VISHNU
UNIVERSAL LEARNING

BVRIT HYDERABAD College of Engineering for Women

Department of Information Technology

SMART CART WITH AUTOMATIC BILLING AND ANTI-THEFT

Under the Guidance of

Guide Name: Ms. Ch Sai Lalitha Bala

Designation: Assistant Professor

Team- 11

M. Sahithi(19WH1A1209)

M.V. Vanshita(19WH1A1225)

G. Naga Preethi(19WH1A1239)

S. Manasvi(20WH5A1203)

VISHNU
UNIVERSAL LEARNING

Contents

- Abstract
- Introduction
- Problem Definition
- Literature Survey
- Proposed System
- Project Modules
- Performance Measures
- Comparison Results
- Conclusion
- References

VISHNU
UNIVERSAL LEARNING

Abstract

- Rush plus cashiers who prepare a bill with a barcode scanner take longer & have longer-lasting results. This innovative project includes an automated billing system that can be placed in a shopping trolley.
- This automated payment system includes an RFID reader controlled by ESP instead of the traditional barcode readers.
- Each product of shopping mall, super markets will be supplied with an RFID tag, to identify its type. The centralized database will give and information about the product on the LCD screen present on the shopping cart, which will help the customer in buying products. LCD can display characters, numbers. LCD show the running bill.

VISHNU
UNIVERSAL LEARNING

Introduction

- For the smart cart shopping, the RFID reader and LCD screen are attached to the cart.
- The RFID reader scans the RFID tag on the item when it is placed near the RFID reader where the item details will be displayed on the LCD screen.
- A weight sensor installed on the smart cart for weighting items.
- During the time of checkout, If the added weight of all items is equal to total weight of the cart, then it is concluded that no theft is detected and the customer can proceed with a final checkout. In case of theft, extra unaccounted weight will be detected and displayed on the screen.

Problem Definition

- Currently, shopping can be a hassle: Waiting in long checkout lines, keeping track of subtotal manually.
- With all these factors, a simple task like shopping becomes hectic and wastes time. Our Smartcart shopping system is a solution to this.The Smartcart will remove the issue of long lines,Display the cost of the products in their shopping cart."
- These are the problems that are currently faced by most consumers. There are some existing methods to solve the problems that are stated above but the effectiveness still consider improvable.

Literature Survey

S.No	Title of the paper	Author(s) & Journal Details	Description/ Interpretation
1	Smart Shopping Cart with Automatic Billing System through RFID(2021)	1) Mr.P. Chandrasekar 2)Ms.T. Sangeetha	This application creates an automated central bill system for the mall. Customers can pay their bill through credit/debit cards. Zigbee and RFID used for in it..
2	The RFID Based Smart Cart (2019)	1)Ms. Rupali Sawant 2) Kripa Krishnan 3)Shweta Bhokre 4)Priyanka Bhosale	a mobile device is used to make the payment of a bill via mobile applications etc.. Anti-theft id less focused here but it gives detailed information about automatic billing system
3	RFID Based Smart Shopping and Billing(2019)	1)Zeeshan Ali 2) Reena Sonkusare	In this paper, more utilization of LCD like removing the item by cancel button on LCD is iimplemented. Product information and pricing with weight is displayed on LCD.
4	Intelligent Shopping Cart(2018)	1)Raju Kumar 2) K. Gopalakrishna 3) K. Ramesha	It explains, how to acces real time information about the diverse product inside the shopping cart. It focuses on accessing information through QR code.

Proposed System

- In the proposed system, The main objective of this project is to reduce and eliminate time taken in billing counter in super markets by designing a project.
- This automated payment system consists of a RFID reader which is controlled by Microcontroller which is ESP32.
- So, whenever the shopper puts any product in trolley it is detected by the RFID module and is displayed on LCD along with the price of the product. To avoid the theft we are using weight sensor for detecting any theft.

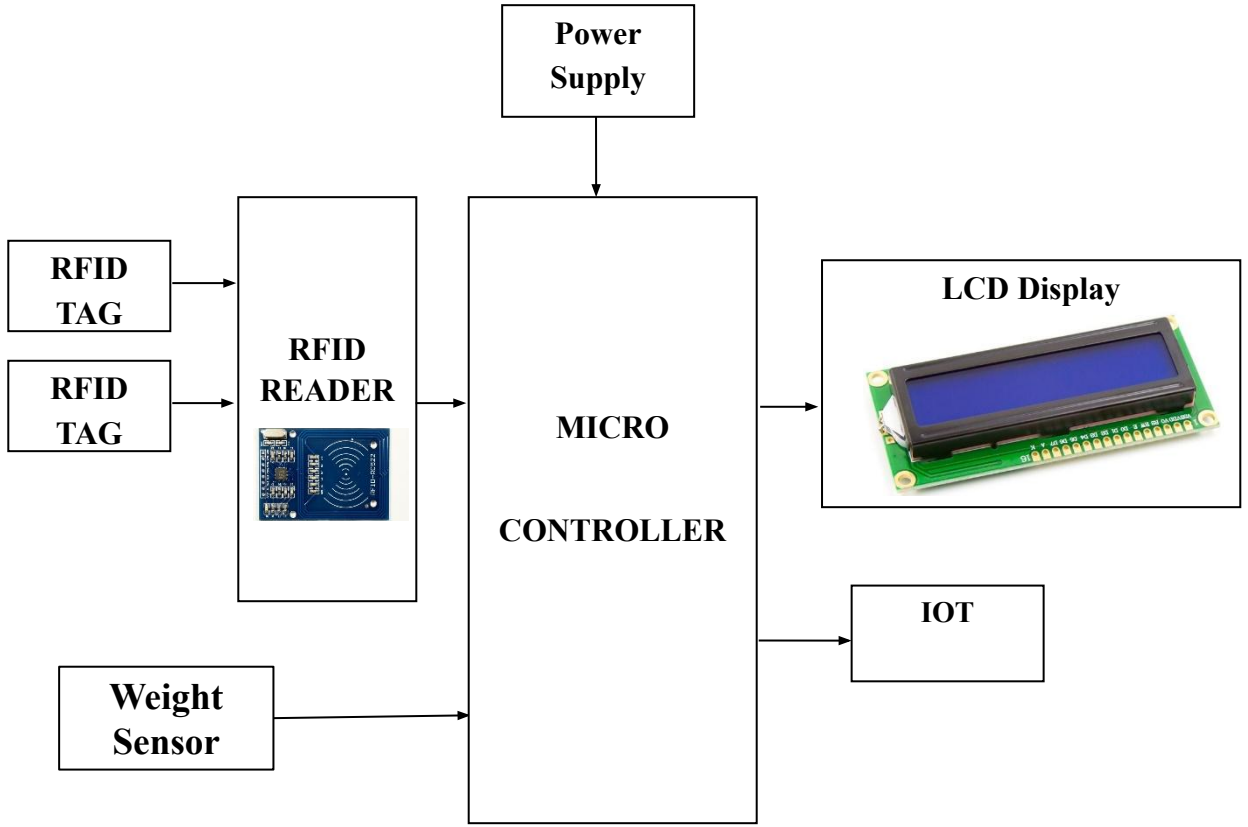
VISHNU
UNIVERSAL LEARNING

Project Modules

- Power supply: Given to the transformer where the rectifier converts AC to DC
- RFID: The RFID tags are scanned using RFID reader.
- Weight sensor: The driver board is connected to weight sensor to convert analog weight to digital weight inputs.
- Billing: The user gets notified about the total amount in telegram application.

VISHNU
UNIVERSAL LEARNING

Design Architecture



Implementation and Results

```
#include <WiFi.h>
#include <WiFiClientSecure.h>
#include <UniversalTelegramBot.h>
#include <ArduinoJson.h>
//#include <Arduino.h>
#include "HX711.h"
#include "soc/rtc.h"
#include <LiquidCrystal.h>
#include <SPI.h>
#include <MFRC522.h>

// Network credentials
const char* ssid = "dell";
const char* password = "12345678";

// Initialize Telegram BOT Token and Chat ID
#define BOTtoken "5888885352:AAEQpPWR3nkEm3LNmhrxBYzk9cQtH8b1vmA"
```

a.Header files

```
//rs/en/D0/D1/D2/D3
LiquidCrystal lcd(13,12,14,27,26,25);

const int buzzp =  21;
const int buzzn =  3;

int quantity =0;

// HX711 circuit wiring
const int LOADCELL_DOUT_PIN = 16;
const int LOADCELL_SCK_PIN = 4;

//RC522 RFID
#define SS_PIN 5
#define RST_PIN 17
```

b. Initializations

Implementation and Results

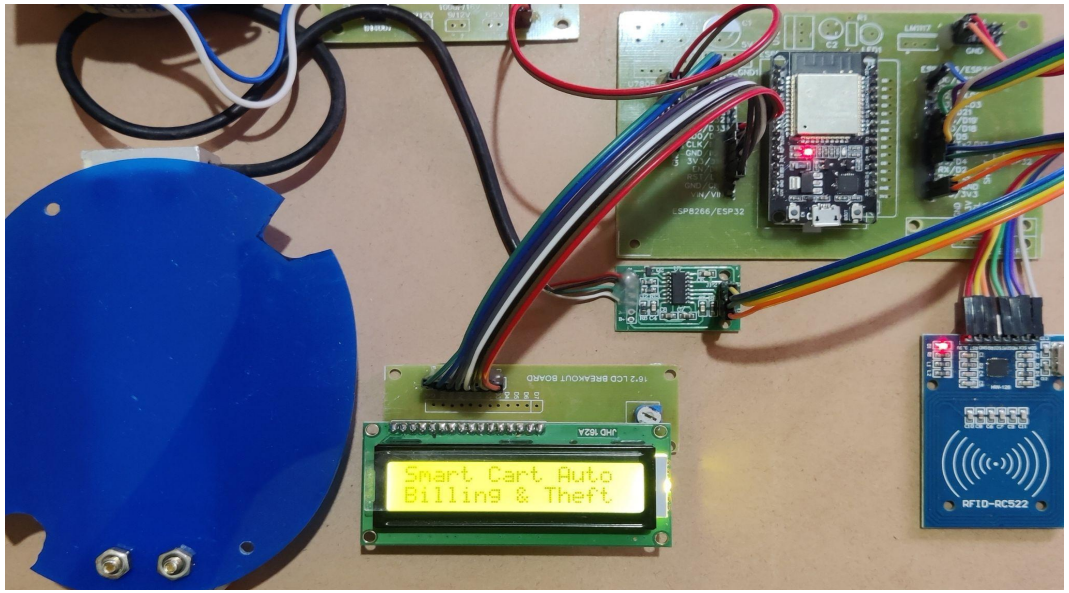
```
int card1[4]{3,52,94,23};
int card2[4]{146,140,15,71};
int card3[4]{195,100,18,22};
int card4[4]{146,166,88,71};

int card5[4]{243,54,225,145};
int card6[5]{211,54,178,148};

int sno=0;
unsigned int total=0;
int user1=0;
int user2=0;

int weight=0;
int flag0=0;
int flag1=0;
```

c. Enable scan and scan the items

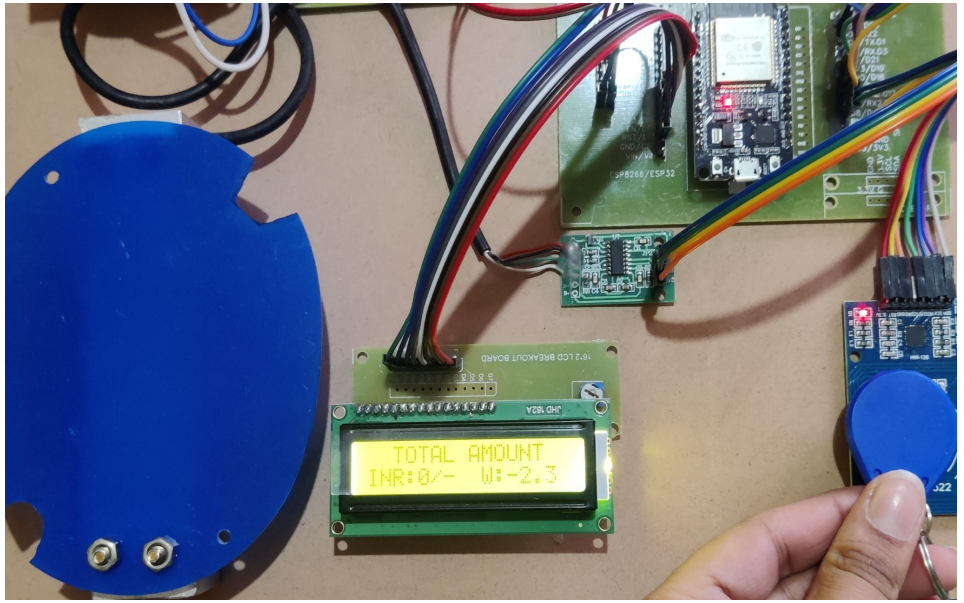
```
total+=10;
objectweight=objectweight+25;
lcd.clear() ;
lcd.setCursor(0, 0);
lcd.print("CHOCO ");lcd.print("S ");
quantity=quantity+1;
lcd.print(quantity);lcd.print("    ");
//Serial.println(F(quantity));
lcd.setCursor(0, 1);
lcd.print("P:");
lcd.print("10 ");
delay(1000);
 lcd.print("  W:");
lcd.print(scale.get_units(), 1);
chocoweight=scale.get_units(), 1;
scale.power_down();             // put the ADC in sleep mode
delay(3000);
scale.power_up();
Serial.println(F("CHOCOLATE"));
break;
```

d. Weight sensor

Implementation and Results

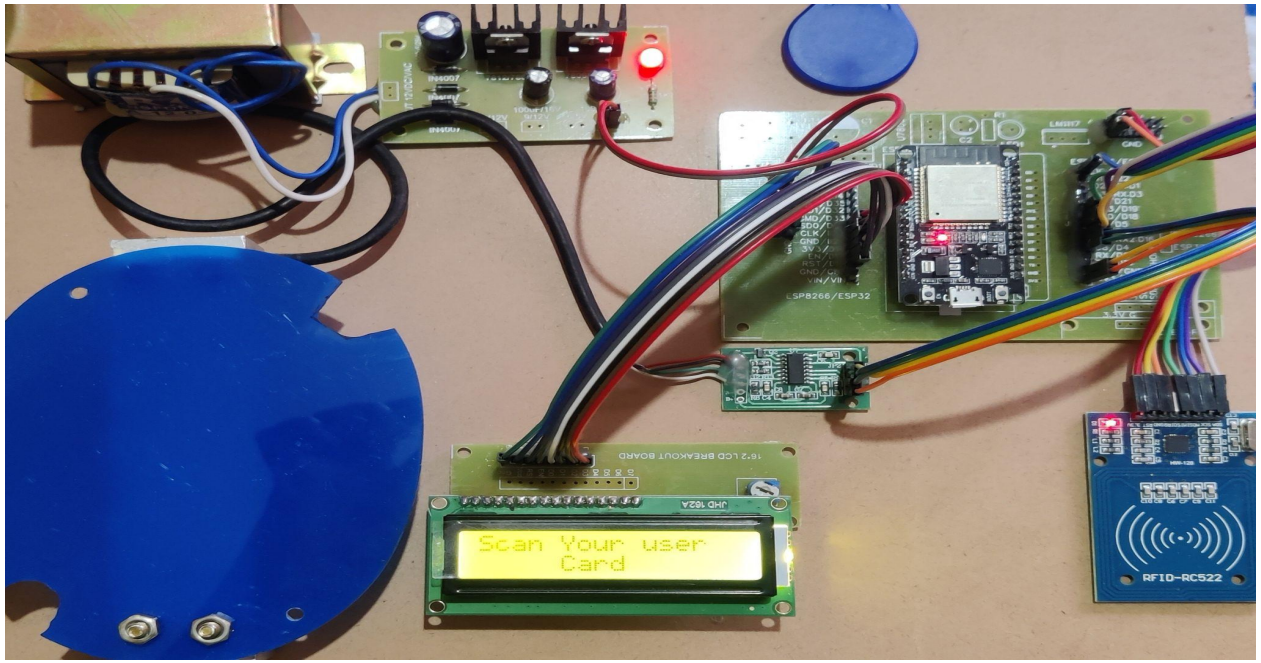


A. Smart cart with automatic billing and theft

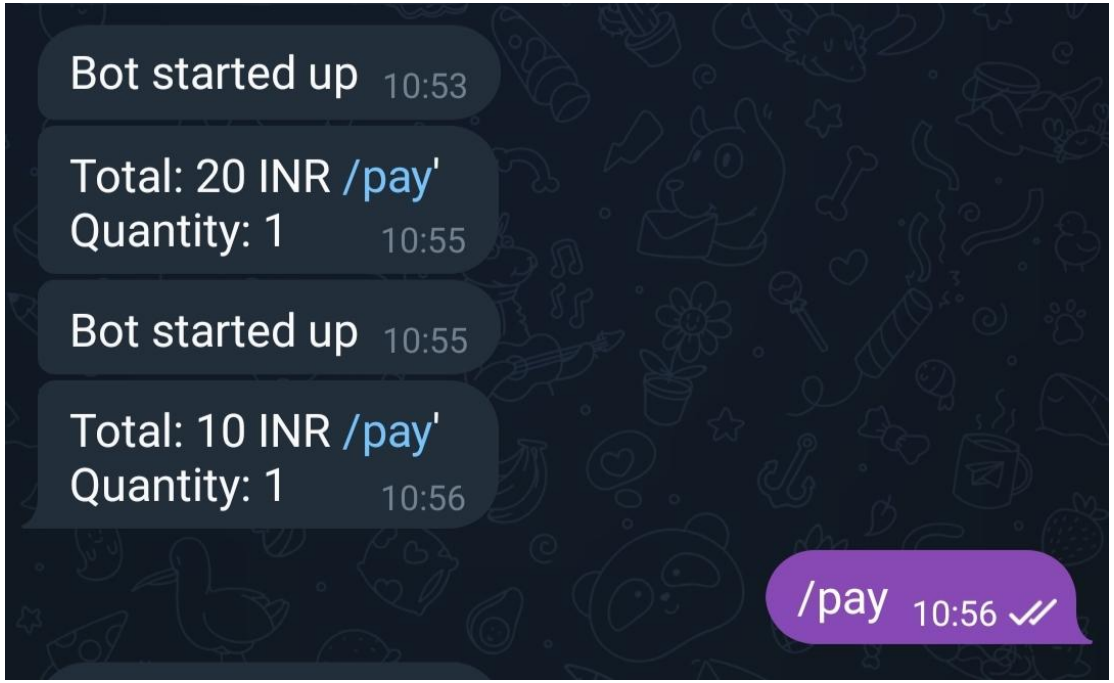


B. Scan your User Card

Implementation and Results

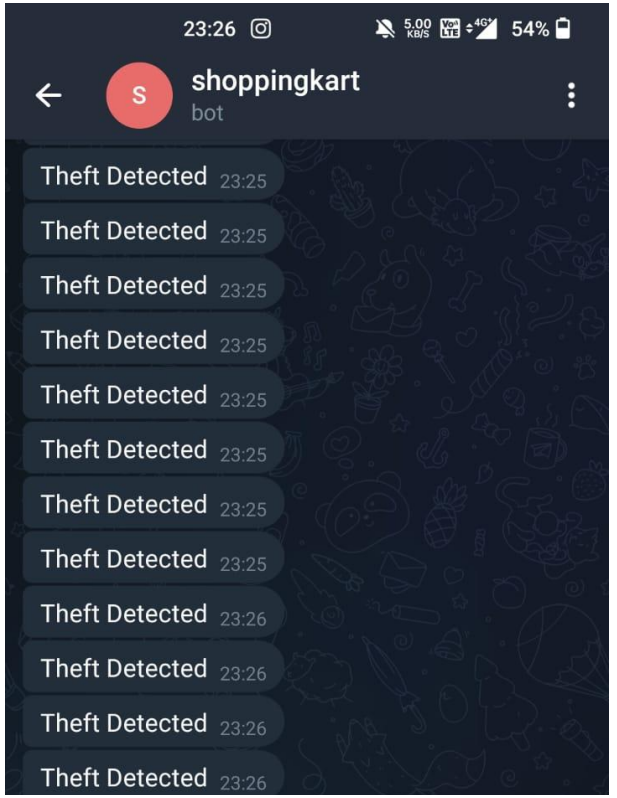


C. Scan the Products



D. Online Payment

Implementation and Results



E. Theft Detected

VISHNU
UNIVERSAL LEARNING

Performance Measures

- When a product with RFID tag is scanned, It reads and displays the product information along with its price on the LCD.
- When the weight in the cart is more than the scanned weights, It automatically displays as Theft Detected.
- It accurately measures the weight of the product when scanned by RFID scanner.
- Once the total products are scanned, It once again checks the total weight and redirects to telegram payment page to complete payment.

VISHNU
UNIVERSAL LEARNING

Timeline

DATE	DURATION	TASK
15/09/2022 -28/09/2022	2 weeks	Project Requirements
29/09/2022-26/10/2022	4 weeks	Soldering and design fabrication
27/10/2022-30/11/2022	5 weeks	Building the Model
1/12/2022-21/12/2022	3 weeks	Code Implementation

VISHNU
UNIVERSAL LEARNING

Conclusion

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 which is a time taking process.

The main aim of the project is to reduce the wait time at the billing counter and also detect the theft when the weight is greater than the actual weight of the product.

VISHNU
UNIVERSAL LEARNING

References

- Ashmeet Kaur, Avni Garg, Abhishek Verma, Akshay Bansal, Arvinder Singh, Arduino Based Smart Cart, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), 2 (12), 2021.
- Budic D, Martinovic Z, Simunic D, Cash register lines optimization system using RFID technology, IEEE Explore, 2014. Dhavale Shraddha D, Dhokane Trupti J, Shinde Priyanka S, IOT Based Intelligent Trolley for Shopping Mall, IJEDR, 2020.
- Galande Jayshree, Rutuja Gholap, Preeti Yadav, RFID Based Automatic Billing Trolley, International Journal of Emerging Technology and Advanced Engineering, 4 (3), 2018.

VISHNU
UNIVERSAL LEARNING

Thank You