

Smart Shopping Trolley Using Rfid

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Abstract

Nowadays shopping is an easy thing, but waiting in line at a store is not. A bill counter makes it an arduous and boring job. The combination of a rush and the cashier preparing the total bill with a barcode scanner needs more time, which causes very long queues. This smart project consists of an automated billing device that can be integrated into a shopping trolley. A RFID reader is used in this automated billing system, which was controlled using Arduino. As a consequence, whenever the customer places some product in the cart, The EM-18 RFID module detects the item and then displays price of the item on LCD. When the customer keeps on adding the items, the module detects them all, and the value increases accordingly. If the customer modifies their mind and they don't want a product to add to their trolley, they may remove it, and then the price added would be automatically deducted. When the buyer clicks the button at the last of the purchasing process, the items will be added along with the prices of the items, then include the total price to be charged. Then the shopkeeper will use a mastercard to verify the products purchased at the end for verification. As a consequence, this device which is an appropriate tool to use in places like supermarkets, as it can aid in manpower reduction and contributes to a much better shopping experience for customers.

Keyword: RFID (radio frequency identification), Arduino, Universal Product Code (UPC)

I. INTRODUCTION

Customers may use a mall or market to purchase daily necessities such as branded foods, snacks, clothing, electric and electronic devices, and so on. In today's world, there are a huge number of malls, both large and small. The mall will be very busy during the holidays and weekends. The public was clamoring for more and spending more time in the mall. Purchasers spend time at the billing counter for billing the purchased item after paying for a longer period of time.

Continuous change was needed within the common billing system in order to provide purchasers with a higher level of shopping experience. We've devised a practical SHOPPING TROLLEY to address these issues as well as to vary and enhance the current scheme. This can be accomplished by simply applying RFID tags to the items and placing an RFID reader on the shopping trolley with an LCD monitor. Customers will need to know the value of each item scanned with RFID and LCD in this system; the overall price of the item will be shown on the LCD, as well as a brief description of the merchandise.

II. EXISTING SYSTEM

We are currently using the system in malls with the assistance of a barcode scanner. Vendors use a barcode scanner to inspect the product. This is expected to be a lengthy operation, with customers having to queue for long periods of time. As a result, this is also one of the justifications for many people having to go to the mall and wait in a long line to shop for a few things.

Disadvantages

- The individual must be able to read the product's barcode.
- Barcodes must be visible on the product's surface.
- To read a barcode, we must have a clear line of sight.
- Dirt, moisture, abrasion, and packaging contours can all reduce the readability of barcodes. Reading distance is short.

III. PROPOSED SYSTEM

We want to purchase more goods to stop the current drawback. New forms of innovations have emerged in recent years. Customers must place an item in a smart shopping trolley. Every product has a unique identifier. The product id can be read by an RFID reader. This may have been beneficial to consumers. Customers can benefit from any of these solutions. Such solutions help customers save time and money.

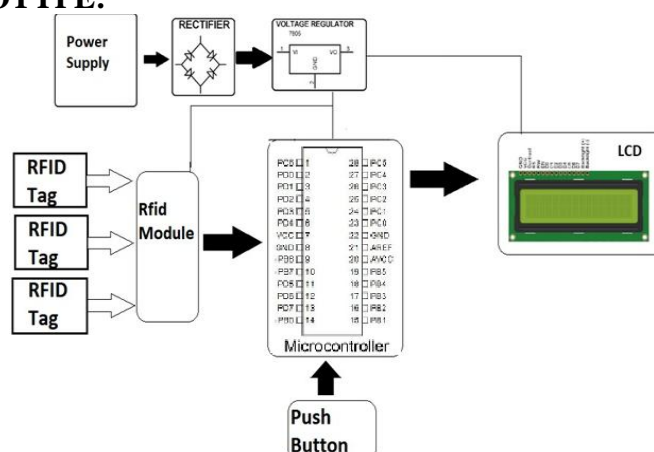
Advantages

- The product's RFID tag is automatically read.
- RFID tags are often embedded in products. RFID tags do not need a line of sight to be read, and they are not affected by such factors.
- Reading distance is long.
- RFID tag with READ/WRITE functionality.

IV. WORKING

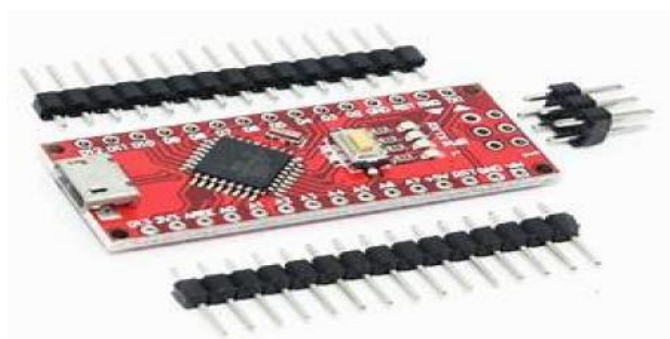
The Arduino is connected to all of the remaining modules, as seen in the diagram above. The microcontroller is initialised and set to the required settings after being charged up with a 9v battery. Now the device is ready to go, which means the RFID card and thus the tag are frequently scanned. The RFID reader then retrieves all of the small print from the scanned card or tag, and if the scanning process is accurate, the product details are transferred to the microcontroller's memory, and then to the LCD module, where they will be displayed on the LCD screen. To pass or retrieve information from the RFID card or tag, the RFID module employs the SPI communication technique [4]. Following the completion of the shopping, the entire bill will be reflected on the LCD screen; each card or tag will serve as a product, with the merchandise specifics pre-set or poured into the cardboard. The software's entire operating process is referred to as Arduino IDE.

V. SYSTEM PROTOTYPE:



VI. HARDWARE DESCRIPTION

The Arduino Nano and the Arduino UNO are very close. They will share software since they both use the same processor (Atmega328p).



The measurements of both UNO and NANO are a significant difference. Since UNO is twice as big as Nano, it will take up more time in our project. Uno is not breadboard compatible, although Nano is. To programme an Uno cable, we need a standard USB cable.

A liquid crystal display (LCD) is a display module that creates a transparent image by using liquid. The 162 LCD display is a very basic module that can be used in a wide range of applications. A 16-character display will be split into two sides. A 57% pixel matrix is used to represent each character. This IC's job is to take the commands and data from the MCU and process them so that they can be displayed on the LCD screen in a meaningful way.

A frequency identification reader is a device that gathers information from RFID tags, which are used to track specific objects.

The tag transmits the details to the RFID reader through the radio waves. RFID reader brings auto-ID technology to the next step by allowing the tags to be read without the line of sight and gives a read range from a few cm to over 20 m, depends on the type of RFID reader.

Jumper wires are the wires with connecting pins on both sides which can be used to connect two ends without the using solder. Jumper wires mostly used with breadboards and other

prototyping tools for make it simple to change the circuits as required. A jumper is a short length of conductor used in electronics and computing to close, open, or bypass an area of an electronic circuit.

RFID tags are used for tracking the system that identifies products using barcodes. RFID tags make use of radio frequency technology. These waves carry information from the RFID tag to a scanner, which then sends information to an RFID computer programme.

RFID tags are used to track products, but they can also be used to track vehicle, animals. An RFID tag is often referred to as an RFID chip.

Push Button is a switch mechanism for controlling any part of the system. Buttons are commonly made of hard materials such as plastics. This surface is either flat or shaped which allows the human finger or handle to easily depress or push it. The Buttons are typically biased switches, though many unbiased buttons do need a spring to return their unpushed state due to their physical design. Pressing, depressing, mashing, slapping, kicking, and punching are all terms for "pushing" a button.

VII. SOFTWARE DESCRIPTION

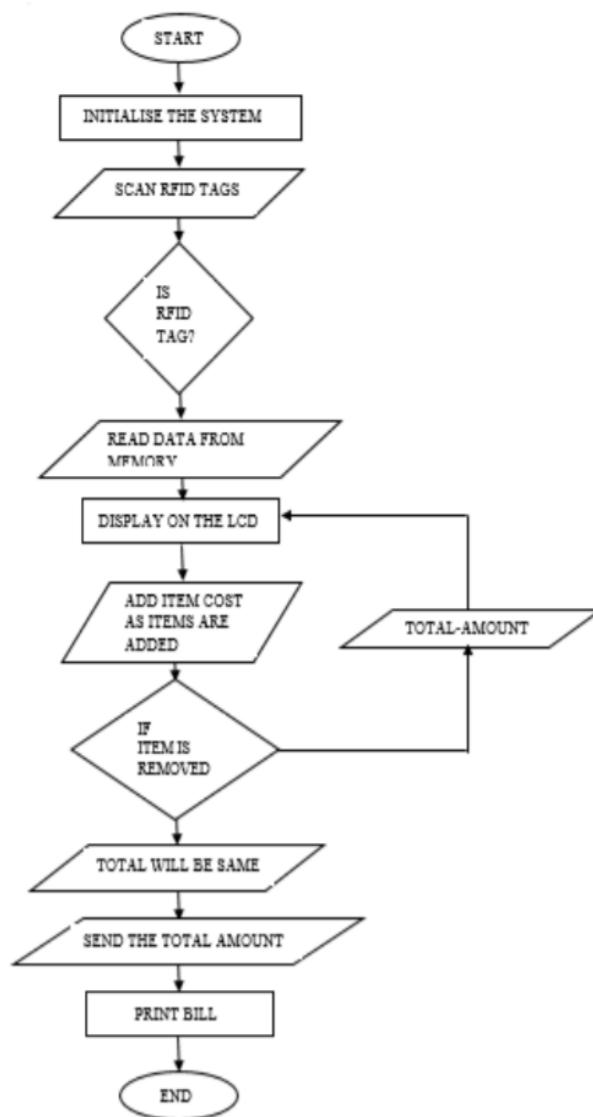
ARDUINO IDE

The Arduino IDE which includes a text editor which is used for writing code, message field, a toolbar containing buttons for common functions and set of menu icons. It links to Arduino and Arduino hardware used to upload the programmes. Essentially, IDE converts and compiles our sketches into Arduino-compatible code.



We have used the Arduino IDE to monitor the functions of our board by sending a series of instructions to the board's microcontroller (referred to as uploading software). Furthermore, the Arduino IDE makes programming simpler by using a simplified version of C++. Finally, Arduino offers a regular form factor that condenses the microcontroller's functions into a more manageable kit.

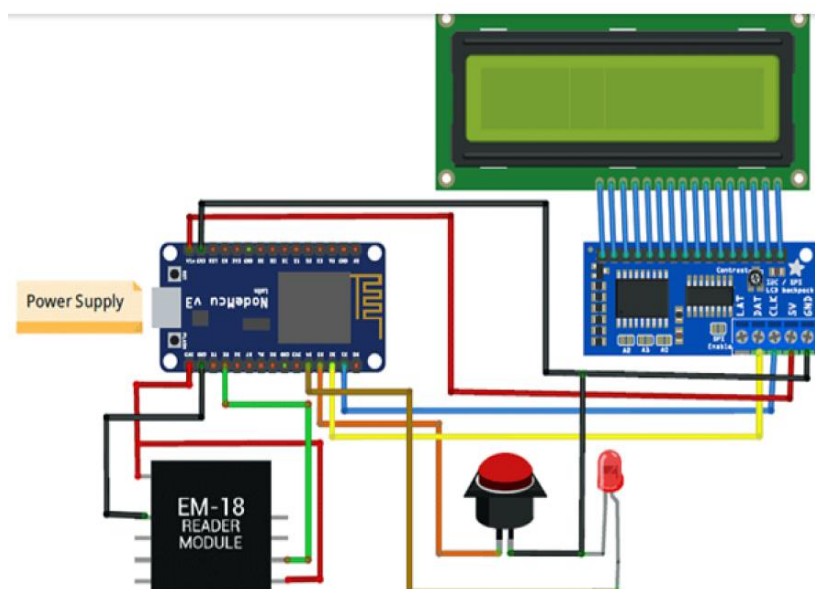
VIII. FLOW CHART



ALGORITHM:

- Begin the process.
- Scan the RFID tags. Check the RFID tags. If the tag is scanned, the information can be read from memory by the RFID reader.
- On the LCD, the data and cost will be shown.
- The object is automatically inserted, and the total cost is measured and displayed on the LCD.
- If any object is omitted, the overall cost is subtracted from the cost of the removed item, and the process is repeated.
- The procedure has come to an end.

IX. CIRCUIT DIAGRAM



X. ADVANTAGES OF OUR SYSTEM:

- Customers can self-check out instead of going to the cash register, which is a huge advantage of using the smart shopping cart. Since the smart shopping cart has a scanner and an interactive computer.
- Customers will scan the products' barcodes and add them to their carts directly.
- Shopping smart carts have a number of benefits over traditional carts as a result of this.
- The product's RFID tag is automatically read.
- RFID tags can be embedded in the product. To read RFID, no line of sight is needed.
- RFID tags are unaffected by such circumstances.
- RFID tag with READ/WRITE capability and long reading distance.

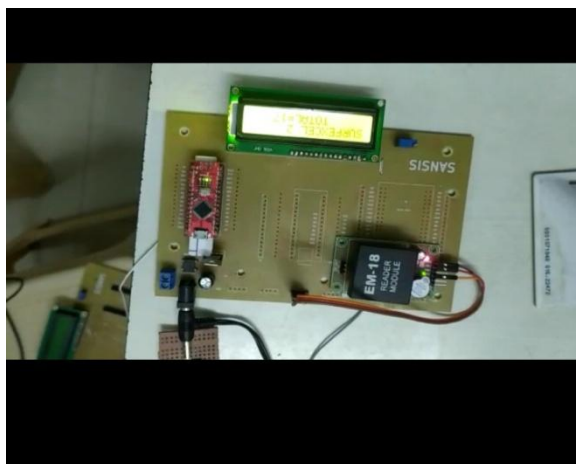
XI. RESULT

As a result of the research, the intelligent smart trolley with RFID was successfully launched. RFID modules are used to search the RFID reader, which contains product details. These details will be sent to Arduino and then shown on the LCD.

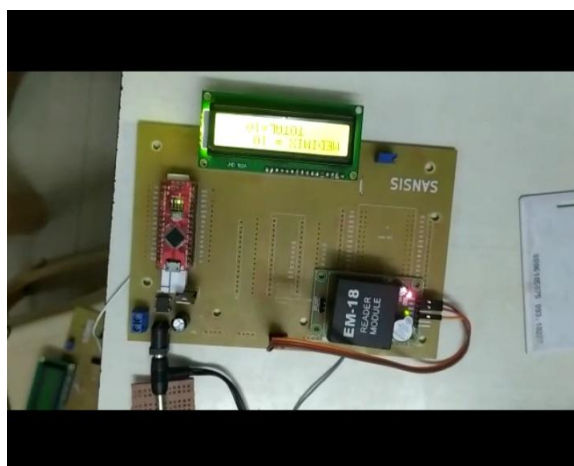
Product 1:



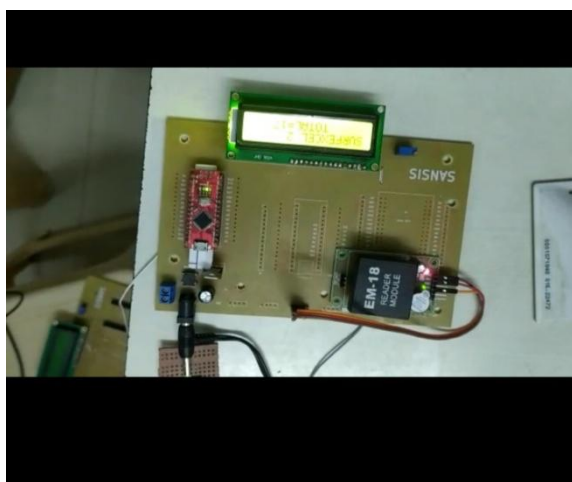
Product 2:



Product 3:



Product 4:



XII. CONCLUSION & FUTURESSCOPE

Science and technology advancement progress is an unstoppable method. Every now and then, evolution-altering technologies are created. We can't imagine a world in which technology would pervade every aspect of life. To obtain goods, this groundbreaking project concept is often used in locations such as shopping centers, supermarkets, and malls. In this case, an RFID card is used to gain safe access to any product in a store. When a product is scanned and added to the cart, the LCD screen will display all of the product's specific details. As a result, an RFID tag/card is used to gain access to the items. As a result, this initiative would help to improve safety while also reducing shopping time. It also offers buyers a pleasurable and user-friendly shopping experience.

REFERENCES

- [1] F. Xia, L. T. Yang, L. Wang, and A. Vinel, "Internet of things," International Journal of Communication Systems, vol. 25, no. 9, p. 1101, 2012.
- [2] P. Castillejo, J.-F. Martinez, J. RodriguezMolina, and A. Cuerva, "Integration of wearable devices in a wireless sensor network for an e- health application," IEEE Wireless Communications, vol. 20, no. 4, pp. 38–49, 2013.
- [3] N. Mitton, S. Papavassiliou, A. Puliafito, and K. S. Trivedi, "Combining cloud and sensors in a smart city environment," EURASIP journal on Wireless Communications and Networking, vol. 2012, no. 1, p. 1, 2012.
- [4] T. Song, R. Li, X. Xing, J. Yu, and X. Cheng, "A privacy preserving communication protocol for iot applications in smart homes," in to appear in the International Conference on Identification, Information and Knowledge in the Internet of Things (IIKI) 2016.
- [5] T. Shanmugapriyan, "Smart cart to recognize objects based on user intention," International Journal of Advanced Research in Computer and Communication Engineering, vol. 2, no. 5, 2013
- [6] SnehaAngal "RFID Arduino Based Automated shopping cart System" International Journal of Science & Research (IJSR) Volume 5 Issue 7, July 2016
- [7] Bhagyashree.Chat ,Prof.J.G.Rana , "Smart trolley system using Raspberry pi and Beacon Module. "International Research Journal of Engineering & Technology (IRJET),2016
- [8] KomalManchhirke, PriyankaGoche, RupaliRathod, RinkuPetkar, ManoharGolait a new technology smart shopping cart using RFID and ZIGBEE, Vol.5 Issue.2, pp.256-259, February 2017.

- [9] G.S.Rajagopal, Mr.S.Grout, M.Janarthanan Smart intelligent system for shopping and billing, Vol.3 Special Issue.19,pp.339-342,2016
- [10] R. Rajeshkumar, R. Mohanraj, M. Varatharaj Automated Barcode based bills calculation by using smart trolley,vol.6, Issue.3,pp.2539-2542,march 2016.
- [11] 8052 microcontrollers: an applications-based introduction
- [12] SatishKamble, SachinMeshram, Rahul Thokal&RoshanGakre, ''Developing a multitasking shopping trolley based on RFID technology'', Vol.3 Issue.6,January 2014
- [13] Microchip PIC16C84, a reprogrammable EEPROM-based 8-bit microcontroller 1993
- [14] H. H. Bi and D. K. Lin, "RFID-enabled discovery of supply networks", IEEE Trans. Eng. Manag., vol. 56, no. 1, pp.129 -141,2009.
- [15] Y. J. Zuo, "Survivable RFID systems: Issues, challenges, and techniques", IEEE Trans. Syst., Man, Cybern. C, Appl. Rev., vol. 40, no. 4, pp.406 -418, 2010. 7. S. S. Saad and Z. S. Nakad, "A standalone RFID indoor positioning system using passive tags", IEEE Trans. Ind. Electron., vol. 58, no. 5, pp.1961 -1970 ,2011.