

# ELECTRONIC SMART KART FOR AUTOMATED BILLING SYSTEM

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**Abstract**-The project depicts the Smart Trolley System which works as an intelligent system that auto-generates the cost of each product entered in the trolley and displays its total amount. This type of product can be used in supermarkets and malls. Nowadays it is very difficult and time-consuming for customers to stand in queue for billing, with the help of the proposed system the generated item wise list and the amount will be sent to the billing counter via server. The earlier trolley system had a lot of complexes as inventory and amount could not be updated during the addition and removal of items and if multiple trolleys get into scanning range then the RFID tags get shuffled and cause technical issues related billing. As soon as the customer puts a product in the trolley it will be stored in the memory when another product is added its cost is added, finally, the total bill will be calculated and displayed on the LCD. This information will be sent to the billing counter wirelessly via Raspberry Pi. This design employs Raspberry Pi and RFID tags. Whenever someone puts a product into the trolley, the RFID reader will detect that tag placed on the item and then it displays the amount and if any item is removed

then the corresponding amount will be reduced. It is necessary to have an RFID reader at the exit door

for Anti-Theft. This uses Raspberry Pi for achieving wireless communication with Server. Keywords : LCD, Raspberry Pi, RFID Tag.

## 1. INTRODUCTION

A trolley is a user-friendly tool used in commercial markets where the chances of collecting materials are more. When a customer enters a shopping complex the main job is shopping for different materials in different areas. When shopping is done the other main job becomes to be standing in a long queue for billing which consumes even more time much than the shopping does. The presence of E-commerce nowadays and usage of the same is increasing, but some people still opt for offline shopping and buy products on their own. This becomes much easier and helpful for a shopping customer to check the products thoroughly but the difficult part is to stand in a long queue for billing. The Smart Trolley System will reduce time consumption and increase productivity. In this kind of system, the customer has to no longer wait for big queues, instead, the customer can itself scan the total amount while keeping materials in the trolley and generate the bill itself. This guarantees less consumption of time.

## 2. WORKING METHODOLOGY

The given system is imposed into two parts .The first part being the dissever of the Raspberry Pi for setting up the

RFID Reader. Second part is the tag disclosure of products by RFID Reader that are placed in the cart and simultaneously sending the product information from the cart to the main billing unit.. The outline working of this system is - The customer enters into the shopping mall, where the first job is to collect a trolley .Every cart is enabled with a RFID reader ,a scanner and LCD screen. The customer begins to shop for products and one-by-one place them into the trolley .Each tag will be read by the RFID reader which will send the information to the microcontroller. The microcontroller evaluates the information with the data that is already stored in it. If this data matches, then the cost of the product gets displayed on the LCD screen which has a user friendly UI that enables user to check the product

information. If the user desires to abolish any product from the cart then they can take out that product from trolley and cost of that product will be deducted automatically from the total amount and after complete shopping for products, the whole data along with total amount of products gets imparted to the central billing unit.. The RFID Reader is placed in the middle position inside the trolley. The cart is designed in such a way that the part outside the trolley will be covered with the RF(Radiofrequency) covering to make sure that the reader does not read any products related with every tag outside the cart.

### 3. SYSTEM ARCHITECTURE

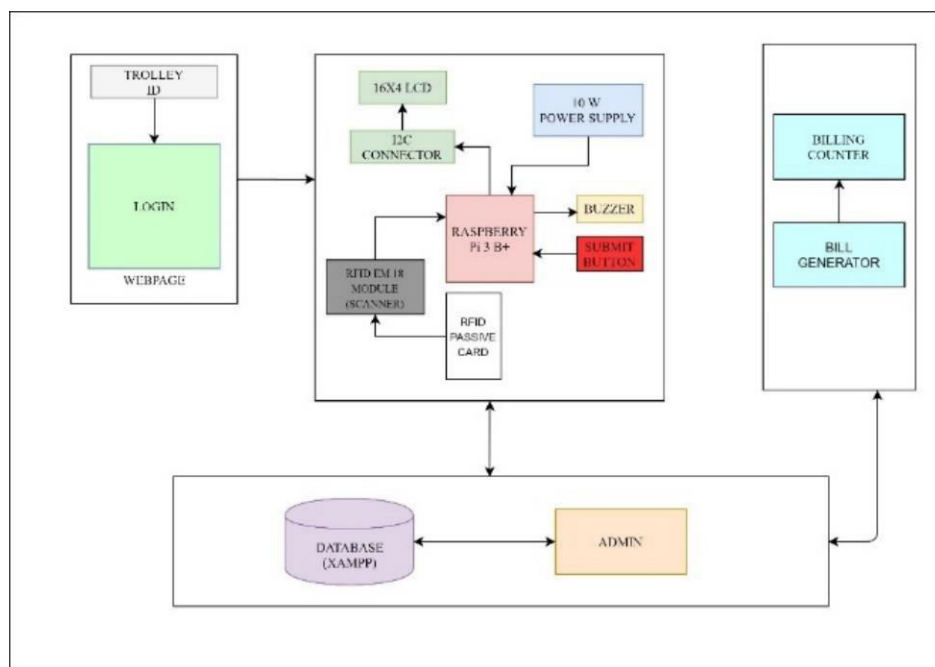


Fig 3.1:SYSTEM ARCHITECTURE

The given System architecture is the generalized way of depicting the internal and external working of the Smart trolley system. In a normal shopping complex, right from entering the supermarket, the customer has

to go through given phases from collecting the trolley, until the billing of the products. The Architecture comprises of the Admin that handles the localhost (Database). The bill counter and bill

generator are two important terminologies that are administrated after the purchasing of the products are

**WORKING STEPS:**

- Start the procedure.
- Initialize the system
- Scan the product's RFID tags
- Check the RFID tags
- If the tag is registered or scanned, the RFID reader can read the information from memory
- Display the data and cost with the help of LCD

**4. COMPONENTS USED****Raspberry Pi 3b+:**

It is the main component of this project which does all the processing of data, and is being used here because of its flexible working around many components and is relatively easy to program.

**RFID scanner:**

It is generally used to scan the RFID tags which is hooked to the products and it is used for the same purpose here. One of the major reasons to use RFID scanning technology is because of its "bulk reading" strategy in which multiple tags can be read at the same time, which is a must needed feature for this project.

being done.

- The item is added automatically and the total cost will be calculated and displayed on LCD
- If any item is removed, the total cost is deducted by the particular removed item and again the process will be continuing.
- On pressing the send key, the total amount will reflect on the billing system.
- Bill will be generated. And text message will be sent to the user.
- The process will end.

**RFID tags:**

There are various kinds of RFID tags that are available, but one used here is called passive RFID tags, which do not have an onboard computer or battery instead the tag uses the radio energy transmitted by the reader and is comparatively much cheaper.

**LCD:**

A lot of displays are available in the market but one which is used in this project is a 16\*4 LCD which uses an I2C module to the interface. An I2C module is a kind of interfacing protocol which is generally used. In this project, the display only shows little information such as item scanned, the amount and the total amount of all products in the cart.

## 5. IMPLEMENTATION

RFID labels have more advantages than the standardized tag which gets hampered because of temperature, water, physical tear and so forth. This guarantees that the product information is stored safely.

The entryway in the trolley doesn't open until an item is scanned and its information is read properly. The tally of items put inside the trolley helps in ensuring the robbery of the items and removing items that are not charged excessively. Removing an item can likewise be done by the same procedure. The device stores into a local database server. The outcomes demonstrate that the working model is executable in current shopping situations.

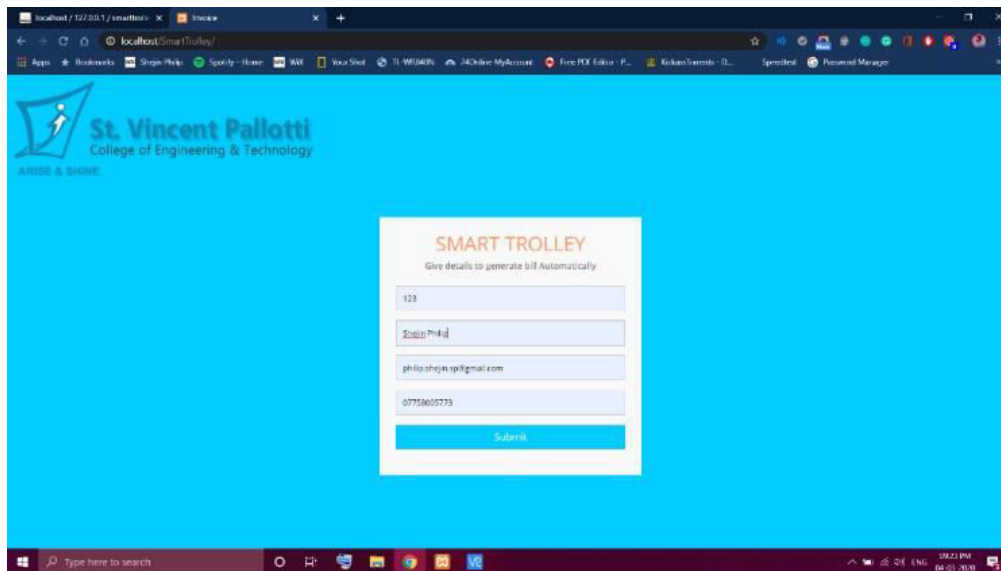
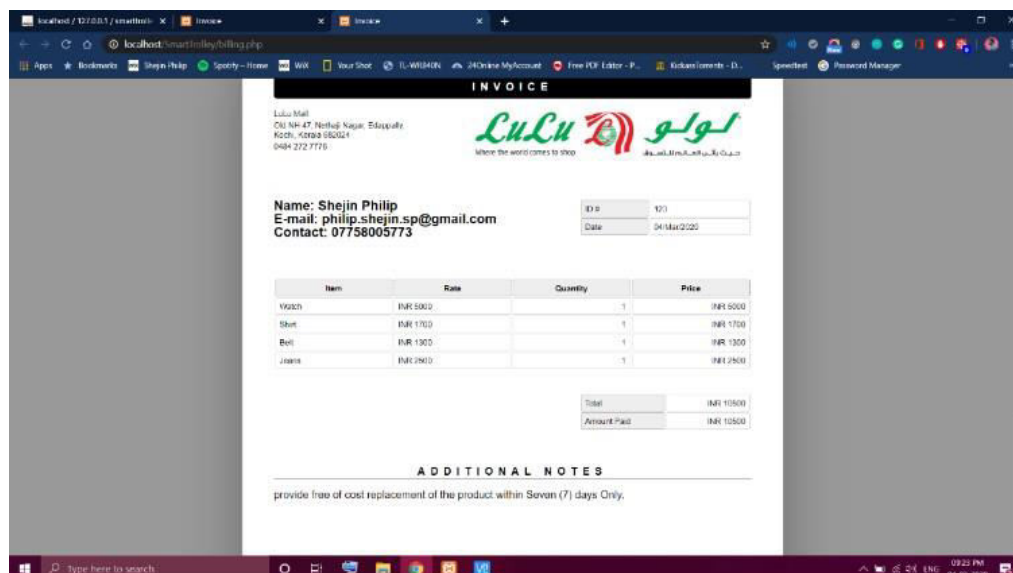


FIG 5.1: COUNTER LOGIN INTERFACE

The given figure depicts the user-friendly customer trolley login. Every trolley has a unique trolley ID and every customer has to log in and fill in the required details to commence their purchasing.



Item	Rate	Quantity	Price
Vageti	INR 5000	1	INR 5000
Shirt	INR 1700	1	INR 1700
Belt	INR 1300	1	INR 1300
Jambin	INR 2000	1	INR 2000
<b>Total</b>			<b>INR 11000</b>
<b>Amount Paid</b>			<b>INR 11000</b>

**ADDITIONAL NOTES**  
provide free of cost replacement of the product within Seven (7) days Only.

FIG 5.2: INVOICE

The given fig shows the bill generated after purchasing the products. The bill comprises the customer's name, e-mail, and contact number. Along with this the total price, items purchased and the quantity is displayed.

## 6. CONCLUSION

A smart shopping trolley is thereby a beneficial tool for a customer as well as helps them in saving their time.

The whole system comprises of major hardware components such as the RFID, Raspberry Pi, LCD screen. The automated smart trolley will generate a user friendly interface in the screen that would let them know the products they purchased & the system also provides the feature of removing their product, which was not accessible there in the earlier proposed system. The working also includes the option of payment that can be done online/ by cash/ Credit card.

The trolley system will ensure safety, time efficiency and productivity as compared with the existing system.

## APPLICATIONS:

1. It can be utilized in every wholesale shopping malls as well as complexes.
2. It can also be implemented in grocery stores.

## RESULT:

The project work has exposed a lot of information relating to shopping problems. Also, it has been observed that in this fast world the shopping takes time and also standing in a long queue for billing followed by payment that issues such as scanning each and every product in billing counter, these issues were resolved by this Kart. This Kart

will provide convenience and will also reduce complications for customers. It provides connectivity between customers and cashier. So by resolving the problem, we have installed a button on trolley and by clicking that button the bill will get generated automatically and will directly be displayed at the billing screen. This kart is easy to use by the customers and also reduces the time and manpower taken by the standing in a long queue.

## 7. ACKNOWLEDGMENT:

We would like to thank our guide and professors of the Information and Technology Department at St Vincent Pallotti College of engineering and technology for their support and guidance throughout this tenure.