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IOT BASED APPLICATION FOR SHOPPING CART TROLLEY

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1. Abstract:

The standard of living for people has improved thanks to contemporary technology. Shopping centres experienced heavy crowds as a result. We need to speed up the billing procedure to handle the enormous audience. This is accomplished utilising an RFID-based smart shopping system. The bill is generated and shown once each item in a smart shopping cart is read individually. The customer pays the bill using their pre-charged cards provided by the shopping centre after the final bill is generated. The goal is to cut down on the amount of time required for the billing system.

2. Introduction:

One of the challenges in the modern shopping system is having to follow a long queue through the time-consuming billing process.Thus, this project uses an automatic billing system based on Rfid technology to shorten the average time spent by customers at the shopping mall.

The primary objectives of the project are to please the customer and shorten the time spent on the billing process, which is accomplished by having customers finish their billing in the trolley as opposed to standing in queue even for a few items. After a quick scan, the customers must add the items to the cart, and once the shopping is complete, the finalised cost will be shown. The consumer had the option of paying their bill using the pre-recharged customer card that the shop offered.The entire information will then be submitted to the shopping mall's central office.

3. Literature Survey and Related Work:

According to our knowledge, there are very few articles that discuss the automatic supermarket shopping cart with RFID. Sainath (2014) used an automated shopping trolley for supermarket billing that made use of barcode technology to bill things as the client scanned them. The bill will be sent to the central billing system, where the customer can pay by presenting a unique identification. Line of sight is a requirement for barcode scanning, and its boundary should be fixed inside it. Budic (2014) created a system for shopping utilising RFID that optimises the lineups at cash registers. The RFID is used to scan products, and the information is then saved in a database that may be paid for online or with a single bill. It also uses web application to maintain entire shopping details. It necessitates web application server maintenance. For the items that the consumer unintentionally dropped into the cart, no appropriate actions have been performed. DhavaleShraddha (2016) developed an IOT-based intelligent trolley for shopping malls that employed RFID technology for in-store invoicing and an ESP module for bill management. The server where the central billing unit will handle the customer's payment will receive the payment information. The ESP module will function as a wireless communication short-range Wi-Fi chip.

The implementation of a smart shopping trolley using RFID and ZigBee by Komal Ambekar (2015) created a significant challenge for the customer because bills are generated by scanning products in the reader and sent to the central billing department, where they can be paid at the counter. Hsin-HanChiang (2016) achieved a concept of automated shopping trolley with automated billing where they employed face recognition for user verification. Smart shopping trolley with customer-oriented service. It is not an easy operation because it might be difficult and inaccurate to accurately identify shoppers during busy shopping hours.While employing recognition for authentication, numerous mistakes are conceivable. Smart RFID based Interactive Kiosk Cartusing wire less sensor node by Narayana Swamy (2016), applied RFID for automated shopping. For user contact and billing maintenance, they used a dedicated website. Every user with a unique ID can visit the web server to view information about invoices and bill payments. Internet access is required for this kind of service. Therefore, the process could fail as a result of erratic internet, and server error issues could

also develop as a result of heavy load. Vinutha (2014) uses RFID technology for shopping and automatic billing that integrates with a server end. Products are scanned using radio frequency identification, and after that, a bill is generated on the server end and sent to the consumer. This necessitates server upkeep and internet connectivity for both the customer and the store owner. According to Prateek Aryan's (2014) proposal, a smart shopping trolley with automatic billing and Bluetooth transfers billing from the trolley to the user's Android smartphone. One cannot expect every consumer to own a smartphone, and Bluetooth can experience connectivity problems and limited range. Suganya (2016) created an automated smarttrolley with smart billing using Arduino. They also created a model for automatic shopping using Arduino and an Android application, which also requires a constant network connection. Every consumer may or may not have a mobile device that runs Android. Instability in the network causes billing delays. Vanitha Sheeba and Brindha Rajkumari (2015) developed an RFID-enabled smart billing system that uses ZigBee and RFID to communicate generated bills to a server before being collected by a person at the bill counter who can identify consumers.However, since only bill creation is automated by scanning using RFID, this will once more result in a billing queue. In our design, payments are made in the trolley itself through a secure and straightforward invoicing mechanism. Because it does not require Wi-Fi, ZigBee, an ESP module, or any of the other technologies mentioned above.The customer card or the ATM card may be used to pay for it. The aforementioned ideas do not guarantee product security against intentional or unintentional theft. We used a door that requires the customer to scan any items before dropping them. Additionally, a separate IR sensor was employed to prevent the products from being dropped by accident. We employed code logic that correlates the IR count and RF count in the microcontroller to increase effectiveness.

4. Implementation Study:

Since its creation, the RFID chip has come a long way. The progression is shown here. In WWII, radar technology from the 1940s was employed to distinguish between enemy and ally aircraft. This was the first usage of RFID technically. Harry Stockman, a scientist and inventor, is credited with developing RFID in 1948. In 1963, inventor RF Harrington develops new RFID concepts that integrate information and data scattering. 1977-The first RFID transmitting license plate is created.

By the year 2000, approximately 1000 patent applications utilising RFID technology had been made. If you are not one of the businesses using cutting-edge RFID technology, it may be difficult to think that RFID will be widely used in 20 years. However, you may have already used this technology to decrease costs and streamline operations. The phrase "radio frequency identification" (RFID) refers to a system that wirelessly broadcasts an object's identify (in the form of a unique serial number) via radio waves. Automatic Identification (AutoID) technologies, which are more broadly categorised, include RFID technologies. More and more often, the barcode labels that began the evolution of identification systems are insufficient. Although they are inexpensive, their limited storage capacity and inability to be reprogrammed present a challenge. A feasible solution was putting the data on silicon chips. The ideal scenario is contactless data transfer between the device that is carrying the data and its reader. The electronic data carrying device would also receive power from the leader via contactless technology. These procedures give RFID its name. RFID has a broad commercial ambition that includes transforming the demand-supply chain. In the current, essentially prehistoric situation, manufacturers develop things based on forecasts and hope that everyone would use them up before their shelf life runs out. If the market is reliable, that is good. It's awful if a sudden rush causes the supply to run low and everyone in the supply chain loses out on earnings. If demand suddenly disappears and losses are transferred along the chain, it will be disastrous. Future stores with RFID capabilities will keep an eye on consumer behaviour in real time.When something is needed, the shelf will alert the inventory, and the inventory will order supplies from the manufacturer based on the quantity of stock. Simple concept, not-so-difficult implementation and revolutionary results in the pipeline. That's RFID, in short.

5. Proposed Work and Algorithm:

Step 1: The cart is initially reset.

Step 2: Next, the scanner reads the RFID TAG.The item is added to the cart if the tag is read an odd number of times.

Step 3: The Rfid TAG is removed from the cart if it is read an even number of times.

Step 4: Once more, the complete billing amount is shown on the LCD screen after pushing the reset button.

Step 5: The sum is then debited from the cart using the pre-charged cart.

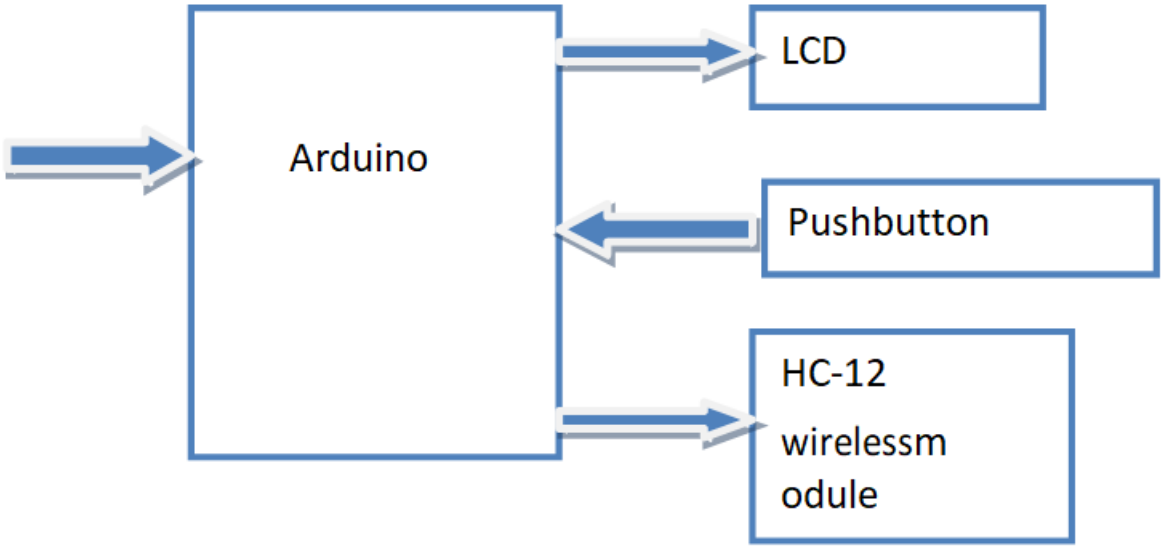

Fig-1: Block Diagram

6. Methodologies:

Every item in the mall has an RFID tag (125 kHz frequency), and the scanner (EM-18) is mounted to the cart. The product's tag is scanned by the reader at the time of purchase. Every tag has a distinct EPC. The details about the product and the most recent cost are shown on the LCD in accordance with the EPC that the Arduino has received. The item needs to be scanned once more if the consumer wants to remove the added product. The price of the respective item will then be subtracted from the total. The cart is equipped with a push button to signal the completion of shopping. The total bill is presented on the LCD when a push button is pressed, and a preloaded card can be used to make payment. Recharged cards are personalised RFID tags that are given to every consumer. These cards include details including the card's available balance and the customer identification number.

Payment is made at the tram by scanning pre-charged cards.

7. Results and Discussions:

Fig1 - LCD display

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Fig2 - LCD display about total product and Amount

Fig3 - When a product is added in basked it displays the confirmation in LCD

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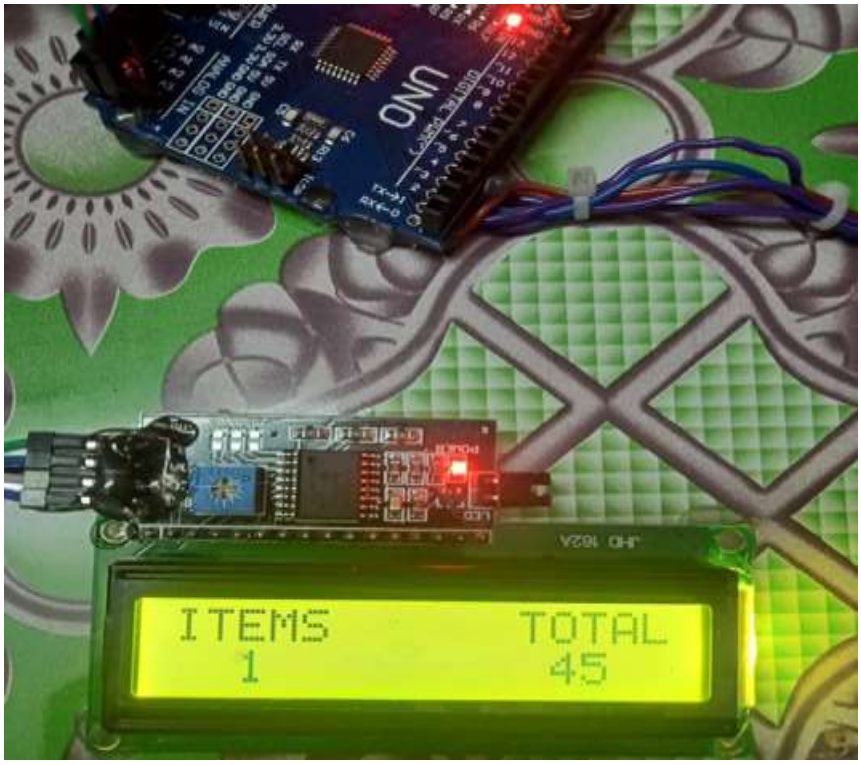

Fig4 - Total items and price infomation

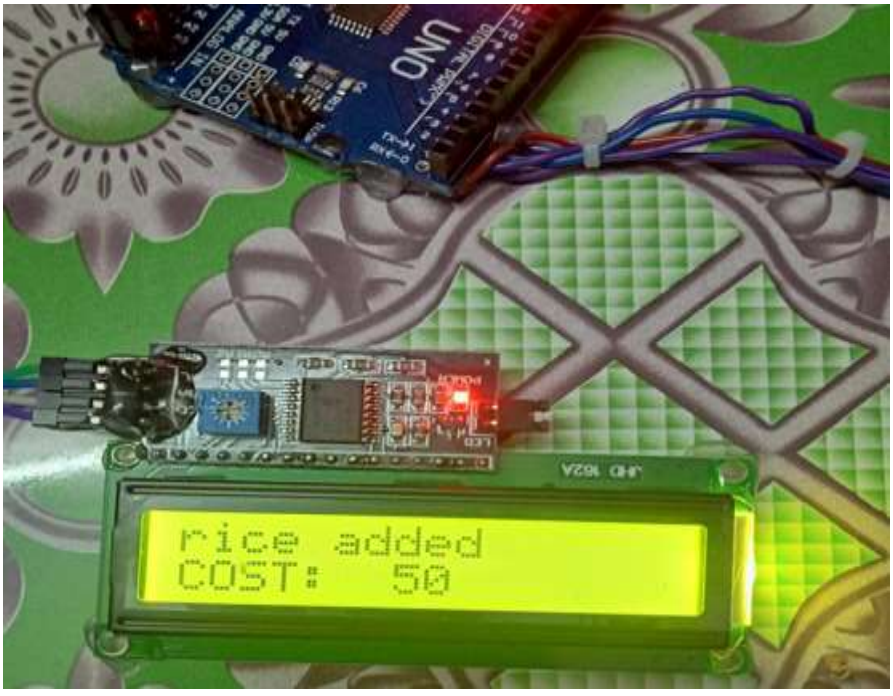

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Fig5 - Adding price to billing

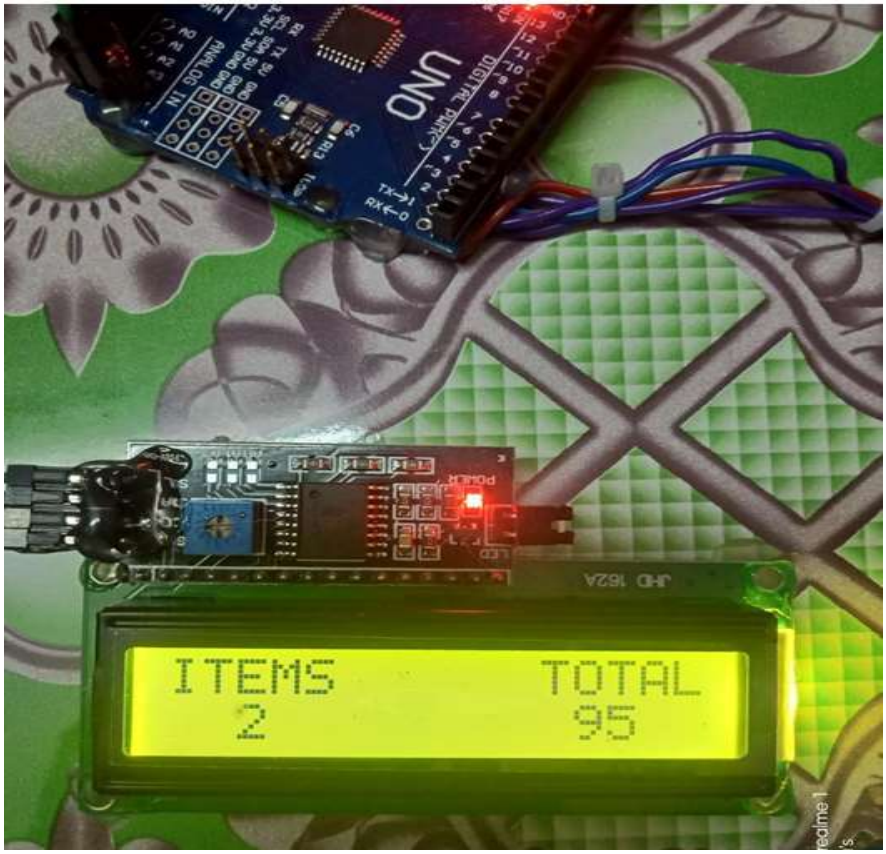

Fig6 - Total price and toal products displayed in LCD

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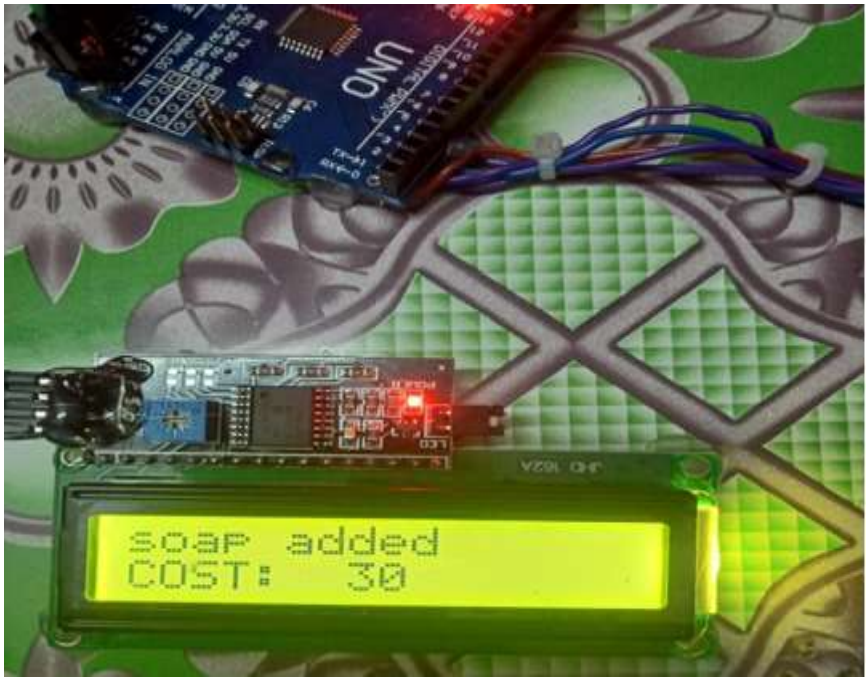

Fig7 - Product name is displayed in LCD

Fig8 - When item removed it gives notification

Fig9 - Final bill is calculated and the we can scan card for payment

8. Conclusion and Future Work:

The trolley trolley is a crucial piece of equipment for contemporary retail, offering customers efficiency and convenience. It is a valuable tool for supermarkets and retailers due to its sturdy construction and manoeuvrability. The trolley trolley streamlines the shopping process and motivates clients to buy more goods with its convenient features and roomy capacity. The EM-18 reader, Arduino, and RFID technologies were used to complete the task. Its goal is to shorten the length of time spent billing in lengthy lines so that customers benefit and inventory management is made easier. It can be used in malls when there is a lot of foot traffic and a rush to enter malls. This automated billing system is crucial to the advancement of technology in the field of automation. This technology will take the place of the currently used barcode system. As a result, it increases customer happiness and sales, making it a worthwhile investment for any retail institution. As a result, this

technology can assist in making people's life simpler and more time efficient.

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