

# A User-Friendly Shopping Application Using RFID System

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**Abstract-** This Project is used to make shopping in an effective way using RFID system. This Android application can be used even by a person who is unfamiliar with the product specifications. The product specifications can be viewed and compared with a set of related products in various aspects. Reviews can be posted by the customers and previous reviews can also be viewed by them while making decisions. Purchase can be effected by the customer through this application to save time. The administrative staff of the shop is provided with user-id and password. The Sales Report is provided to the administrative staff to know the demand for the product with which he can maintain the stock level of the product periodically.

**Keywords-** RFID System, Android Programming, JSON, Volley Library, RFID Tag

## I. INTRODUCTION

In this modern era, customer focus is more transferred towards online shopping rather than offline shopping. E-commerce giants like Flipkart, Amazon, e-bay have created a big revolution in the field of online shopping. Nowadays, Instead of offline shopping, people prefer online shopping. There are many reasons, the primary one is to save time and another one is to save energy. It really needs an arduous effort to transfer the product from one location to another location. Moreover, a variety of things is available online and can be purchased in a single click. When a customer purchasing a product in an e-commerce site gets into a dilemma of whether to buy a product or not, e-commerce sites provides an essential solution in the form of related products and user reviews. What if there is an option for reviews and related products for products that customer buys in the shop? We have developed an android application that answers the above question. RFID technology is used to develop this application. All the products in the shop are incorporated with rfid tags. When a customer scans the product in the rfid system which is placed in the shop, an application displays the product specification, related products and user reviews. The application also makes the customer to avoid waiting in a queue for billing of the purchased products. It also provides an effective way of maintaining the stock for the shopkeeper. Convenience forms the main major part when the customer wants to purchase the

product. This system when implemented in a shop reduces the number of employees in the shop.

## II. DESCRIPTION

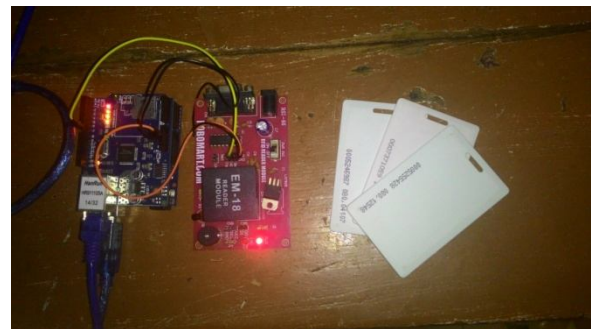


Fig.1 RFID system

An Ethernet shield is mounted over the Arduino uno. The Ethernet shield is used to connect the Arduino to the internet. The EM-18 RFID reader is connected to the Arduino. RFID tags are scanned by the RFID reader which fetches the tag value and sends it to the Arduino. The value can be read using the arduino serial monitor. The whole module is connected the laptop. The Figure Fig.1 represents the RFID system which includes Arduino uno, Ethernet Shield, EM-18 RFID reader and RFID tags. This system is placed in the shop.

## III. OVERALL ARCHITECTURE

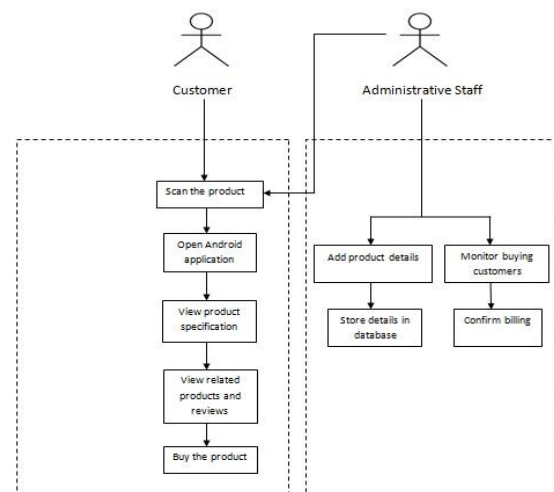


Fig. 2 Core Architecture

The above figure Fig.2 represents the Core Architecture.

When the Administrative staff of the shop place the product incorporated with RFID tag near the RFID system, the Arduino fetches the tag value and send the value to a webpage via Ethernet shield. Then, the staff access the webpage and store the details of the product along with the tag value in MySQL database. Similarly, the details of all the products are stored in the database. The customer who wish to know about the details of the product scan the product by showing near the reader.

The Android application fetches the tag value and display the details of the product associated with the tag which is matched in the database. Customers can view and post the reviews of the product they have scanned. They can also view the related products based on price, reviews provided by the customers who have previously bought that product and the product which are newly arrived at the shop. If the customer want to buy the product, then they can add the bill through the application by providing their details and quantity of the product they wish to buy.

The administrative staff monitors the customers who are buying the products through the android application in the website. The staff generate the bill when the customer confirms and pay for their purchase. When the staff generate the bill, the products along with their quantities are stored in the database. In Android Application, the administrative staff is authenticated to view the sales of all the products in the shop.

## IV. IMPLEMENTATION

### A. Adding Product Details

For data entry, a php page has been designed. The product incorporated with RFID tag is scanned by the RFID reader and the arduino. The Arduino fetches the tag value and saves it to the MySQL database using a php script. From here, it is passed to another php page. Submit button is then clicked by the staff after entering the category field. The page is then directed to the respective php page. Product specifications is then entered by the staff and the details are stored in the database created. The figure Fig. 3 represents the Home Page.

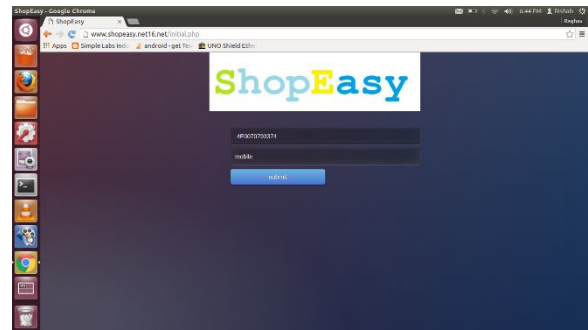


Fig. 3 Home Page

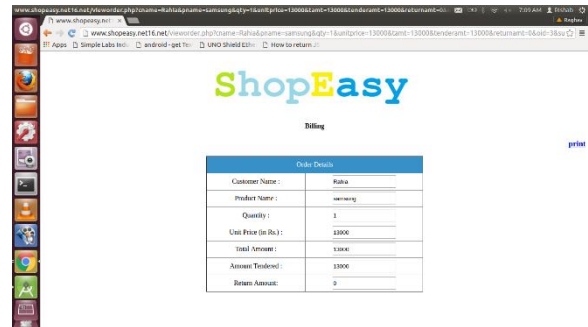
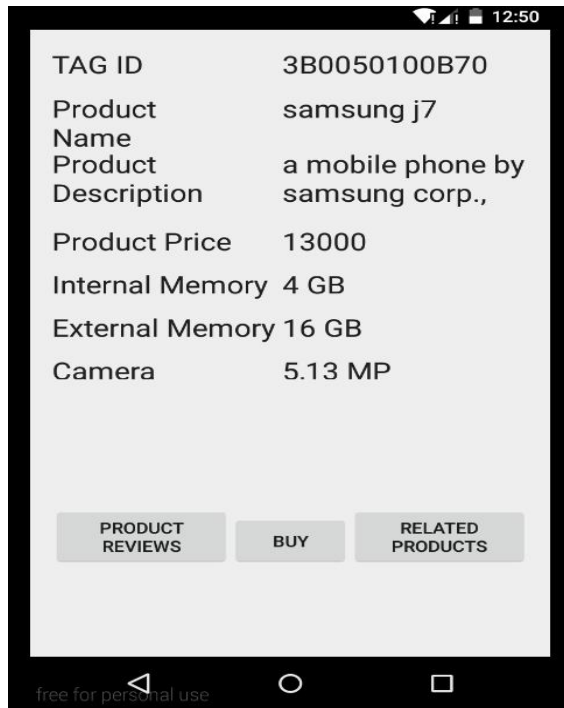


Fig.4 Billing

### B. Displaying Product Details

The product is scanned by the user. Arduino reads the tag value and send it to a php page. When the user opens the application, the php page is then viewed by the customer in android application through webview. JavaScript interface interfaces the javascript code and the android code, by which the tag value present in the text box of php page is retrieved into the android code. The category of a tag id is converted into a JSON data which is retrieved into android using Asynchronous Task method. JSON data is converted into JSON string using the Asynchronous Task which runs on main UI Thread. The GSON library stores the each category of a tag id into an array structure using the serializable interface. The scanned tag id is then matched with the category in array structure. If the category is mobile then the details of the mobile is retrieved from the mobile database and converted into a JSON data in a PHP page. The JSON data is then converted into JSON string using the asynchronous task. The details of the product are stored into a individual string from JSON string. The details are then added into an adapter which is set for the list view. The custom layout is inflated into an adapter class by which the details of the product are displayed.

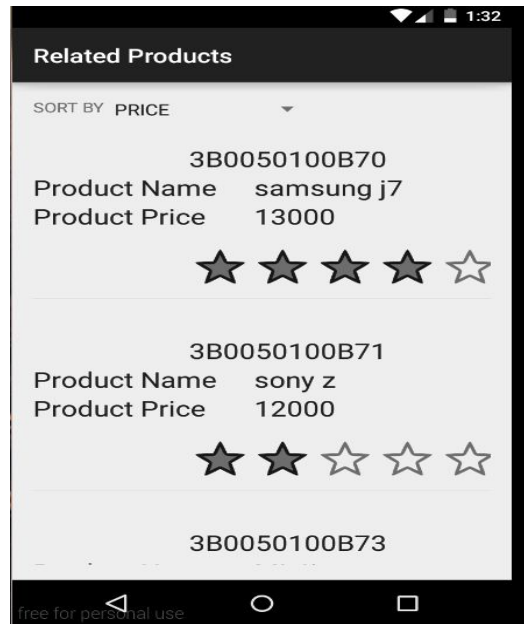


**C. Related Products and Reviews**

There are two buttons named related products and product reviews below the listview in which the product details are displayed. The related products and reviews are viewed by the customer with the help these two buttons. In the product reviews page, the ratings and reviews of the product are retrieved into android as JSON data. The ratings and reviews of the product are fetched from the JSON data using volley library which stores the reviews and ratings into a separate string.

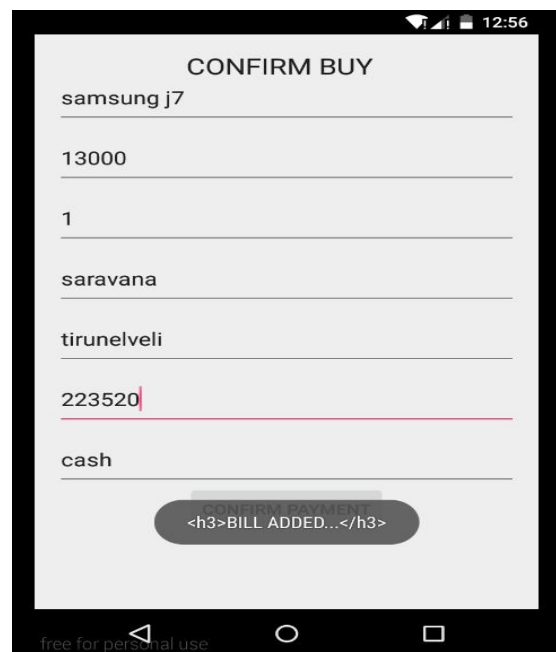
The volley library process the JSON string in any thread which is not in the case of asynchronous task where the JSON string is processed only in main thread. The ratings and reviews of the product is displayed in the list view by the means of custom layout .The customer can also post a review and rating for the product which is stored in a database using volley library.

In related products page, the customer can view the related products based on price, user reviews and newly arrived products by selecting the spinner. When the customer selects price, the product which are in the range of that particular product is displayed in a listview. When the customer selects the user reviews, the products are displayed in the listview based on the user rating. Similarly, the newly arrived products are also displayed to the customer when he/she selects the Newly Arrived.



**D. Sales Report and Billing**

An authenticate button is provided in the android application. The administrative staff of the shop is provided with the user id and password. A sales report is generated once the sales report button is clicked by the administrator staff. The details of the sale of each product are displayed in the sales report. In the product details page, the customer can also buy the product. When the customer clicks on the buy button, they can specify the quantity of the product. Then, the customer has to enter their name, address and mobile number. The buying details of the particular customer are stored in the database. The admin monitors the buying customers through the php page and generate bill for the customer.



## V. CONCLUSION

Majority of shops in India provides barcode system only for billing. The barcode system has been replaced by RFID system in our project. Not only we have done the billing part, but also have added details like displaying the product specifications, viewing reviews for the product, related products in this application. In addition sales analysis has also been done to let the shopkeeper know about the sale of each product. This application can be used by the customers for an effective shopping. It saves time for those customers who are in a dilemma of buying products. Inspired by the e-commerce websites which provides the product specification related products, reviews, ratings to the user, this android application provides the above mentioned facilities to the customers.

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