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Automated Shopping Cart

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Abstract — **Now a day it is common to see people getting enthusiast in online shopping through e-commerce websites but still the shopping centers are popular. We come across many types of carts used for shopping in malls and shopping centers. We are proposing smart shopping cart which uses the RFID technology to identify the products details and sends the data wirelessly to the receiver. We propose to have facility to browse the available products list on-screen in the display connected to the microcontroller which is situated in smart cart. The cart is interacting with the Main Server and it will have the facility to generate the bill for all the products added into the cart. The proposed system will be helpful for avoiding queues in shopping malls for billing. With the proposed design conventional queue system for billing generation and hence the shopping becomes easy and enjoyable.**

Keywords- Automated Shoping cart, IOT Based Cart, Arduino Cart, Database, Smart Cart.

I. INTRODUCTION

Shopping mall is a place where people get their daily necessities ranging from foodproducts, clothing, electrical appliances etc. Sometimes customers have problems regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers. Now a day's numbers of large as well as small shopping malls has increased throughout the global due to increasing public demand & spending. At the time of festivals, special discounts, holidays, etc. there is a huge rush in shopping malls. The useof barcode reading technique in such situations always results in waste of time since customer has to wait till whole items get scanned. These problem can be avoided by using IOT based Intelligent Trolley proposed in this report. This system uses RFID technique instead of barcode. Proposed system uses separate RFID reader for each trolley and RFID Tag for each product. When customer buys any product RFID reader reads the tag which is present on the product. The cost of product and the total bill of shopping items can be displayed on LCD. IOT based intelligent trolley is easy to use and does not require the special training to customers. RFID technique has many advantages over barcode systems. RFID reader reads the tag from a distance of 300 feet whereas barcode can read the information at distance not greater than 15 feet. Also the barcode need one site of propagation. Reading frequency of barcode reads is only two tags whereas reading frequency of RFID is 40 tags. So the use of RFID is more useful than traditional barcode reading technique.Automation plays an increasingly important role in the world economy and in daily experience. Automatic systems are being preferred over manual system. Through this project we have tried to show an RFID based trolley for supermarket. RFID is one the fast growing technology all over the world for identifying and tracing goods. Radio-frequency identification (RFID) is the use of an object (typically referred to as anRFID tag) applied to or incorporated into a product,Animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the readerIn recent years, electronic systems have progressively replaced mechanical devices and human operation for identifying people or objects in many everyday life applications. The RFID is a technology that uses communication through the use of radio waves to transfer data between a reader and an electronic tag attached to an object for the purpose of identification and tracking. It is possible in the near future, RFID technology will continue to multiply in our daily lives the way that bar code technology did over the forty years leading up to the turn of the 21st century bringing inconspicuous but remarkable changes when it was new. In every RFID system the transponder Tags contain information. This information can be as little as a single binary bit, or be a large array of bits representing such things as an identity code, personal medical information, or literally any type of information that can be stored in digital binary format.The project consists of RFID module, LCD display and microcontroller. The input module is the RFID reader which gives the information of the good when it decodes the RFID tag of the good, this information is displayed on theLCD. The entire data related to goods are stored in the microcontroller and also displays on LCD.

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In this project, a RFID module is used for decoding the RFID tag of the good, geared DC motor for the conveyer belt setup and LCD display is used for displaying the information of the good. This application is very useful in big shopping malls to store data of all the goods in the departmental stores, and to display on LCD using RFID

Technology. This project makes use of an onboard computer, which is commonly termed as micro controller. It acts as heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions.

II. LITERATURE REVIEW

During our survey, we found that most of the people in shopping mall after adding products to the cart they have to wait in a long queue for billing and payment. Most of the time many people argue for a delay in billing service. Similarly, the person who buys single product has to wait until the person in front of him completes the checkout process. Many tech giants like amazon are trying to solve this issue. From many of them amazon launched its first grocery shop without customer queue for billing. But this solution is costly. Similarly there are many technologies coming into the market for solving this issue.

Our "Automated Shopping Cart" system allows a user to scan the product and add to cart without any difficulty and the cashier at the checkout counter have not to worry about again scanning the whole cart items. The shopping cart has built in RFID sensor and Arduino which is a microcontroller. Once the product get scanned from scanner it can display the cart information and product information to the user on the LCD display attached to the cart itself. Whatever the items get added to the cart its count and price will be continuously displayed on LCD display to keep the track of customer expense. This feature also solves the issue of people who always add over budget items to cart and at the time of payment they remove it. Unnecessarily the task of the staff in the grocery shop gets increased. Our cart will automatically sync with the database to check the entries of the products in the cart. As much many things are getting evolved with the evolution of IOT industry or Industry 4.0 standard Every device and gadget is getting smarter and keeping track of user's data and his choices. This system also could be helpful for the users to keep the track of their daily needs and regularly keep up to date with the offers related to it. By using data mining concept we can dig the user choices and provide more efficient service to him/her.

By using our "Automated Shopping cart" user can get rid of the queue for billing. The person just has to visit the store add products to our automated shop cart and just go to checkout counter the cashier enters the cart id on his machine and the bill will be generated, you just have to pay the bill generated by the system. The system reducing the time required to again scan all the products from the cart and add again it to cart to handover to customer. This time is small for a single customer but if there are 10 or 20 customers in a queue imagine time required for last person, the patience of that person is tested.

Currently available method in shopping malls is barcode method. In this method there are barcode labels on each product which can be read through specially designed barcode readers. A barcode reader (or barcode scanner) is an electronic device for reading printed barcodes. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating optical impulses into electrical ones. Additionally, nearly all barcode readers contain decoder circuitry analyzing the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port. When we select any product for buying we put it in the trolley and take it to the billing counter. The cashier scans the product through the barcode scanner and gives us the bill. But this becomes a slow process when lot of products is to be scanned, thus making the billing process slow. This eventually results in long queues.

If compared, RFID technology is found to be more comprehensive than barcode technology. It is possible to read RFID tags from a greater distance. An RFID reader can access the information of the tag from a distance of around 300 feet, whereas barcode technology can't be read from a distance of more than 15 feet. RFID technology also scores over barcode technology in terms of speed. RFID tags can be interpreted much faster than barcode tags. Barcode reading is comparatively slower because it requires a direct line of sight. RFID tags are well protected or either implanted inside the product, and hence is not subjected too much wear and tear. Interpreting a barcode requires a direct line of sight to the printed barcode, because of which the barcode is printed on the outer side of the product, and is thus subjected to greater wear and tear. It also limits the re-utilization of barcodes. As barcode lacks read and write facility, it is not possible to add to the information already existing on it. On the other hand rewriting on RFID tags is possible. These RFID's offer more advantages over conventional Barcodes as they have a major drawback which is Line of sight technology and also these barcode tags have constraints in its durability whereas the RFID's tags are more durable and able to read/write data

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which could even be encrypted. These tags could hold plenty of data like products name, price, size, weight and other information using their identification number. By implementing this RFID technology for unique representation of each product in a market shopping is done more easily. This could be done by having Shopping trolley installed with an RFID reader to scan each product and load it which is controlled by a micro controller

III. SYSTEM DESIGN AND METHODOLOGY

System design is the process of defining the architecturemodule, interface, and data for the system to satisfy the specific requirement. Three types of system design diagram are as follows

1. Block diagram

2. Flow Chart

3. Data Flow Diagram

Block Diagram

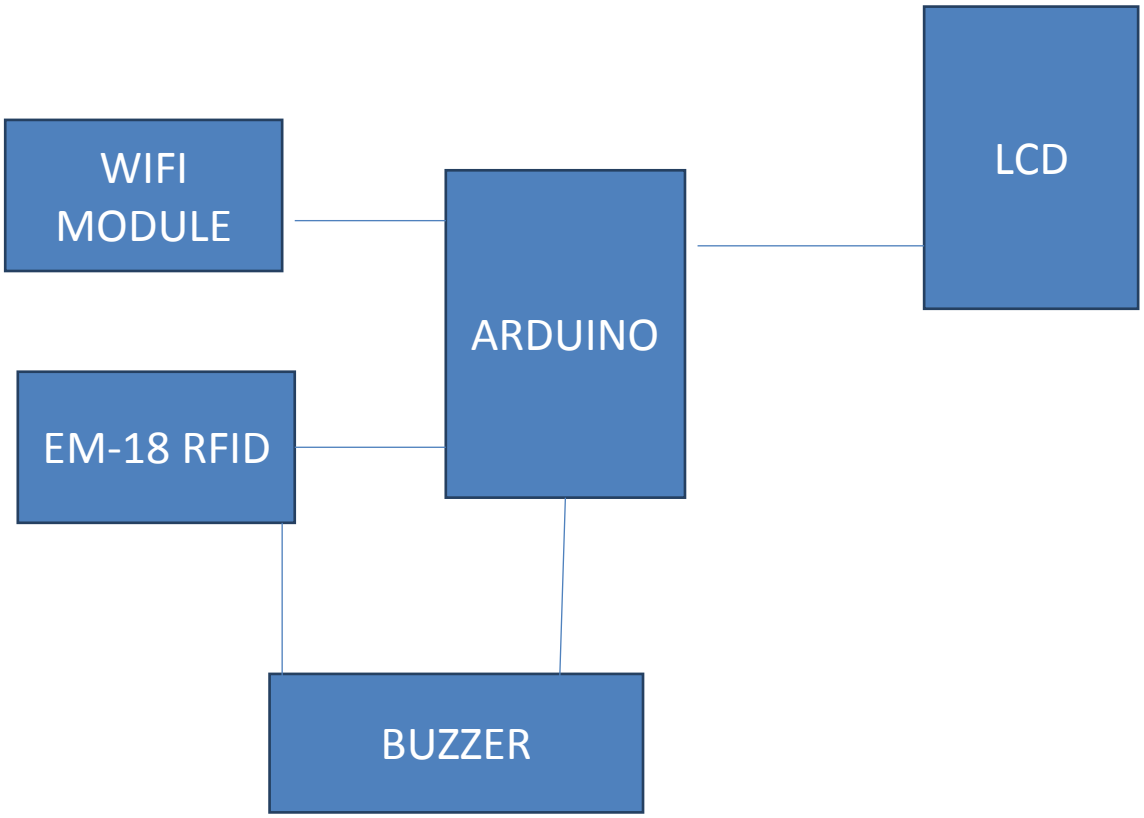

Diagram 1: Block diagram of transmitter of IOT based intelligent trolley for shopping mall

Diagram 2: Block diagram of Receiver of IOT based intelligent trolley for shopping mall

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At the time of festival or special offers there is huge rush in mall. Customers waste their lots of time at the billing counter. To overcome this disadvantage the technique develop is based on RFID. In IOT based trolley for shopping mall customer done automatic billing. And this is helpful for economic and efficient shopping. Also by using the concept of IOT this technique is helpful to owner also. Owner can observe real time business done in shopping mall from any place.

Flow Chart

OPERATION OF WORKING:

This IOT based Trolley has following applications:

1) Automatic billing at shopping mall

2) Helps to owners.

It has two sections transmitter section and receiver sections. First initialize the power of kit then it is ready to use for customer. If customer wants to purchase any product then he/she has to put the product in the trolley. As soon as the product falls in the trolley the RFID reader read the RFID Tag place on the product. This RFID reader is connected to the microprocessor. Microprocessor crosschecks the information get from RFID reader and information in the memory of microprocessor. If the information get match then the cost of product, name of product and the total bill display on the LCD. If user wants to remove any product then he/she simply remove that product from the trolley then LCD again display the name of product, cost of product and the total bill. Trolley is provided with ESP which has same functions as ETHERNET. ESP transfer the information to the main server which is in the range. This main server has its own cloud from that owner can access the information from anywhere and anytime with the help of user ID and password. This is the concept of Internet of thing (IOT).

We also create responsive application that identifies data from our customize kit and provide whole information about what type of operation is perform on cart i.e., product add or remove.

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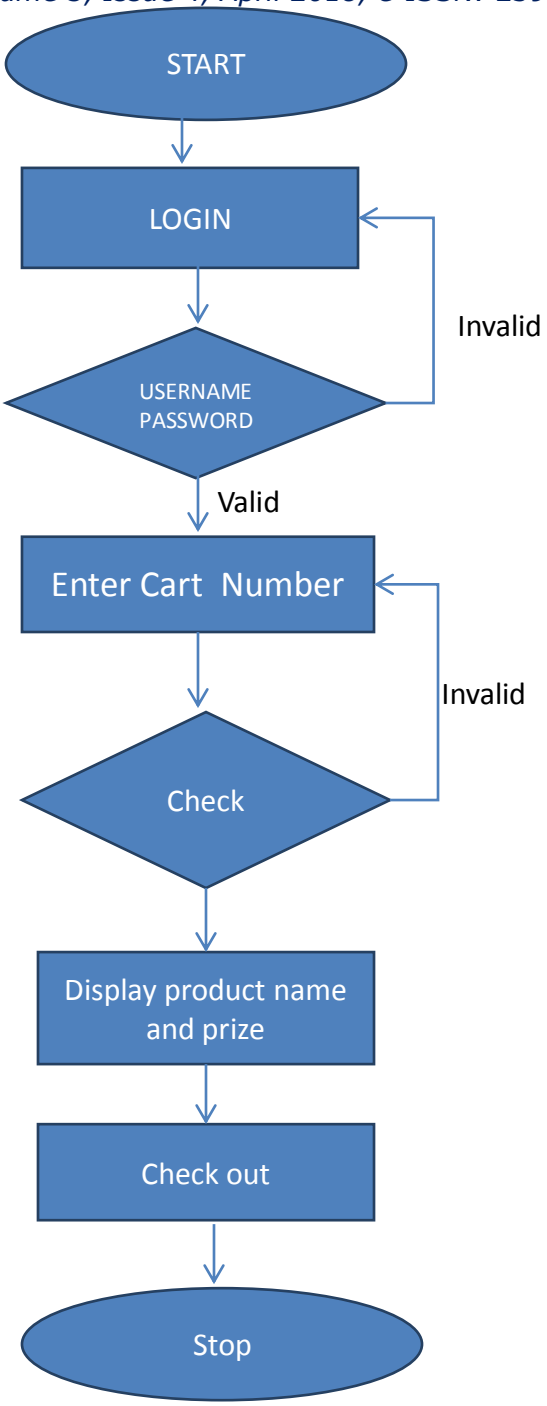

Flowchart: Flowchart of Shopper

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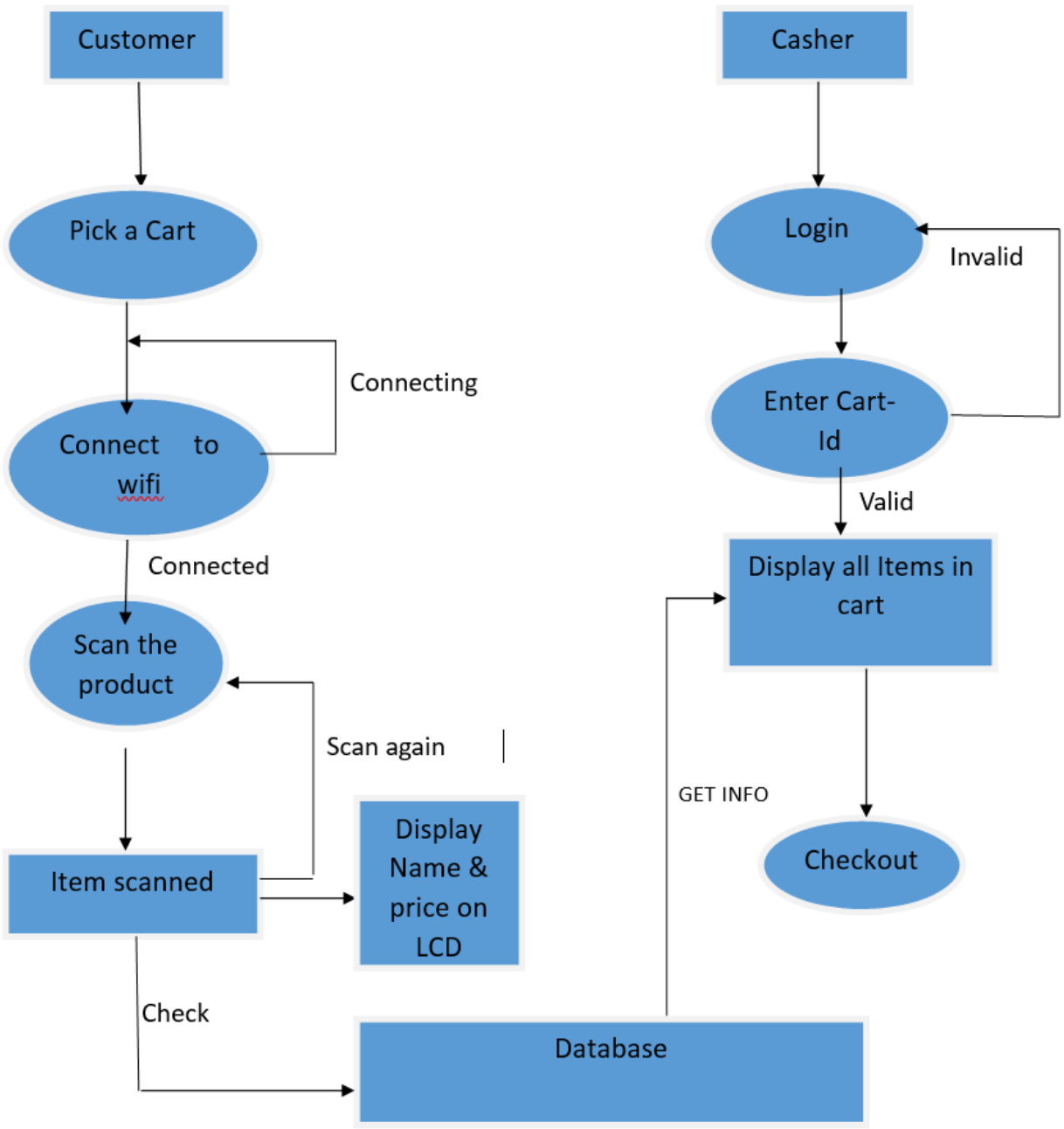
Data Flow Diagram



DFD: Automated Shopping Cart

In our Futuristic Billing Trolley system environment, each product will have the passive Radio Frequency ID tag which is bearing a unique Electronic Product Code.. This Electronic Product Code provides the info like name, price etc about the product. When the customer will put the product in the Futuristic Billing Trolley, the Radio Frequency ID scans the tag and the Electronic Product Code number is known by Radio Frequency ID reader.

Radio Frequency ID reader passes the Electronic Product Code to the Arduino. Arduino has in build possessor which compares the Electronic Product Code with the database of the system containing various products. After that the name and price of the product obtained by the Arduino gets displayed on the LCD display of the Futuristic Billing Trolley, where user can see the product information. The Arduino microcontroller also passes the data obtained from the database to the transmitter from where the data is wirelessly transmitted to the billing computer. The master computer

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receives this data through receiver using Max 323 interface. Max 323 interface is the interconnection media between the receiver and the computer

IV. RESULT

After assembling all the hardware components and loading program into the microcontroller it is ready to send data to the database. When products are added to cart data displayed on webpage for checkout, some screenshots of web application as follows.

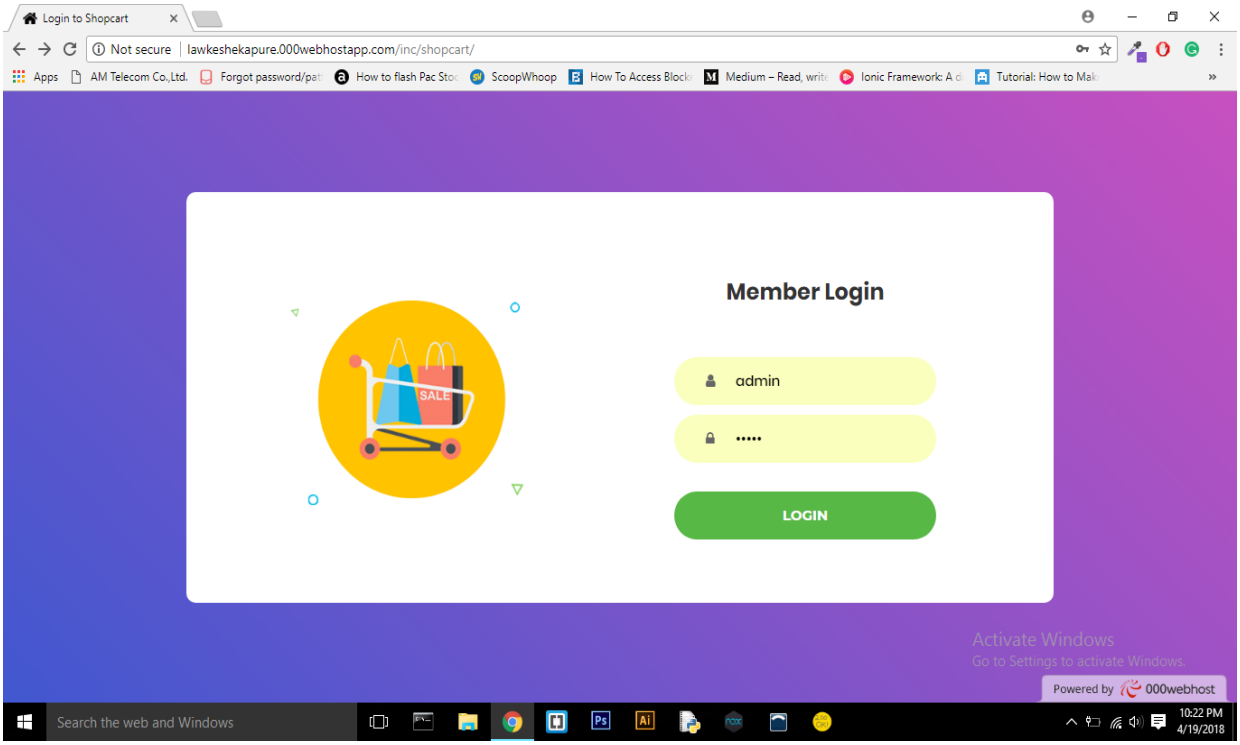

Fig 4.1 : Member Login

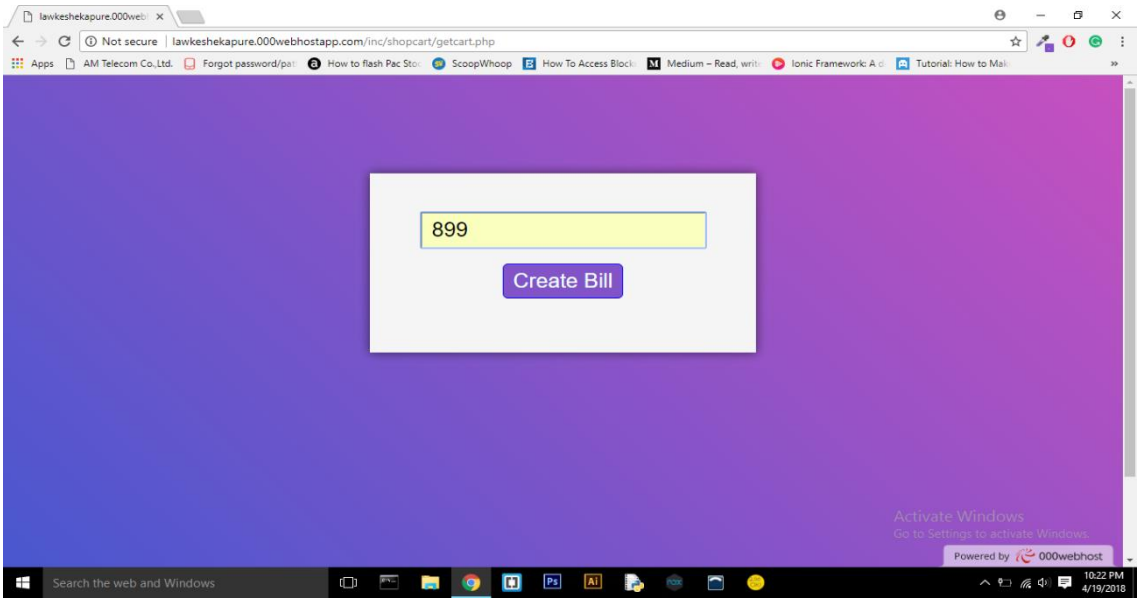

Fig 4.2: Creating Bill

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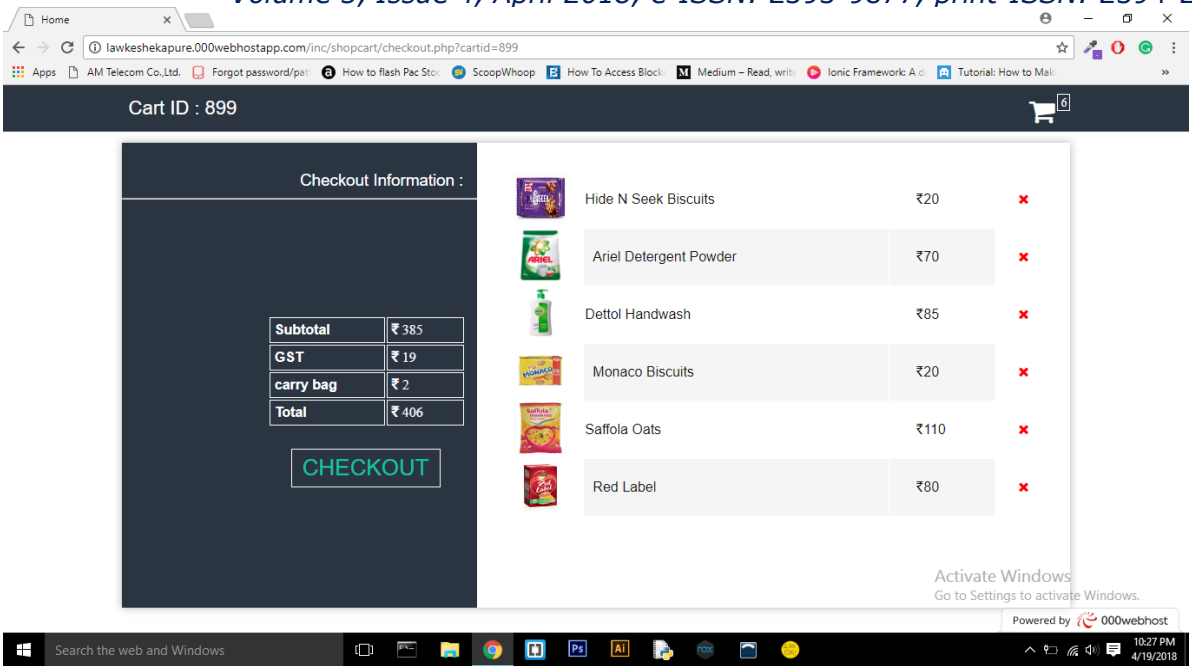

Fig 4.3: Checkout Page

Fig 4.3: Shop Cart Picture

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