

RFID Based Smart Trolley Inventory System

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Abstract

The smart cart is the new area of development for shopping purposes in the malls. This cart provides more comfort to customers. The portable unit will save the customers from the liability of strolling around with trolleys. This unit will allow the customers to view item information, its cost, variations, and usage simply by bringing the unit closer to the item. The handheld unit will comprise of a display, a keypad, a flash memory and an RF transmitter to transmit information about shopped items. A PC based Software module will also be designed that will allow the mall personnel to update the information about all the items. The idea is to provide every customer entering a mall with a portable hand held unit that can be used to shop for products.

Keywords: IOT, Shopping, Cart, Android, RFID Tags, Bluetooth, RFID Reader.

INTRODUCTION

The basic idea of this project is based upon "AUTO BILLING FOR MALLS" used in malls and shopping centers. A device "SMART TROLLEY" also called as Logger Device" is an information storage system. Here the system parameters of an Intelligent Trolley like

company name, products name, products amount etc are continuously recorded and displays the name of the product with its cost. This "SMART TROLLEY" has it's application and with help of proper interface the recorded data can be transferred to the main database at the counter of the mall. The system is an

efficient means for commercial purpose to the customers of being time efficient and easy to control.

Mall or Shop owner can maintain effectively a daily/weekly record of each product and judge his shop requirements and consumer's consumption. This project is specially targeted at the owners of commercial customer's ease of their shopping.

OVERVIEW OF THE TITLE

In this project we are using RFID technology. Radio Frequency identification [RFID] is a technology that uses radio waves to transfer data from an electronic RFID tag attached to an item, through a reader for the purpose of identifying and tracking the object [9]. RFID is the special type wireless card which has an inbuilt embedded chip along with loop antenna. It has a 123 digit card number.

RFID reader is the circuit which generates 125 KHz magnetic signal which is transmitted by the loop antenna connected along with the circuit which is used to read the RFID card number. RFID reader is interfaced with microcontroller [8].

Accurate and real time data is collected by RFID system and communicate via radio waves. It has 3 components tags, reader and RF unit. The RF reader transmits RF waves which are received by the RF tag within the reader's range. In turn the tag is transmits the information back to the reader. Finally RF reader transfers this information to the RF unit.

MOTIVATION

While surveying we found that most of the people stand in a long queue for billing and payment. Some of the concerns we are addressing in our project are as follows:

- We implement to ease the billing process, make it simple & increase its security using RF-ID technique. This will take shopping experience to a different level.
- Automatic billing of products by using RFID technique will be a more viable option in the future.
- The system based on RFID technique is efficient, compact and shows promising performance.



Fig -1: Long Queue in Shopping Mall for Billing process.

LITERATURE SURVEY

The literature review consists the existing approaches as:

- **Traditional Shopping Scenario:** Sometimes customers face problem regarding waste of unnecessary time at the billing counters and incomplete information about the product on sale. There is huge scope of improvements in traditional billing system to improve shopping experience of the customers.
- **Hectic in Billing System:** Current bar code method for billing process is a slow process having

lots of products to be scanned resulting in long queues.

- **Speed of service:** Fast scanning of products right after customer placed it in the trolley, and billing via credit cards help customers through the hardness of line up to pay.

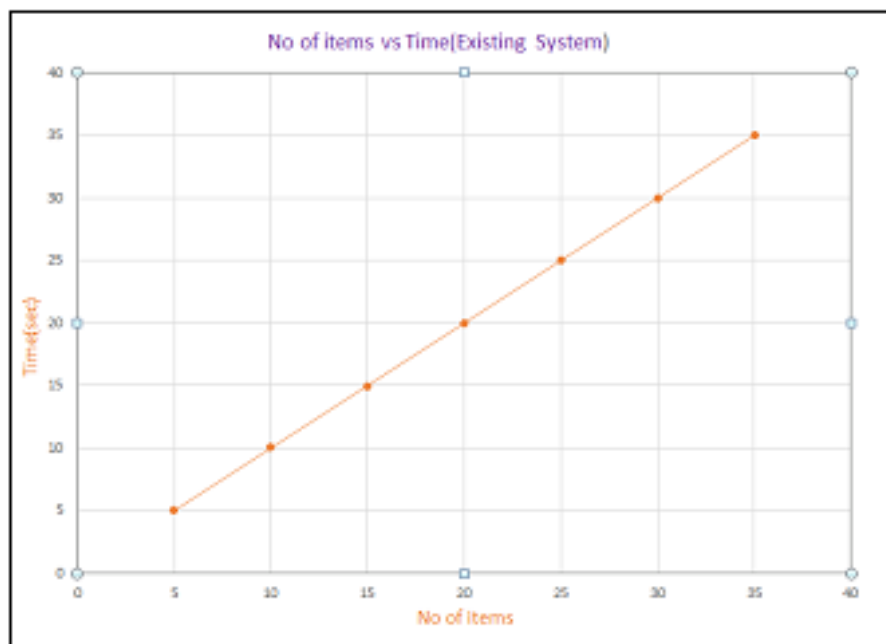


Chart -1: Existing Approach

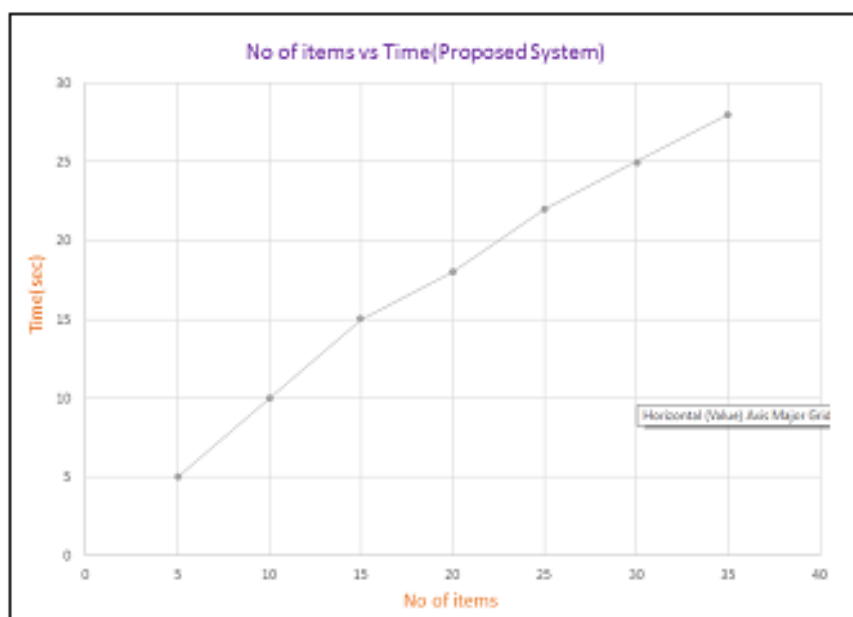


Chart -2: Proposed Approach

Assuming transaction time as 1 sec per item in existing system while it is not same in proposed system. Time

consuming in proposed system would be less than existing system.

PROPOSED WORK

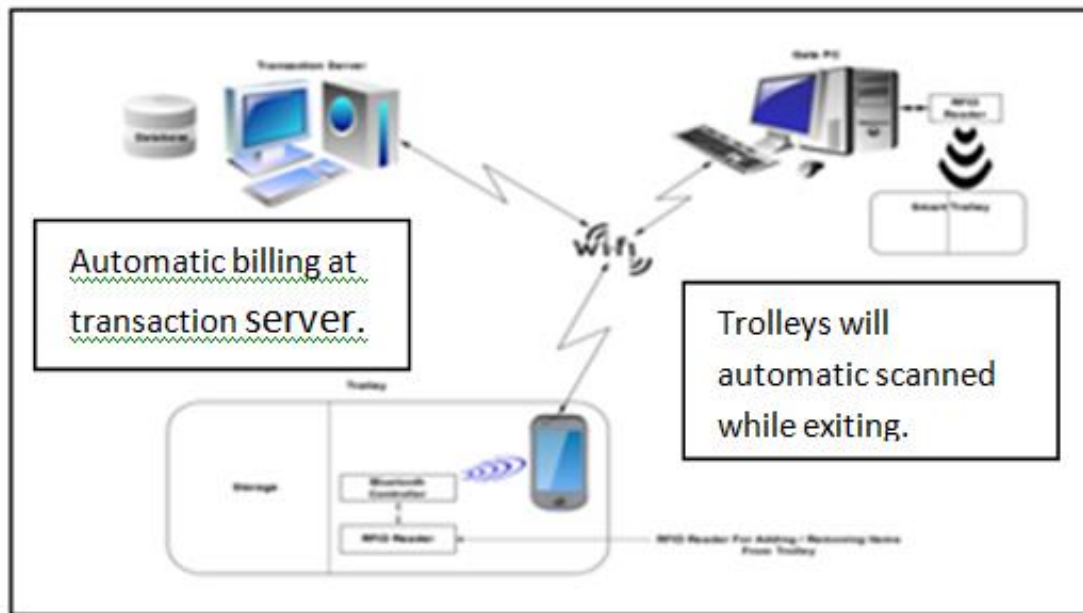


Fig -2: Architecture Layout

System Design architecture shows how the user will enter the product into trolley which consists of RF-ID reader and Bluetooth controller and that product will display on table of trolley and same data of products will store at administration part and there is Gate Pc which will look out whether customer had paid bill or not.

MODULES

I. Admin Module: In admin module, admin of the system can control all data contents like inventory, products etc. for that we are going develop admin module. Following contents going to be there like update, delete, add product. In add product admin can store the all the inventory data

along with the RFID tag id, price and specifications.

II. Server Module: In server module actual client server communication going to take place. In supermarket or malls there can be number of trolleys. This server module helps to track and data transfer of each individual trolley with RFID scanner simultaneous all of the mall.

III. Cart (Trolley) Module: In Trolley module, actual hardware controller and tablet with all android application we are going to use. Android application use for use login and trolley occupy and along

with all the goods list with detailed amount and bill. Hardware like RFID scanner placed in the trolley which is actually use for scan the product marked with RFID tag. RFID scanner will send scanned data to tablet android application using Bluetooth, for that Bluetooth connectivity going to place between hardware and tablet.

IV. Client Application Module: Client application module developed using android mobile application for user registration and login using trolley id. This application used to track all the purchased good along with the bills, and history of purchases, this client application we going to introduce new concept easy online pay system like Paytm, E-Wallet.

COMPONENTS

1 Component UML diagram

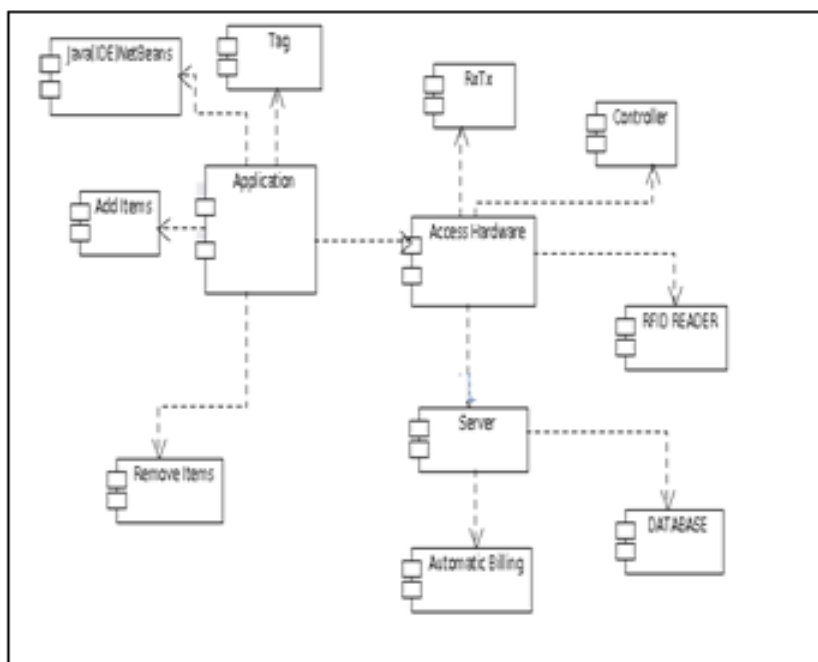


Figure. 3

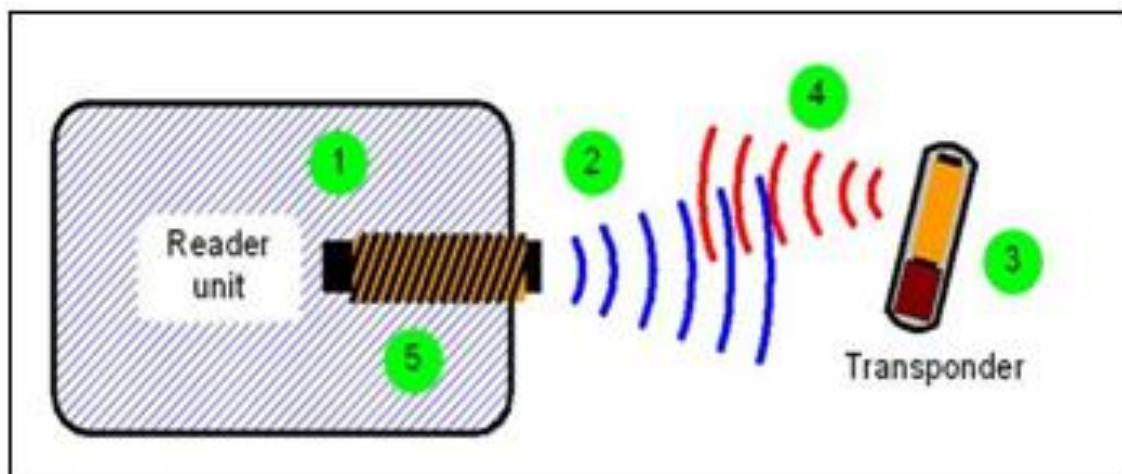


Fig -4: Representation of RFID System.

I. RFID Reader: The reader as shown in fig 4 powers an antenna to generate an RF field. When a tag passes through the field, the information stored on the chip in the tag is interpreted by the reader and transmitted to the server, which communicates with the integrated library system when it is interfaced with RFID System. It provides automatic identification and data capture (AIDC) solutions. **See Figure 4.**

II. RFID-TAGS: It is a technology that uses radio waves to automatically identify people and objects. Serial number is stored that identifies a person or object, and perhaps other information on a microchip that is attached to the antenna (the chip and the antenna are together called as RFID transponder or RFID tag).

Antenna enables the chip to transmit to a reader an identification number.

Radio waves are converted by the reader and reflected back to the RFID tag into digital information goes to the computers that can make use of it.

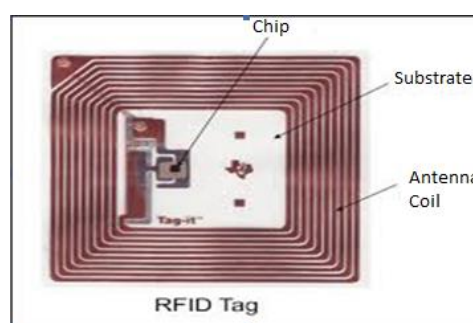


Figure. 5

RFID Specification:

1. Frequency Band: 13.56MHz (HF)
2. Range: 10 cm – 1m
3. Standards: ISO/IEC 18000
4. Cost: 50 ₹ to 300 ₹

Platforms:

- Editor-Net Beans
- Language - Java
- Database-My-Sql
- Android
- Admin GUI: AWT

CONCLUSIONS

Experience with Smart Shopping has indicated that there are several technical challenges to be met in deploying a pervasive retail system. The model successfully reveals for developing a Smart Shopping System which automates the whole billing agenda. The system which is highly dependable, authenticate, trust-worthy and time-effective.

The benefits of using this scenario in terms of cost and time effectiveness may be summed up as: The salary amount given by the mart to the employees will reduce since the manpower shall minimize as the whole system is becoming smart. Cases of theft shall be controlled, which further is added to the cost efficiency.

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