for an editor, assembler and cross assembler, it specific to the microcontroller or processor used, are the main programming tools in the system. Usually, 'C' programming is used for developing the systems. The Radio frequency identification (RFID) is a rapidly growing technology and that has the potential to make great economic impacts on a many industries. While the RFID is a relatively old technology and more recent advancements in chip manufacturing technology that are making RFID practical for new applications and settings in particularly consumer item level tagging. These advancements have a potential to be revolutionize supply-chain management, inventory control, and logistics. At its most basic, the RFID systems consist of a small transponders or tags is attached to the physical objects. The RFID tags may soon become a most pervasive microchip in the history. While wireless interrogated by RFID transceivers or readers and tags respond with the some identifying information that may be an associated with arbitrary data records. Thus, the RFID systems are one of the types of automatic identification system that it is similar to optical bar codes. ZigBee is built on top of the IEEE 802.15.4 standard. ZigBee provides routing and multi-hop functions to the packet based radio protocol. ZigBee technology is a low data rate, low power consumption, low cost; wireless networking protocol targeted towards automation and remote control applications. Supermarket is the place where customers come to purchase their daily using products and pay for that. So there is a need to be calculating how many products are to be sold and to generate the bill for the customer. Cashier's desk to be placed in a position, that to promote the circulation. At present, in many supermarket chains are attempting to the further reduce labor costs by shifting the self-service check-out machines, where a single employee can oversee a group of four or five machines at once, assisting multiple customers at a time.

2. LITREATURE REVIEW

A Novel Low-Cost Intelligent Shopping Cart
Author: J.Suryaprasad
In this project develop a low-cost intelligent shopping aid that assists the customer to search and select products and inform the customer on a special deals are available on the products as they move around in the shopping complex.

Smart Trolley Using QR Code
Author: Jasmine Khan, Zeeshan Khan
In this Smart Trolley It Consist of QR code reader .In this system they have only 60% efficiency and also take more time to read the product code.

Smart Shopping for Automated Billing Using Bar Code
Author: Sanchita Roy, Udita Gang Wan

In this system the bar code does not have READ and WRITE capability. If any moisture on the product code the barcode cannot read the price of the product.

Automated Shopping and Billing with Product Inventory Management System
Author: N.Murulidhara

In this system difficult to track the product. The product information is difficult and time consuming. The bar code reader is high cost.

3. SYSTEM DESIGN

Then modules for the device which is attached to shopping cart of supermarket. The normal shopping experience current date, after the invent of various supermarkets is first enter the store and take a trolley and push it around the entire store in search of the products needed then load them into the trolley. Afterwards stand in queue and pay the bill. At last exit from store. The usage of RFID tag are benefits such as consequent reduction in product cost, reduced manual billing human intervention, reduced a cost availability of accessing the real time information about the diverse products inside the shopping cart.
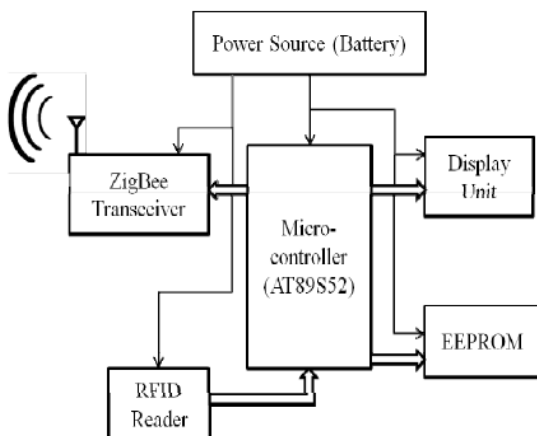

Fig.1. Hardware Implementation of Shopping Cart

A. Microcontroller
The AT89S52 is consuming a low-power, high-performance of CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory and is able to exist with the industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system Fig. 1. Hardware Implementation of Shopping Cart. It is a nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller and it's provide a highly-flexible and cost effective solution to and application for many embedded control. The AT89S52 provides the following standard features: 8K bytes , 256 bytes for RAM, 32 input and output lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, both transmit and receive simultaneously. So it is full duplex serial port, on-chip oscillator, and clock circuitry.

In addition, the AT89S52 is designed with static logic for operation down to zero frequency and it supports two software and the power saving modes is selectable. The Mode stops only the CPU while allowing the RAM, timer counters, serial port, and interrupt system to continue the functioning. The Power-down mode saves the RAM con-tents but freezes the oscillator; disconnect all other chip functions are until the next interrupt.

B. ZigBee
ZigBee is commonly used to provide a low cost and low power consume and also provide a longer battery life that needs for the equipment as long as several months to several years but does not require data transfer rates as high as those enabled by Bluetooth. ZigBee can be appliance in mesh networks larger two than is possible with Bluetooth. ZigBee compliant wireless devices are expected to transmit 10-75 meters, depending on the RF and the output Power consumption required for a given application, and will operate in the unwarranted RF worldwide (2.4GHz global, 915MHz Americas or 868 MHz Europe). The data rate is 915MHz and 20kbps at 868MHz.

Fig. 2. ZigBee Module

C. RFID Reader
RFID closeness OEM Reader Module has a built-in antenna in small factor. It is construct to work on the industry standard carrier frequency of 125 kHz. This LF reader module with an internal or an external antenna aid communication with Read-Only transponders—type UNIQUE or TK5530 of the air interface. The tag data is sent to the host systems of the wired communication interface with a protocol selected from the module Both TTL and Wiegend Protocol. Radio-frequency identification (RFID) is a technology to electronically record the presence of an object using radio signals. It is used for supply control or timing sporting events. RFID is not a replacement for the bar-coding, but a complement for distant reading of codes and it is less cost compare to bar code reader. The hi-tech is used for automatically identifying a person, a package or an item.
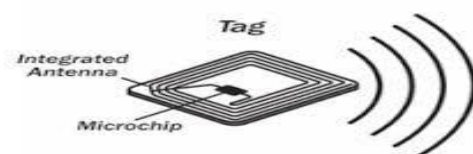

Fig. 3. RFID tag

D. Central Automated Billing System

The fig shows the concept of Central Automated Billing System. Since each cart is attached with product identification device (PID), through ZigBee communication PID sends its information to central automated billing system, there it calculates an overall price for the purchased products. Customer can get their billing information at the packing section according to their Cart Identification Number. Even there's is no need for a cash collector, in case customer uses their debit/credit for bill payment. The Automated central billing system consists of a ZigBee transceiver and a server/system connected to access.
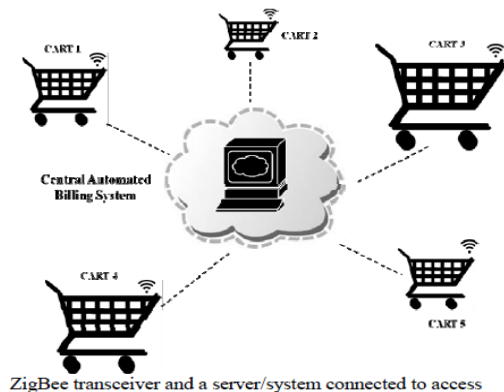

Fig.4. Central Automated Billing System

Product database. The automated billing system will be developed using visual basic. Visual Basic was designed to hold a beginner of the programmers. Programmers can not only create simple Graphic User Interface applications, but to also develop complex applications. Programming in Visual Basic is a combination of visually arranging components specifying characteristic and actions for those components, and writing additional lines of code for more functionality. Since VB defines default characteristic and actions for the components, a programmer can develop a simple program without writing more code. Programs built with earlier versions suffered performance problems, but faster computers and natural code compilation has made this less of an issue.

4. WORKING PRINCIPLE

A customer enters into the shopping mall. On entering, they first pick up a Trolley. Each trolley is built with a RFID reader. When the customer purchases a product, they first scan the RF tag of the product with the help of RFID reader and then places it into the trolley. While the customer scanning the RF tags of the product, a price of the product is to be taken and stored it in the system's memory. Information is stored in the system's memory is compared with the lookup table. If matches are found, then cost, name and weight of respective product gets displayed on the LCD. At the same time wireless module sends the same information to computer for billing purpose with the help of RS232 protocol. Here we are used IR sensor for counting purpose of product. This works as the IR sensor continuously emits IR rays. If we put a product in to a trolley ant at that time there is obstacle for IR rays, then it would result in interruption in counting of products in trolley. This recorded data is stored in the controller.

5. CONCLUSION

The smart shopping trolley application will creates an automated central billing system for the supermarkets and malls. Using PID (product identification), customers will not waste the time near cash counters for their bill payment. Since their purchased product information is transferred to central billing system. Customers can pay their bill through credit or debit cards otherwise pay the cash. The system proposed is low cost, authentic, trustworthy and time-effective and it does not need any special training. There will be reduction in salary amount given to employees, reduction in theft. Also, the system is very time-efficient. Different parameters such as the system parameters of smart trolley like stock name, products cost, product weight etc. it is continuously displayed on the LCD.

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