Intelligent Trolley System

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Abstract— **An innovative product with social acceptance is the one that aids the comfort, convenience and efficiency in everyday life. Purchasing and shopping at big stores is becoming daily activity in almost all cities nowadays. We can see big rush at these stores on holidays and weekends. People use trolleys to carry purchases around. After completion of purchases, one needs to go to billing counter for payments. At billing counter the cashier prepare the bill using bar code reader which is very time consuming process and results in long queue at billing counter.**

In this project, we develop a product "Intelligent Trolley" to assist a person in everyday shopping, in terms of reduced time spent while purchasing. The system will provide a technology oriented, programmable, low-cost, easily scalable, and rugged system for assisting shopping in person using RFID module. In this system we are using RFID tags instead of barcodes.

*Keywords—***Intelligent trolley; RFID module; RFID tags; Barcodes.**

I. INTRODUCTION

In the modern world, every supermarket and hypermarkets employ shopping baskets and

shopping trolleys in order to aid customers to select and store the products which they intend to purchase. The customers have to drop every product which they wish to purchase into the shopping cart and then proceed to checkout at the billing counter. The billing process is quite tedious and highly time consuming and has created the need for shops to employ more and more human resource in the billing section, and yet waiting time remains considerably high.

In our project, we seem it fit, to propose an "Intelligent Trolley" which aims to reduce, and possibly eliminate the total waiting time of customers, lower the total manpower requirement and expenses for markets and increase efficiency overall. In a world where technology is replacing the ways we pursue everyday activity, the future of the retail industry also lies in more and more automated devices.

"This shopping cart will change the way people shop as radically as ATM's changed banking."
The trolley will reduce and eliminate time taken in billing counter in supermarkets thus allowing users to self-checkout and increase productivity.
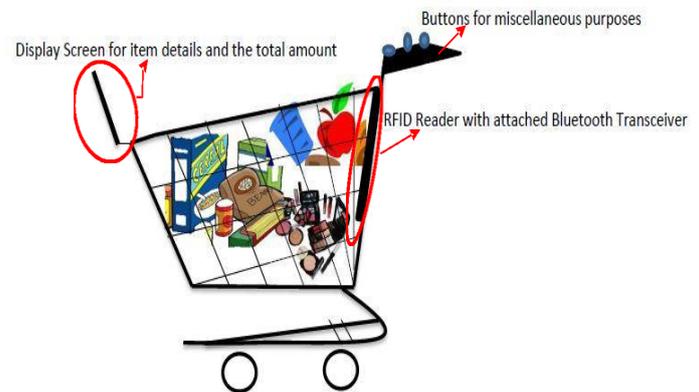

Fig 1. Visual abstract

II. MOTIVATION

In survey we found that most of the people prefer to make purchases from any retail shop instead of waiting in long queues to buy a few products in a supermarket. People are supposed to stand in a long queue for billing and payment. While trying to come up with a solution to the previously identified problem, recent years have seen the appearance of several technological solutions for hypermarket assistance. All such solutions share the same objectives: save consumer's time and money, help these markets to win loyal clients.

Another problem faced by the management is the maintenance of the transaction records and the absence of a live inventory leading to problems like, products being out of stock, thus leading to the loss of customers.

We therefore, aimed at solving the above problem and also to make things easier not only for the customers but also for the management of the store be it local or nationwide.

III. PROPOSED METHOD

After complete analysis of the advantages of the RFID system, we propose an Intelligent Trolley System by making use of Arduino platform. Here we are going to explain our hardware and software model.

A. Hardware Description

1)Arduino Mega : The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 . It has 54 digital input/output pins (of which 14 can be used as PWM outputs),16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get start.

2) Bluetooth Module: It is of HC-05 type

3) RFID reader: EM-18 reader is used

4) RTC Module: DS 1307 is used as it works well with 5V

based chips such as arduino

5) GLCD Module: 128*64 pixels monochromatic display

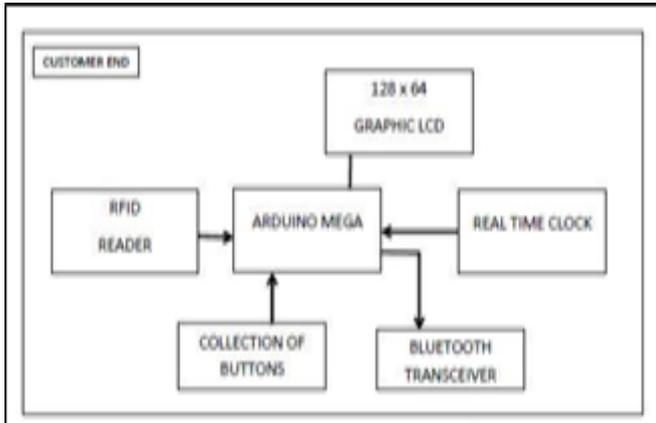The proposed hardware model of this system is shown in fig.2.

Fig.2 Hardware model of the system

B. *Software Description*

1) Arduino IDE : Arduino is a powerful IDE. The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. The environment is written in Java and based on Processing and other open-source software.

2) Blue term : VT-100 terminal emulator for communicating with any serial device using a bluetooth serial adapter. The

RFCOMM/SPP protocol emulates serial communications over bluetooth. For this Bluetooth serial adapter is needed. This is an opensource application.

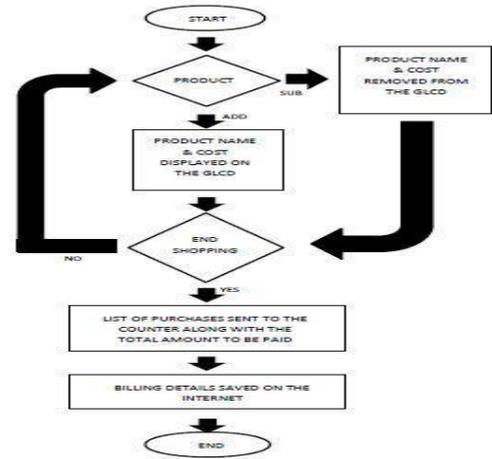The overall flow diagram of software design is given in fig.3.

Fig.3 Flow diagram of the system

IV.COMPARISION AND CONCLUSION

Taking into account the changing trend in retail shopping, we come to a conclusion that the Intelligent Shopping Basket is most certainly a definite necessity for the Retail marketing industry to step up their portfolios , cope up with the advancement in technology and save time and manpower.

The intended objectives were successfully achieved in the prototype model developed. The developed product is easy to use, economical and does not require any special training. Though the project showcases the proof of concept, there are a few aspects that can be included to make the smart shopping cart more robust. Further, a more sophisticated micro-controller and larger display system can be used to provide better consumer experience.

Table III. Comparison between BARCODE & RFID

Existing system	Proposed system
a) Manual billing.	a) Automatic billing
b) Use barcode for billing	b) Use RFID TAG for billing
c) human staff is needed for billing	c) No need of any staff for billing
d) Low product cost but overall expenses are much high.	d) Product is little expensive but overall expenses is much low
e) Difficult to track the product.	e) Easy to locate/track the product
f) Getting product information is difficult & time consuming.	f) Getting product information is easy and no extra time needed.
g) It does not disclose any automatic way of indicating to the shopper how the total bill is affected as objects are added or removed from the cart.	g) LCD display is present which will show the updated bill every time the shopper add or remove any object from the cart.
BARCODE (existing technology)	**RFID** (proposed technology)

a) Person is required to read barcode on product.	a) Automatic reading of RFID tag from product.
b) Barcode must be visible on the surface of product.	b) RFID can be placed inside the product.
c) Line of sight required to a read barcode.	c) No line of sight required to read RFID.
d) The readability of barcodes can be impaired by dirt, moisture, abrasion, or packaging contours	d) RFID tags are not affected by such conditions.
e) Short reading distance.	e) Long reading distance.
f) Barcode does not have READ & WRITE capability.	f) RFID tag having READ & WRITE capability.

V.FUTURE SCOPE

In Future the prototype can also be used with automated bill printing for ready to go bill payments . there can be implementation of bill payments over wifi using which customers can do bill payments through credit or debit cards.it can be illustrated in fig. 4.
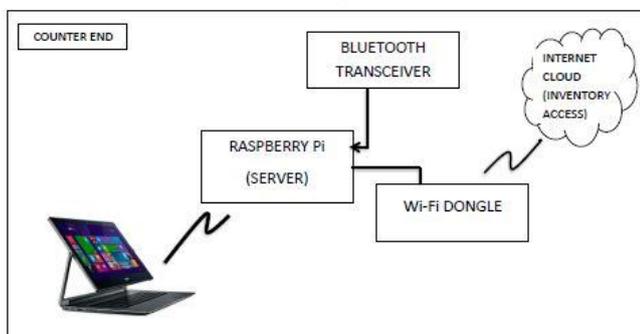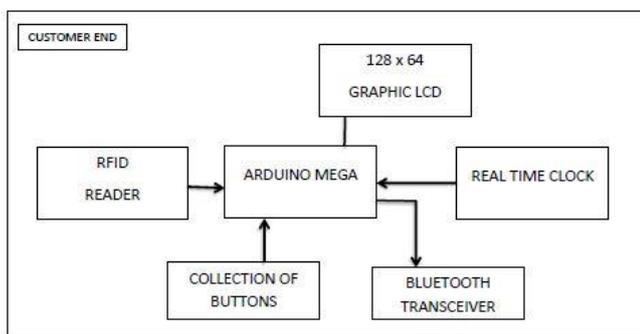
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