

## SMART TROLLEY TO AVOID LARCENY USING LOAD CELL

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**Abstract** - Shopping mall is a place where people get their daily necessities. There has been an emerging demand for quick and easy payment of bills in shopping malls. Quite often, when shopping in a supermarket shoppers are frustrated at locating the items on the shopping list and no assistance is available. To overcome these problems we have designed a smart trolley. This paper provides a centralized and automated billing system using RFID. Each product of shopping mall, super markets will be provided with a RFID tag, to identify its type. Each shopping cart is implemented with a Product Identification Device (PID) that contains microcontroller, LCD, an RFID reader. Purchasing product information will be read through a RFID reader on shopping cart and it is displayed in LCD which is interfaced to the controller.

**Key Words:** RFID Reader, RFID Tag, LCD

### 1. INTRODUCTION

Now a day's interest in shopping malls is widely increasing among people. In the present shopping malls, customers find various difficulties. Those difficulties are mentioned below. One third of major shoppers buy groceries on a budget. Most of the times, it is only at the end of purchase shoppers come to know that the overall purchase total is greater than their budget. Then they spend much time in searching for their desired products and finally overall shopping process becomes more time consuming too. Due to this, several times shoppers couldn't buy all their desired products and miss out few items. Another major problem faced by users is that they have to wait in long queues for billing. Thus the proposed system overcomes all these drawbacks faced by shoppers in shopping malls. In the first step of this project, a mobile application is developed to make shopping process easy.

This application is designed in such a way that it holds information about all the products available in the shopping mall with price. As soon as the shopper opens the app, list of items with price gets displayed. The customer goes through the items and will select the desired items. After selecting, this application sorts the Selected items and displays them rack wise i.e. rack1 items first, rack2 items second and so on. Each item in Supermarket is tagged with a unique RFID label. Each shopping cart is designed or implemented with a Product Identification Device for quick checkout aisles that scan all products at once and generates total automatically, eliminating different sectional

### 1.1 Objectives

- Creation of inventory: In Arduino program itself an inventory is built specifying: 4 products with their name price and respective weight.
- Radio frequency signal transmission and reception: Radio FID tags and Radio FID reader is utilized to read item, cost and weight which is already saved as an inventory in the program.
- Display: each item scanned using a Radio FID reader is displayed and information: like product name and its weight and price is displayed along with the total cost.
- Weight measurement: at the end when amount has to be paid at the counter: total weight of the products will be measured and if the weight is more than that then what calculated by the program the billing would just restart, therefore, avoiding theft in the mall.
- Our proposed system overcomes all the problems in existing system and provides high speed billing efficiency. This is a perfect/optimal solution for saving one's time during shopping. The features of our product are briefly described below:

A Completely automated system helps the customer to use the product with ease. When this is applied on large the management can earn profits with reduced labor cost. The customer need not wait all through the long lines for billing but can happily walk out of the store by paying the amount he is supposed to

### PROBLEM STATEMENT

There are existing systems for the product we have developed such as:Barcode System

A barcode (also bar code) is an optical, machine-readable, representation of data; the data usually describes something about the object that carries the barcode. Traditional barcodes systematically represent data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional (1D). Later, two-dimensional (2D) variants were developed, using rectangles, dots, hexagons and other geometric patterns, called matrix or 2D barcodes, although they do not use bars as such. Initially, barcodes

were only scanned by special optical scanners called barcode readers

All the super markets and shopping malls uses barcode system to bill the products that are purchased by the customers. But with the growing customers and sales barcode system fails as the barcode readers are very slow

They can only read one product at a time which makes the entire billing process slow and lot of time of customers is wasted.

The disadvantage using the traditional barcode system for Billing areas

- Lack of shopping experience
- Absence of billing system

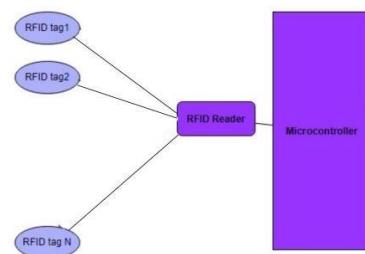
## 2. METHODOLOGY

This project is a mixture of s/ware and h/ware. This section will provide the different tools and terminology used in implementing this project. Every component used in this project plays a vital role.

Our product is taking help of two different technologies viz. ARDUINO and RFID, which is most efficient when compared with other technologies used. ARDUINO processes the data internally and serves as micro controller for the entire system. RFID is frequency-based technology which is 25 times faster than any existing technologies that are being used for the same purpose.

### 2.1 PROPOSED SYSTEM

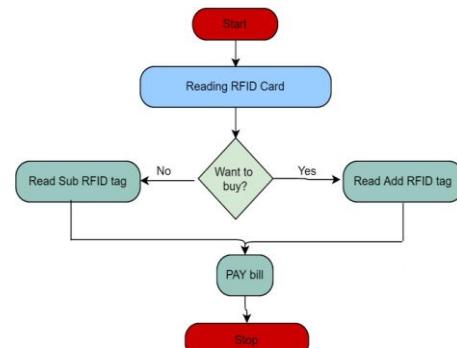
Technological developments have opened up new opportunities for the company to conduct its business activities. According to the report published by techinasia, there are several smart phone technology bases that have been popular among people and it plays a big part of a day to day necessity. Today's consumers are surfing more, shopping more and socializing more on their mobile devices. In this paper, it displays the list of products present and its cost. The user is asked to select the products. Once the selection process is over, the products are sorted and displayed based on its location. Radio Frequency Identification (RFID) is becoming preferable technology as an alternative to barcode systems. RFID systems provide an automatic identification method, relying on storing remotely retrieving data using RFID tags or transponders.



**Fig -1:** RFID and Microcontroller

The Arduino microcontroller centrally controls all the devices connected to it. The program has to be uploaded into the Arduino board and connected to the power supply. The devices are triggered according to the flow of the code. Firstly, the data regarding the prices of products are to be stored on RFID tags. All the authorized RFID cards data is to be stored and code must be written to check the authentication. Upon the user purchasing the product he adds it to his cart by reading the tag.

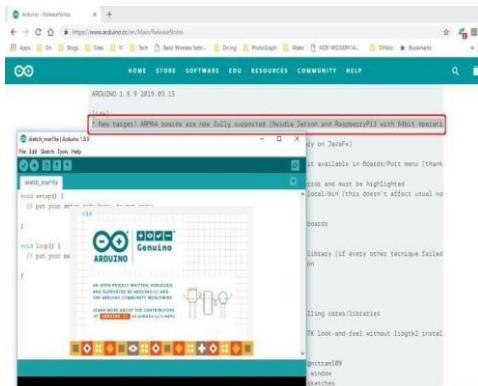
RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves. Chip-based RFID tags contain silicon chips and antennae. In this paper, we have developed a smart shopping cart system that allows customers to manage their shopping list while shopping and only pay the bill at the checkout counter.



**Fig -2: WORKING FLOW OF PROPOSED SYSTEM**

The architecture of the smart shopping cart with its interfaces. The Arduino microcontroller centrally controls all the devices connected to it. The program has to be uploaded into the Arduino board and connected to the power supply. The devices are triggered according to the flow of the code. Firstly, the data regarding the prices of products are to be stored on RFID tags. All the authorized RFID cards data is to be stored and code must be written to check the authentication. Upon the user purchasing the product he adds it to his cart by reading the tag. Each product has two tags to serve their purposes.

## 2.2 SOFTWARE USED:



**Fig -3: Arduino Software (IDE)**

The Arduino Integrated Development Environment or Arduino Software (IDE), contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

## 2.3 ADVANTAGES AND APPLICATIONS

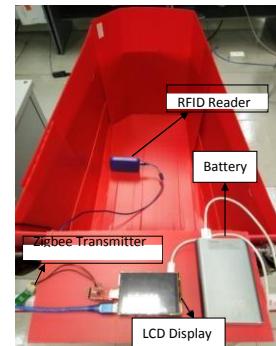
- Time saving.
- Clients do not have to hold up in long lines at checkout.
- Items putted into a smart shopping cart (with RFID perusing capacity) can be read by default and the billing information is generated, clients do not have to hold up in long lines at checkout.
- Smart racks that are likewise outfitted with RFID readers can screen every single loaded item and send item status updates to the server. At the point when items wind up sold out, the server can tell representatives to restock.

## 3. CONCLUSION

Hence the Smart Shopping Cart provides a best solution for the long queue lines the shopping malls. Our proposed system is designed in such a way that it overcomes all the defects of previously available systems. User friendliness is given much importance in our system which makes it more comfortable to use than any other existing systems. Also, it is built with open source hardware which makes it cheaper and more efficient for the users. There are existing systems for the product we have developed but most of them are using embedded-systems which is costly to build, we are using Arduino which is very cost efficient and easy for further updating. Finally, time the most important

resource for every individual today, there are a lot of solutions available for these issues like amazon GO and complete solution for this problem is not yet discovered.

## RESULT:



**Fig -4: Smart trolley**

- When the system is on, the LCD display will start. It display the message as system starts for 3 seconds.
- After the system is on, RFID checks for tags here two types of tags in RFID reader: tags and subtags tags are meant for adding elements and subtags are meant for removing elements.
- Display in LCD here tags and subtags are added and removing should display in LCD.

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