

## Contact Less Smart Shopping Trolley with Automated Billing for Social Distancing

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### Abstract

The smart shopping trolley system helps customers while shopping. The trolley has an automatic billing system and it allows the customer hands free shopping by which he or she can avoid long queues for billing and experience contact less smart shopping with automated billing system. The products purchased by the customer and their cost will be automatically updated to the blynk app via LAN and that bill will automatically send to the administrative system in the shop through the Internet of Things(IoT). This helps customer by replacing tedious process of pulling and pushing the trolley and saves time spent in the billing counter. The automatic billing process can be achieved through radio frequency identification (RFID) tag and reader.

**Keywords**— Raspberry pi, RFID reader and tag, LCD, Buzzer, Push button, Power Supply

### 1. INTRODUCTION

This saves them from going into different shops to purchase only a limited type of products. In the modern world, every supermarket and hypermarkets employ shopping baskets and shopping trolleys in order to aid customers to select and store the products which they intend to purchase. The customers have to drop every product which they wish to purchase into the shopping cart and then proceed to checkout at the billing counter. The billing process is quite tedious

and highly time consuming and has created the need for shops to employ more and more human resource in the billing section, and yet waiting time remains considerably high. In this project, we seem it fit to propose the “Smart shopping trolley with automated billing using Arduino” which aims to reduce, and possibly eliminate the total waiting time of customers, lower the total manpower requirement and expenses for markets and increase efficiency overall.

Now a day’s human lifestyle has changed and has become more hectic. Time is money. As people don’t have much time to spend for shopping which is an inevitable thing. Hence, they prefer shopping in the malls so that they can get all the products at the same place.

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## 2. LITERATURE REVIEW

The robotic shopping cart is designed with data imparting transactions and aiding behaviour's to be used inside a shopping mall. As an end result, the robotic pursuits to allow customers discover its useful services and growth the popularity for the clients who're interested by the shopping mall. To put in force a useful purchasing help for the robot shopping cart, the powerful buying statistics inclusive of recommendation and course may be supplied as a similar manner to the information desk.

The product localization ability of the robotic shopping cart can assist the customers with the traversing capability of the shopping mall direction and virtual flyers while customers with the robot drawing close the precise places. This service is much like that a workforce member distributed flyers for promoting. Thus, the combination of flyer-distributing and product information offering is considered.

The automatic shopping trolley has been created with the sensors for the ease of automatic movement of the trolley. Here, they have used IR sensor in the trolley to detect the customers. If the customer stops at a place for taking the items, the trolley stops at a maintained distance which had been programmed into the microcontroller.

In addition, they have also introduced the automatic billing system to avoid the queue at billing counter. The trolley will have a barcode reader and each product will have a RFID tag. When the customer wants that product, he/she can scan the product tag and can place it inside the trolley. The LCD screen in the trolley will display price of each product when it is scanned and also it displays the total amount of the shopping so that the customers can avoid queue at the counter. The trolley stops when another customer interrupts between and there will be many confusions and clashes as there is no obstacle avoidance system been implemented

## 3. EXISTING SYSTEM

The Existing system is complex design where the trolley needs to be connected to the customer's cell phone and requires Bluetooth connection to work which is tedious process and time consuming. The cx has to wait in long queues to pay the bill again. The flaw of the system is the item has to be checked again at the billing counter as to verify with the bill generated in order to cover come the problem we are going with the proposed system.

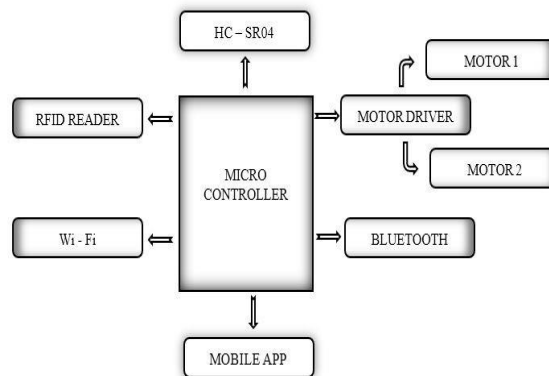


FIG 1: EXISTING MODEL

#### 4. PROPOSED SYSTEM

In the proposed system we are presenting more simplified way of shopping it is divided into two parts.

In the first part the customers have to be register as a premium user with the super market as to use the smart trolley else it works as a regular trolley which helps to avoid any thefts.

In the second part the customers are authenticated with a unique subscription id and will be allowed to use the smart trolley, customer can now scan the item to add to their cart. If the customer decided to remove the item after scan the customer as also do so. The total bill will be displayed on the screen as trolley and the number of scan items.

The system is built on raspberry pi which works as a server to maintain the database of the item remaining in the shop. It also allows the payment gateway for the customer to pay after they complete the shopping. So, the customer doesn't have to wait at the counter to check for the items again.

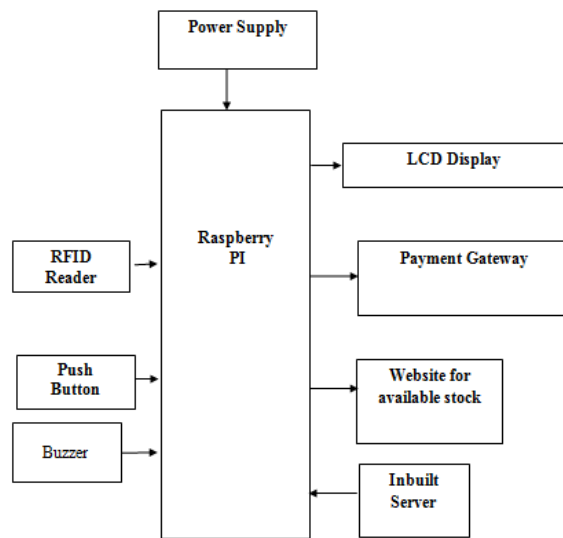


FIG 2: PROPOSED MODEL

#### 5.SCHEMATIC MODEL

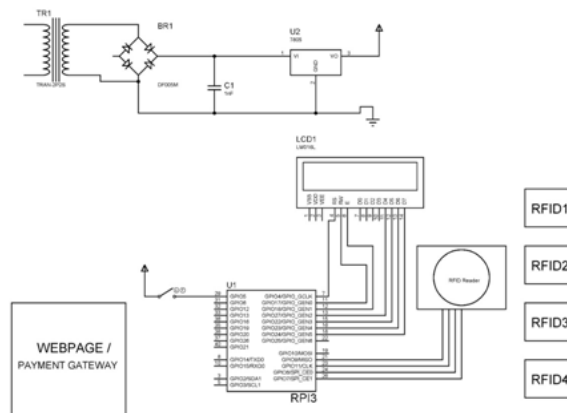


FIG 3: SCHEMATIC

#### 6. COMPONENTS

**Microprocessor (Raspberry Pi 3):**

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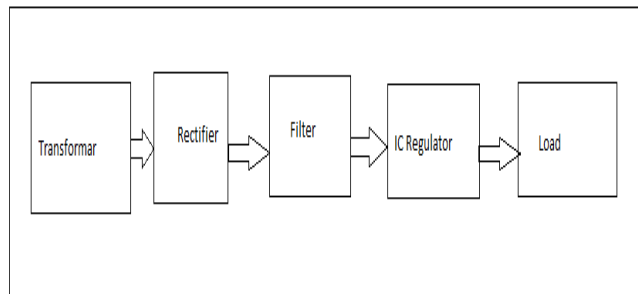
RASPBERRY PI 3 is a development board in PI series. It can be considered as a single board computer that works on LINUX operating system. The board not only has tons of features it also has terrific processing speed making it suitable for advanced applications. PI board is specifically designed for hobbyist and engineers who are interested in LINUX systems and IOT (Internet of Things).RASPBERRYPI plat form is most used after Arduino. Although overall applications of PI are less it is most preferred when developing advanced applications. Also, the RASPBERRY PI is an open-source platform where one can get a lot of related information so you can customize the system depending on the need.



**FIG 4: RASPBERRY PI 3+**

### **Power supply:**

A power supply is a hardware component that supplies power to an electrical device. It receives power from an electrical outlet and converts the current from AC (alternating current) to DC (direct current), which is what the computer requires

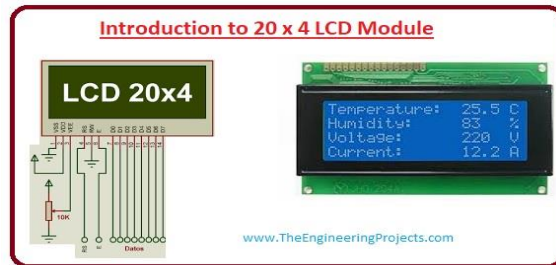


**FIG 5: POWER SUPPLY**

### **LCD:**

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day-to-day life, either at PCO's or calculators. The appearance and the pin outs have already been visualized above now let us get a bit technical.16×2 LCD is named so because; it has

16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots



**FIG 6: LCD 20X4**

**RFID Reader:**

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read.



**FIG 7: RC522**

**Buzzer:**

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.



**FIG 8: BUZZER**

**Push button:**

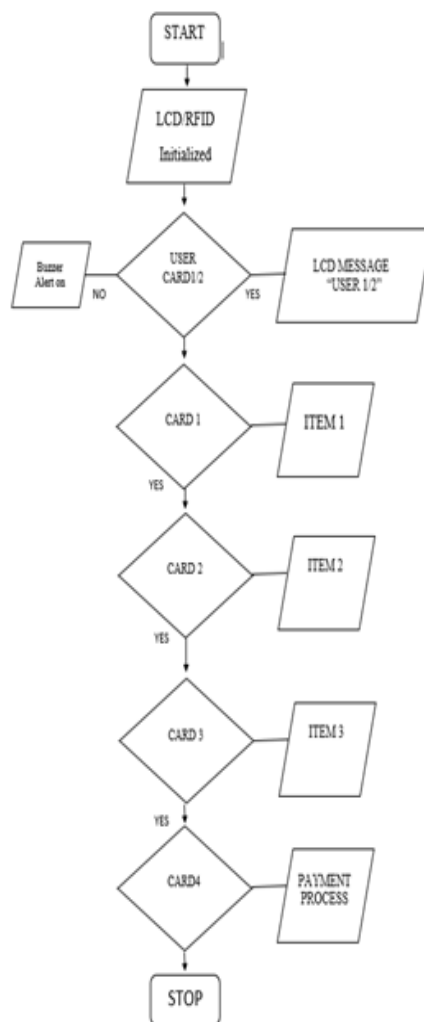
## Contact Less Smart Shopping Trolley with Automated Billing for Social Distancing

A push-button (also spelled pushbutton) or simply button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.



**FIG 9: PUSH BUTTON**

### 7. FLOW CHART



## FIG 10: FLOWCHART

### 8. RESULTS AND CONCLUSION

The Project “Contact Less Smart Shopping with Automated Billing for Social Distancing” has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus, contributing to the best working of the unit. Secondly, using raspberry pi and with the help of growing technology the project has been successfully implemented.

Contact Less Smart Shopping Trolley with Automated Billing for Social Distancing helps customers in shopping. It can reduce the time waiting in a queue for billing and payment. The bill is sent to the admin system application for references and payment. The application in the admin system allows the admin to change the cost of the product if there are any changes in the price of a particular product and that is reflected in the cost of the product while billing.



FIG11: HARDWARE RESULT

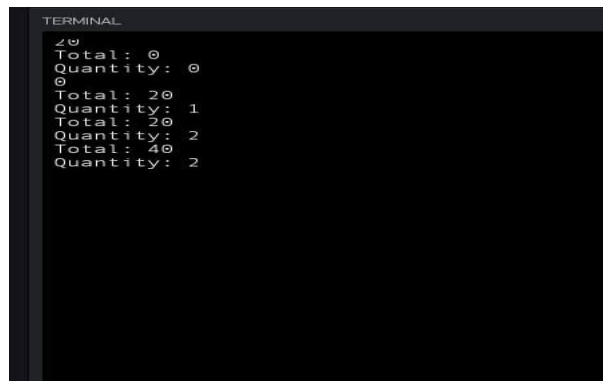


FIG 12: SERVER TERMINAL

### 9. FUTURE SCOPE

The bill sent to the admin system can be stored and the stored database can be used for business analysis. Using business intelligence tools or big data analytics a particular customer

can be provided with the offers in shopping. The bills can also be sent to the customer's mail id with the help of stored customer data.

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