

Smart Cart Billing using RFID

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Abstract

In the modern age of technology in which most of the customers are in the queue in the supermarket for shopping as it is a highly time-consuming process. A huge crowd in the supermarket at the time of discount offers or weekends, the waiting time is very high due to the barcode-based billing process. In this proposed method, Smart Cart Billing using RFID is proposed which consists of Radio Frequency Identification (RFID) sensors, Arduino microcontroller, and Mobile application. RFID depends on wireless communication. One part is the RFID tag attached to each product and the other is an RFID reader that reads the product information efficiently. Then shopping information is sent to the server using wireless communication. After this process, each product information is displayed in the Mobile application. The customer easily manages the shopping list in the Mobile application according to preferences. This experimental prototype is designed to eliminate time-consuming shopping processes and quality of services issues i.e. the Other system takes 10 minutes while our proposed system takes 5 minutes, lower the total manpower requirement from the billing counter and increase efficiency overall. The proposed system can easily be implemented and tested at a commercial scale under the real scenario in the future. That is why the proposed model is more competitive as compared to others.

Keywords: RadioFrequencyIdentification(RFID)sensors,Arduinomicrocontrollerand Mobileapplication.

1. Introduction

An innovative product with societal acceptance aids the comfort, convenience, and efficiency in everyday life. Purchasing and shopping at malls are becoming daily activities in cities. Nowadays there is a lot of rush at these malls on holidays and weekends. People purchase different items and put them in a trolley, after completion of shopping, one needs to go billing counter for payment. There are some existing ways to resolve the issues that are declared on top of however the effectiveness still takes into account corrigible. Examples of existing downside finding techniques are subbing the traditional approach of keying item per item by hand to the register with the technology of barcode scanning wherever the cost is stored in the barcode, and also set up a client information counter to help the client if there are any inquiries about the items at the shopping mall. In this paper, "SMART CART BILLING USING RFID" being developed to assist a person in everyday shopping in terms of reduced time spent while purchasing. Low cost, easily scalable, and robust system for assisting shopping to the customer. The smart shopping cart system allows customers to manage their shopping lists while shopping and only pay the bill at the checkout counter. The cart has the power to calculate mechanically and show the entire costs of all the products within it. In android, a QR code reader is used for the billing. Through the android will pay the bill the amount will reduce from the user's wallet. Customers can buy a large number of products in very little time with less effort.

2. Related works

In [1], the authors have developed an android application that can help shoppers in searching for items in the store. the application has two screens corresponding to searching and map. The user can type in the products in the search bar. A centralized server returns available results for the search. On selecting the preferred search result, the map screen displays the location of the chosen item on the floor plan of the store. in [10], we see how the authors have built an android application for an educational institute. The software android studio is used to develop the application. Android Studio has a large number of diverse views available for the development of the application. Some of the common views are the button, scroll view, list view, checkbox, search view, etc. A layout editor that supports drag and drop of components makes the app more user-friendly. In [13] it describes a bookstore management application that is used to administrate the transaction of books. Users have to register and make an account during the first time they log in. A mobile application to evaluate English pronunciation skills is reported in research work [6]. In this app, the user is provided with random English words which are fetched from the SQLite Database. The user has to pronounce the words. The system compares the received input with the database and notifies whether the pronunciation is correct or incorrect. In [5] the authors have developed an android application that can track the nutritional consumption of the users. The application was developed using Android Studio. The app can provide tips to the user for improving his/her diet. In [9] the authors have introduced a location-based application for shopping assistance. The users can search for nearby shops where a particular product is available. The location of the user is determined by the GPS (global positioning system) system of the mobile phone. In [2] an Android application for controlling a robot is discussed. The application is used to achieve the movement of the robot. A Bluetooth module along with an 8051 microcontroller is used to receive data from the smartphone. In research [10] the authors introduce a wheelchair controlled by an android application. The application acts as a wireless control system for the wheelchair. The application is developed using the tool MIT app inventor. Bluetooth is used to connect the application to the wheelchair. In [6] presents the implementation of an android app that functions as a user interface to control the movement of a pole climbing robot. In [3] the authors have given a detailed comparison on various platforms for android development. The platforms that have been reviewed are JAVA ME, .NET CF, Flash Lite, and Android. Various parameters like run time memory requirement, device support, User Interface support, development languages, deployment methods, etc. are evaluated for these platforms. In [11] authors identified the design requirements of a smart shopping cart that uses RFID readers and tags for the total price calculation. The RFID reader enables the user to pay the bill using the cart itself and thus avoids the tiring billing queues. The entire setup was made and they have also designed a secure communication protocol to make the system more secure. A system capable of visualizing the data generated by biosensors for monitoring ICU patients is described in [7]. Roving's Bluetooth module RN-42 is used to transmit the data from the sensors to the android device. The android interface is programmed to reduce the noise in order to make the readings clearer, described in the paper [12].

3. Proposed method

Radio Frequency Identification (RFID) is changing into preferred technology as another to barcode systems. RFID systems give automatic identification methods, counting on storing remotely retrieving knowledge mistreatment RFID tags or transponders. An RFID tag is an associate object that may be connected to or incorporated into a product, animal, or person for the aim of identification mistreatment radio waves. Chip-based RFID tags contain silicon chips and antennae. In this paper, we have developed a smart shopping cart system that allows customers to manage their shopping lists while shopping and only

pay the bill at the checkout counter. The cart has the power to calculate mechanically and show the entire costs of all the products within it.

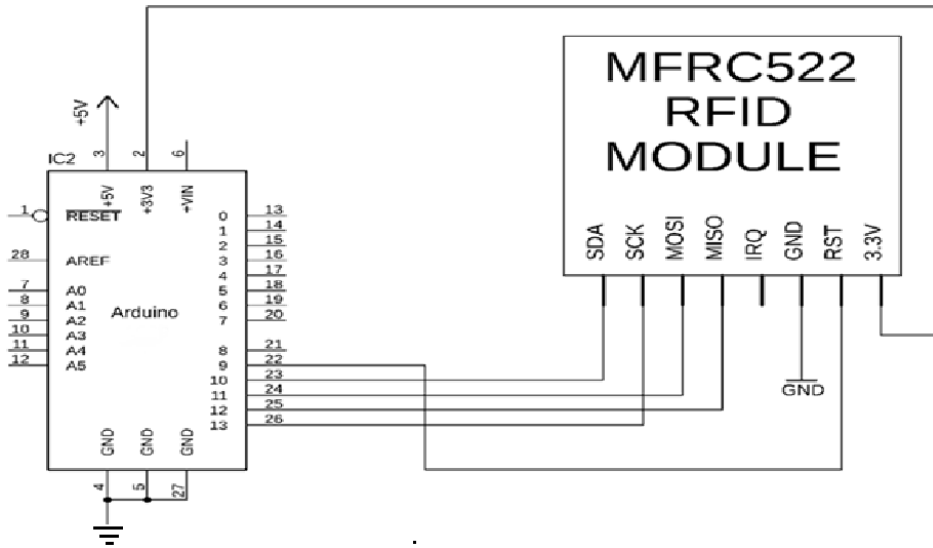


Figure 1 Pin Diagram of MFRC522

4. Results and discussion

The barcode system had various drawbacks including the strict requirements on the line of sight and its need to be placed in one particular boundary while scanning, not to mention the issues concerning its durability and inability to update information. The only constraint that RFID scanning is known to have is the distance and range coverage. RFID tags are durable and allow constant updates of information as well as a rewrite of data to account for changes. They can also operate in extreme temperature conditions and are not susceptible to physical wear and tear or damage underwater. This makes the process reliable, flexible, and adaptive. The door fixed along with the servo motor ensures that until the payment is done, no unscanned product is placed inside the trolley. The availability of multiple modes of payment through digital wallets or bank accounts ensures that every single penny is paid for and prevents the occurrence of penny scams. The proposed project is feasible as it is built on technology that already exists. We have improved it by eliminating the long waiting time of the queue at the time of billing, secured it by locking after completion of shopping, and made the app available to all customers using the ionic framework.

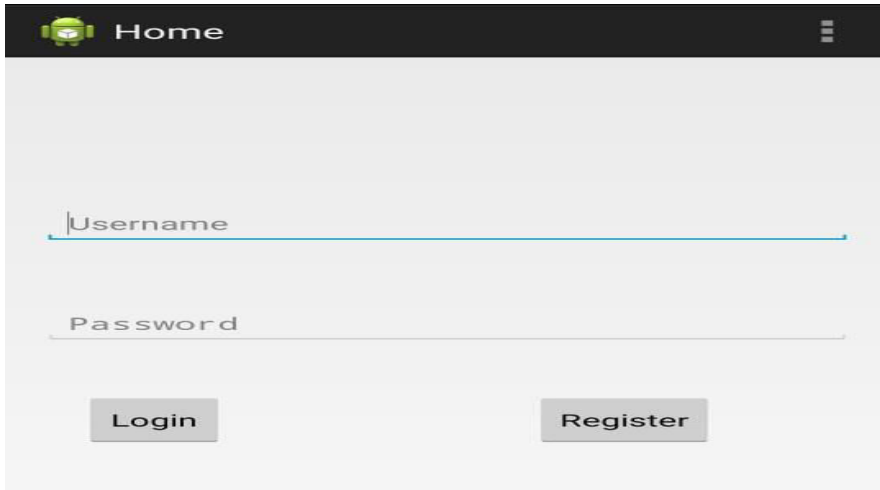


FIGURE 2 Home Page

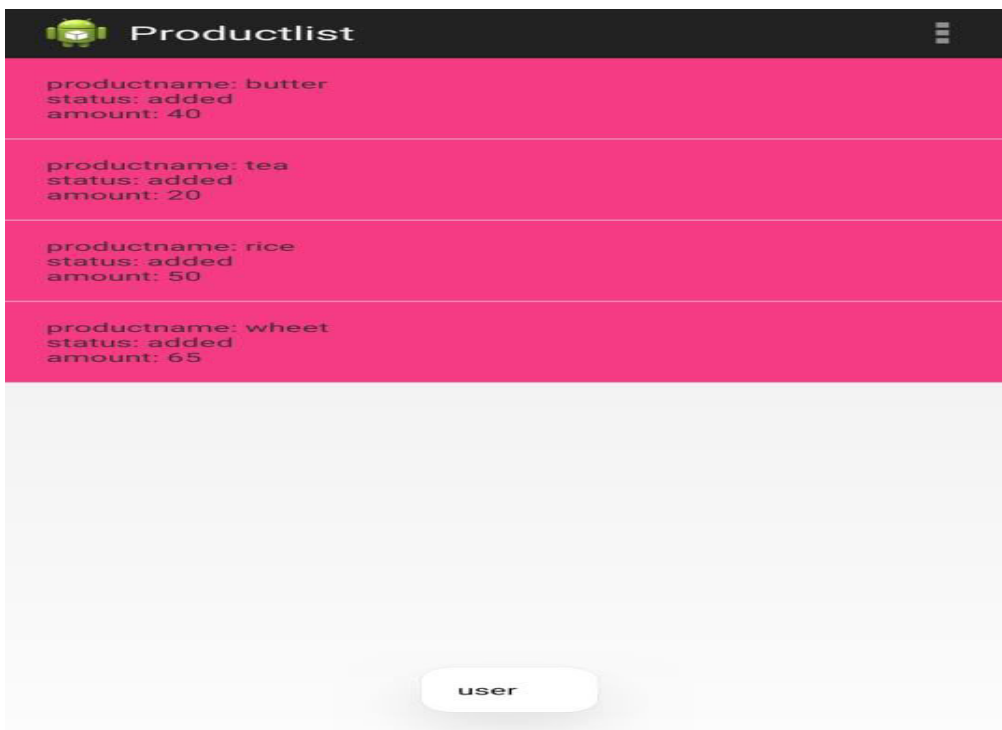


FIGURE 3 Product information



FIGURE 4Payment Completion Page

5. 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 [5]. This innovative project idea can be used in 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 mobile application. Therefore, 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.

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