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SMART SHOPPING CART WITH AUTOMATED BILLING SYSTEM

Mr. MOHAMMED AZHARUDDIN[*1], Mr. YASSER NIZAM[*2],
Mr. WAJID HUSSAIN[*3]
[*1] B. Tech. Student Dept. of ECE, Shadan College of Engineering and Technology
[*2] B. Tech. Student Dept. of ECE, Shadan College of Engineering and Technology
[*3]Associate Professor, Dept. of ECE, Shadan College of Engineering and Technology

Abstract : Today's world have a fast growing population with a wide range of demand from a variety of domains. Customers who need to purchase different products in Walmart or supermarkets needs lots of time and patience in coordinating among them self for successful shopping. In the advancement of technologies, the world is getting automated in many aspects. In this Project, we depict reasonable and cost-effective Smart Shopping Cart with automated billing. Such a framework is appropriate for use in spots such as Walmart & supermarkets, where it can help in lessening work and in making a superior shopping knowledge for the clients. Rather than influencing the clients to sit tight in a long line for looking at their shopped things, this framework helps in mechanizing the easy and comfortable billing process. The shopping is processed with two aspects, with a predefined list and random shopping. These features save time and make shopping easy. Along with these abilities, this system design is also capable of detecting theft by shoplifters. In addition, the Walmart or supermarket management will be able to analyze the shopping behaviors of various customers to arrive at valuable business insights. These will be very beneficial for the retail stores. Accordingly, the management team will have the ability to predict the rate of sales of all individual products and make the stock available is based on the ongoing customer requirements. Overall, this system will ensure that the customers will have the best shopping experience and very often, they visit the Walmart for the shop.

Keywords. Arduino, RFID Module, LCD

Introduction

Now a day's interest in shopping malls is widely increasing among people. In the present shopping malls, customers find various difficulties. Those difficulties are mentioned below. One third of major shoppers buy groceries on a budget. Most of the times, it is only at the end of purchase shoppers come to know that the overall purchase total is greaterthan their budget. Then they spend much time in searching for their desired products and finally overall shopping process becomes more time consuming too. Due to this, several times shoppers couldn't buy all their desired products and miss out few items. Another major problem faced by users is that they have to wait in long queues for billing. Thus the proposed system overcomes all these drawbacks faced by shoppers in shopping

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LITERATURE SURVEY:

Galande Jayshree, Rutuja Gholap, Preeti Yadav in the year 2014 proposed RFID BasedAutomatic Billing Trolley. This paper proposed a system that will be placed in all the trolleys. It will consist of a RFID reader. All the products in the mall will be equipped with RFID tags. When a person puts any products in the trolley, its code will be detected and the price of those products will be stored in memory. As we put the products, the costs will get added to total bill. Thus the billing will be done in the trolley itself. Item name and its cost will be displayed on LCD. Also the products name and its cost can be announced using headset. At the billing counter the total bill data will be transferred to PC by wireless RF modules.

Several previous studies have also discussed the development of marketing applications, including the study entitled "Design of Web-based Marketing Information Systems at BMT(Baitul Maal Wattamwil) Cita Sejahtera". The purpose of this system is a media campaign for the company. This system other than as a promotional media can also process ordering goods, ordering transaction processing, and display the status of the goods, as well as providing reports the purchase of a product level. However, there are still shortcomings in the system, especially in terms of marketing, which is a form of promotion that is carried out is limited to display only items available. There is no specific approach to attract potential buyers to purchase the product supplied. Limited mobility and lack of customer personalization.

The implementation of smart shopping cart using radio frequency identification using the RFID sensors, Arduino microcontroller, Bluetooth module, and Mobile application. Where the mobile is connected to the shopping cart and the application is already installed, the data isshared using the Bluetooth from the arduino microcontroller and the mobile then with Server.

The radio frequency identification Technology has a key role in handling manufactured goods and providing efficient services. Unlike other Technologies like a barcode the RFID doesn't need Line of Sight for the identification of materials. The products are uniquely identified by using RFID tags. There were mainly two classes. RFID.

Devices: active and passive. Active tags either connected to a powered source or use stored energy in a battery. Passive tags not require batteries or maintenance. The RFID reader is responsible for powering the tag and communicates with the tag. The tag antenna receives energy and transmits the unique tag ID. An important feature of the modern RFID is that the tag can contain more information. Due to its potential benefits RFID can be used in many applications.

PROPOSED SYSTEM

In this unit the Arduino microcontroller is attached to a RFID reader and barcode reader. As the user puts the items in the trolley the reader on the trolley reads the tag and sends a signal to the controller. The

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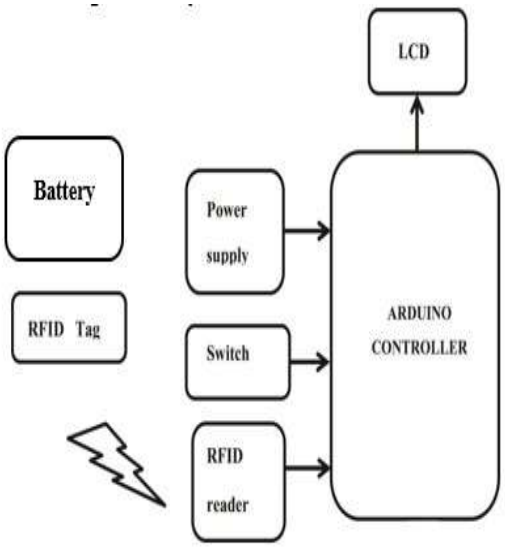
controller then stores it in the memory and compares it with the lookup table. If it matches then it shows the name of item on LCD and also the total amount of items purchase.

Block diagram



ARDUINO

Overview:

Arduino Uno is a microcontroller board subject to the ATmega328P (datasheet). It has 14 pushed information/yield pins (of which 6 can be utilized as PWM yields), 6 essential information sources, a 16 MHz completed resonator (CSTCE16M0V53-R0), a USB alliance, a force jack, an ICSP header, and a reset button. It contains all that ordinary to help the microcontroller; on a crucial level interface it to a PC with a USB association or force it with an AC-to-DC connector or battery to begin. You can intrude with your Uno without anguishing essentially overachieving something mistakenly, most central outcome possible you can trade the chip for two or three dollars and start once more. "Uno" suggests one in Italian and was picked to stamp the presence of Arduino Software (IDE) 1.0. The Uno board and structure 1.0 of Arduino Software (IDE) were the reference sorts of Arduino, direct made to unendingly current deliveries. The Uno board is the first in the headway of USB Arduino sheets and the reference model for the Arduino stage; for a sweeping once-over of current, past, or old sheets see the Arduino report of sheets. • Physical contraptions and sensors Physical contraptions and sensors can amass and see sagacious and multidimensional data,

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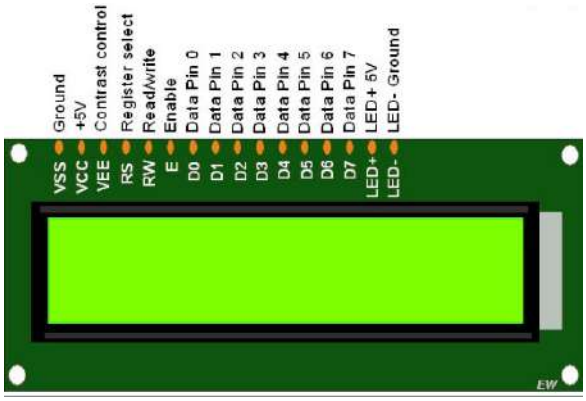
and check of the target state of a function uninhibitedly without human mediation. Besides, when contraptions capacity to get data with presented understanding, gadgets can act and respond. Condition setting will at that point be changed and the contraptions will reach out of the blue. In that limit, this assortment structure will be rehashed perseveringly. • Connection and foundation Association and foundation, for example, cloud, security, covering ceaselessly, security, insistence, and controlling, pull in interminable, solid information and data stream and assessment circles.

LCD

LCD (Liquid Crystal Display) is such a level board show which utilizes fluid noteworthy stones in its major sort of development. LEDs have a gigantic and moving methodology of usage cases for clients and connections, as they can be customarily found in telephones, TVs, PC screens, and instrument sheets.

LCDs were a basic ricochet the degree that the development they eliminated, which breaker light-passing on the diode (LED) and gas-plasma shows. LCDs permitted partners to be all-around more meager than the cathode bar tube (CRT) development. LCDs eat up liberally less force than LED and gas-show shows since they search after the standard of deterring light instead of delivering it. Where a LED emanates light, the fluid tremendous stones in an LCD pass on a picture utilizing foundation edification.

As LCDs have supplanted dynamically sorted out superstar drives, LCDs have started being eliminated by new presentation improvements, for example, OLEDs.



RFID

RFID (Radio Frequency Identification) technology has been around for many years. Prior to the year 2000, common uses for RF-ID in the USA included tollway passes, access ID cards and the tiny ID chips that are inserted in animals for identification. The recent introduction of RFID in the supply chain as well as several mandates has added to the awareness and value of this technology.

RFID tags operate at several different frequencies. The majority of RFID tags operate at either 13 MHZ or 900 MHZ. Think of these two frequencies as the AM and FM bands on your radio. Each one has its advantages. For example, one works better when surrounded by metal while the other will work better over long distances.

13 MHZ (HF) tags are generally better at penetrating liquids and are usually used for access control such as in security cards and wristbands. The read range at this frequency is about 3 feet or 1 meter.

900 MHZ (UHF) tags operate better when reading multiple tags simultaneously, and thus are generally the tag type of choice for inventory purposes. The read range at this frequency is about 3-10 feet or more depending on what type of reader, interrogator or access point is used.

Most RFID tags do not contain any data in them after they are manufactured; they are similar to a blank label waiting for information to be printed on them. To place information in the tag, an encoder must be used. One of the most popular methods of encoding is with an RFID Capable Label Printer that has a built-in encoder and RFID Capable Barcode Label Software.

There are basically three types (called classes) of tags:

Class 0 - these tags are like a license plate in that they are read only and are encoded with data when they are manufactured.

Class 1 - these tags allow you to write the data in the tag and are usually one time programmable (OTP). These are available in either HF or UHF versions and are known as GEN1.

Class 1 GEN2 EPC (GEN2) - these tags are the latest type of UHF tag and are the types of tags most referred to in this document. They are also the tags required for mandates by various suppliers such as Wal-Mart and the US Department of Defense (DOD). In the industry, we refer to these tags simply as GEN2. These tags are 96 bits or larger and contain advanced features such as lock after write and CRC read verification.

The following components are required to write data (encode) to class 1 tags:

Software Application à Encoder Software à Tag Encoder à RFID Tag

The following components are required to read data from the tag:

RFID Tag, Reader, Interrogator or Access Point à Decoding Software à Software Application

IDAutomation.com provides some components of this system including Software Applications, Encoder Software and Tag Writers.

RFID vs Barcodes

Barcoding is a mature technology that has been around for many years, unlike RFID which is still in its infancy. Additionally, the components used to read and write bar codes have come down in price because of this maturity and sales volume. There are many additional issues to consider with RFID, such as those listed below in the Disadvantages of RFID section. However, all things considered, RFID has many advantages over barcoding. In some cases, these advantages outweigh the disadvantages and high cost of the components. Decision makers must carefully consider whether RFID really provides an advantage over barcoding in their business model. Advantages and Disadvantages of RFID

Advantages:

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Inventory efficiency - Because line of sight is not required to read RFID tags, inventory can be performed in a highly efficient method. For example, pallets in a warehouse can be read, inventoried, and their location can be determined no matter where the tag is placed on the pallet. This is because the radio waves from the reader are strong enough for the tag to respond regardless of location.

Return on investment - Though the cost may be high at first, the total cost of ownership should go down over the years and provide a return on investment (ROI), if the implementation provides a significant method to improve business processes.

Vulnerability to damage minimized - barcodes can be damaged in many ways. Although, 2D barcode types such as Data Matrix can be read even when up to 40% of the barcode is damaged.

Disadvantages:

Dead areas and orientation problems - RFID works similar to the way a cell phone or wireless network does. Just like these technologies, there may be certain areas that have weaker signals or interference. In addition, poor read rates are sometimes a problem when the tag is rotated into an orientation that does not align well with the reader. These issues can usually be minimized by properly implementing multiple readers and using tags with multiple axis antennas.

Security concerns - Because RFID is not a line of sight technology like barcoding, new security problems could develop. For example, a competitor could set up a high gain directional antenna to scan tags in trucks going to a warehouse. From the data received, this competitor could determine flow rates of various products. Additionally, when RFID is used for high security operations such as payment methods, fraud is always a possibility.

Ghost tags - In rare cases, if multiple tags are read at the same time the reader will sometimes read a tag that does not exist. Therefore, some type of read verification, such as a CRC, should be implemented in either the tag, the reader or the data read from the tag.

Proximity issues - Tags cannot be read well when placed on metal or liquid objects or when these objects are between the reader and the tag. Nearly any object that is between the reader and the tag reduces the distance the tag can be read from.

High cost - Because this technology is new, the components and tags are expensive compared to barcodes. In addition, software and support personnel that are needed to install and operate the RFID reading systems (in a warehouse for example) may be more costly to employ.

Unread tags - When reading multiple tags at the same time, it is possible that some tags will not be read and there is no sure method of determining this when the objects are not in sight. This problem does not occur with barcodes, because when the barcode is scanned, it is instantly verified when read by a beep from the scanner and the data can then be entered manually if it does not scan.

SOFTWARE TOOLS

Arduino IDE (Integrated Development Environment)

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The Arduino progress condition contains a word processor for including code, a message zone, a book maintains, a toolbar with gets for crucial cutoff regular environmental factors, and an improvement of menus. It interfaces with the Arduino contraption to move activities and talk with them.

Making Sketches

Programming made using Arduino is called follows. These depictions are written in the substance boss. Depictions are saved with the record progress .ino. It has featured for cutting/staying and for looking/dislodging content. The message a region gives input while saving and passing on what's more shows abuses. NB: Versions of the IDE before 1.0 saved draws with the expansion pde It is possible to open these records with understanding 1.0, you will be begun to save the sketch with the .ino progression on save.

The Arduino condition uses the opportunity of a sketchbook: a standard spot to store your undertakings (or depicts). The depictions in your sketchbook can be opened from the File Sketchbook menu or the Open catch on the toolbar.

Tabs, Multiple Files, and Compilation

Connects with you to figure out draws with more than one record (all of which appear in its own astounding tab). These can be typical Arduino code records (no new unexpected new development), C reports (.c speeding up), C++ records (.cpp), or header records (.h).

ADVANTAGES

- It is requires fewer components so its cost is low
- Small in size; due to small size we can place its hardware easily
- Light weight
- Flexible to users
- Easy to operate; anyone can operate it easily

DISADVANTAGES

- Accuracy and processing of system may be slow
- We may have some difficulty in operating with the buses

APPLICATIONS

- Useful for Physically challenged peoples
- Conveying information related operations
- Provides easy communication between the speech impaired people and the natural people
- Used for disabilities
- Handicaps

CONCLUSION

The progression in science & technology development is an unstoppable process. Now & then evolution changing technologies are being invented. We can't imagine the upcoming future in which technology may occupy each & every place. This innovative project idea can be used is places like shopping complexes, supermarkets & malls to purchase the products. Here RFID card is used to securely access every product in shopping places. If a product is scanned & put into the cart, all the required details of the product will be displayed on the LCD screen. Therefore,

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an RFID tag/card is used for accessing the products. hence this project will help in improving the security & also the shopping time can be reduced. It also provides an enjoyable & user- friendly shopping experience to the customers.we have integrated this by using hardware requirements.

Future Aspects:

- This system can be also implemented using LI-FI, NFC & other communication systems.
- This system can be advanced by using Beacon Module instead of RFID Module & including a Load sensor is also a helpful implementation.
- In addition to the product details, nutrition facts of the eatables can be added.
- Automatic track detection & movement of the cart can be implemented by using various sensor technologies.
- Shopping budget limit can be set; when the limit exceeds buzzer should beep indicating this.
- Providing an option to the shoppers to priorly create a shopping list.
- The same system can be used in various places.

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AUTHOR PROFILE

MOHAMMED AZHARUDDIN B.Tech student in ECE from Shadan College of Engineering And Technology, Peerancheru, Telangana.
E-mail Id: azhar102001@gmail.com.

YASSER NIZAM B.Tech student in ECE from Shadan College of Engineering And Technology, Peerancheru, Telangana.
E-mail Id: Yassernizam@gmail.com.

Mr. **WAJID HUSSAIN**, Associate Professor, ECE DEPARTMENT, Shadan College of Engineering and Technology, Peerancheru, Hyderabad
E-mail Id: wajidhussain452@gmail.com.

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