Hi-TECH STORE TOWARDS SMART CITIES

¹Krusha Rawal, ²Vidhi Nadar, ³Amruta More, ⁴Moniya Umbrey

1,2,3,4Department of Electronics, K J Somaiya Institute of Engineering & IT, Sion, Mumbai, Maharashtra, India.
¹krusha.rawal@somaiya.edu

Abstract - **This paper presents the idea about progressive Radio Frequency Identification (RFID) technology in hi tech stores. RFID is wireless non-contact system that uses radio frequency wave to transfer data from tag attached to an object, for automatic identification and tracking. In this era of digitization, automated systems have become the face of technologies. Supermarkets are nowadays frequented by millions of people for the acquisition of an enlarging number of products. Product acquisition represents a complex process that comprises time spent in finding product location, corridors, packaging, bill generation and check out queues. The present automated system is based on barcode system, but barcodes provide less security. These are the current drawbacks faced by the hi-tech stores. Through this paper we convey that RFID is a way to improve the quality of services provided by retailer and to augment the consumer value thus allowing to save time and money.**

Keywords— RFID, Product acquisition, barcode system, bill generation, Hi –tech stores.

I. INTRODUCTION

Smart city applications are developed with the goal of improving the management of urban flaws and allowing for real time responses to challenges. A smart city may therefore be more prepared to respond to challenges than one with a simple 'transactional' relationship with its citizens. In such Smart cities all the components of cities need to be well versed with the advance technologies for better ease.[14]

In such developing fast world where everyone is busy, wasting even a single minute is like crime. According to the statistics, people waste their lot of time in the long queue in super markets for bill generation.

In the present scenario, every advance process barcode system is widely accepted and used. But barcodes can be easily destroyed or manipulated thus less secure. It is a code simply printed on a paper which makes it easy to remove. The barcode scanner needs a full ray line to detect the barcode. These shortcomings have started creating a nuisance in the process.

Hence, through our project we have found a solution to the existing flawed system. RFID cards are used in our proposed system, which provide security to the consumer and also an identification proof. RFID tags have taken the place of barcodes. RFID chips are made up of metal, hence difficult to destroy or manipulate. RFID chips are one time investment product and can be used for long duration. RFID readers can scan the chips easily. Also the time in the waiting queue is reduced as customer's bill is generated during the shopping period itself. Once the customer is done with the shopping, the bill summary is sent to the customer on their registered mobile number through SMS[3]. All these features makes the super markets more efficient, advanced and customer friendly[6].

II. SYSTEM DESIGN

a) Block Diagram
The generalized overview of the project is shown with the help of the block diagram given below:
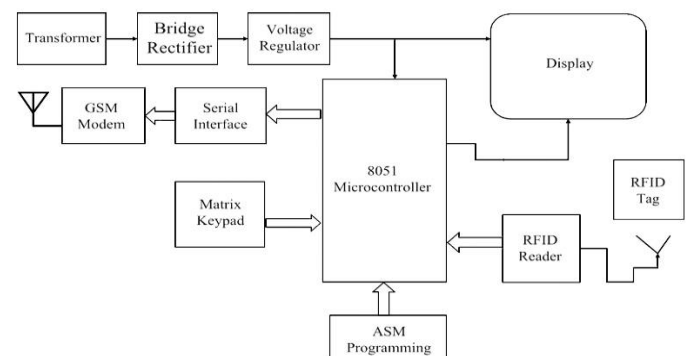

Figure 1: Block Diagram

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The PIC-controller is the heart of the project. The project is divided into four phase: Power supply, RFID phase, PIC phase and GSM phase. The power supply phase consist of transformer, bridge rectifier and voltage regulator for a constant required power supply. The RFID phase consist of RFID card, RFID tag and RFID reader. The PIC phase consists of PIC controller, serial interface communication, programming, matrix keypad for input data and 20x4 LCD for display. The GSM phase consist of GSM modem. The PIC controller controls all the phases. The GSM modem is used for the sending SMS to the registered number.

b) Hardware overview

1] RFID Tag

RFID tag are passive devices. ISO/IEC 18000 and ISO/IEC 29167 use on-chip cryptography methods for intractability, tag and reader authentication. The RFID tag includes either fixed or programmable logic for processing the transmission and sensor data, respectively.

Fig.2: RFID TAG

2] RFID reader

A RFID readers function is to interrogate the RFID tags. A reader contains an RF module, which acts as both transmitter and receiver of radio frequency signal. Fixed readers are set up to create a specific interrogation zone which can be tightly controlled. This allows a highly defined reading area for when tags go in and out of the interrogation zone. Mobile readers may be hand-held or mounted on carts or vehicles.

3] GSM modem

GSM (Global System for Mobile Communications, originally Group Special Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991.

This GSM modem is a highly flexible plug and play GSM 900 operating frequency modem for direct and easy integration RS232, voltage range for the power supply and audio interface make this device perfect solution for system integrators and single user.

4] 8051 microcontroller

Features:

8K Bytes of In-System Programmable (ISP) Flash Memory

• Fully Static Operation: 0 Hz to 33 MHz

• Three-level Program Memory Lock

• 256 x 8-bit Internal RAM

• 32 Programmable I/O Lines

• Three 16-bit Timer/Counters

• Eight Interrupt Sources

• Full Duplex UART Serial Channel

III. METHODOLOGY

As customer enter the super market customer would be issued an RFID card to activate the intelligent cart. The RFID Card consists of the personal data (name, contact number, username, password). As customer swipe the RFID card into the cart, it will show customer's name and ask for the password. After verification of password, the sheet will be displayed. In the store all products are clipped with unique RFID tags. The cart contains RFID reader.

When a customer starts shopping, he pulls out the products from the shelf and keep it in the cart. When he is about to put products into cart, the RFID reader scans the RFID tag and display its detail on the screen connected to the shopping cart. The total amount is being calculated immediately and is displayed on the lcd screen.

In case customer wishes to remove few products from the cart then customer just needs to switch from "IN MODE" to "OUT MODE" and remove the objects easily. This flexibility makes shopping more friendly.

As customer's shopping is done, click on "Done" button and the bill will be generated at that instant. Even the total amount of the bill will be sent to the registered number through SMS. The bill summary will be accounted to the RFID card[4].

IV. RESULT

The customer receives a message in which the details of shopping are given. It helps the customer and even the trader to deal quickly and save their time.
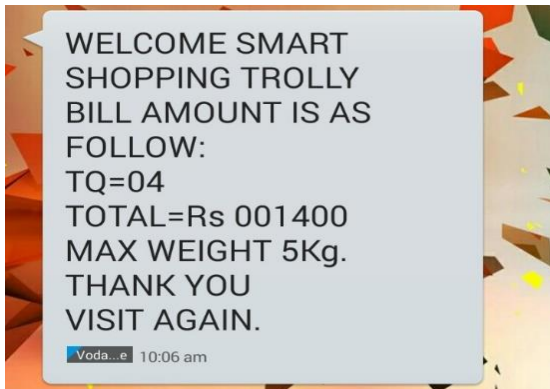
WELCOME SMART
SHOPPING TROLLY
BILL AMOUNT IS AS
FOLLOW:
TQ=04
TOTAL=Rs 001400
MAX WEIGHT 5Kg.
THANK YOU
VISIT AGAIN.

Voda...e 10:06 am

FIG 3: OUTPUT IN THE FORM OF MESSAGE

V. FUTURE SCOPE

Smart shelves: The reader continuously scans and monitors the RFID tagged products on the shelf and updates their status in the central system. If the products of a particular shelf are misplaced and placed in any other shelf alert or notification is sent to the central server or the back end system about the product's movement as 'misplaced items'.[5]

Expired date notification: An alert or notification is generated whenever a product nears its expiration date.

Maps: GPS based locations of various products in the store for lesser complexity. It saves the hassle of searching through aisles for specific products, it's also time saving.[11]

VI. CONCLUSION

The RFID technology has gained significant position in trending embedded systems. Through this project, billing process will become more convenient and easy. Also it provides security and authentication of the products. It is completely eco-friendly and customer friendly. Such digitized, advance super markets are an initiative towards the smart cities.

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