Chocolate Vending Machine using Raspberry Pi

Miss. Sneha K. Gainwar[1], Prof. A. R. Manusmare[2]

Student, Department of Electronics and Telecomunication, Ballarpur Institute of Technology, Chandrapur, India[1]

Professor, Department of Electronics and Telecomunication, Ballarpur Institute of Technology, Chandrapur, India[2]

Abstract: This paper includes chocolate dispensing machines which are an integrated system. The main objective of our project is to launch new technology application in society. This machine can operate by UPI as well as card in order to dispense required amount Chocolate. This system is based on RFID card and UPI payment system in which if any card or UPI payment is detected then chocolate will get dispensed from the nozzle depending on selection of chocolate. It aims at advanced management of the whole chocolate vending machine previously used. The machine may be used to dispense chocolate into container; such chocolate-dispensing machine will be useful in any places like railway stations, bus depots, public areas, colleges, big institutions, government offices, courts, holy places, hospitals, etc. and especially in highly populated countries.

Keywords: RFID tag, chocolate management, UPI payment, DC motor, RaspberryPi, vending machine.

I.   INTRODUCTION

The main motive of this paper is to design a low cost, effective vending machine. The vending machine works on the simple principle, the user or customer pay to the machine in the form of coin and machine will return back the selected goods. Hence is called as the automatic dispense machine. The vending machine is an automatic machine that sells different type of product or food, such as the cans, chocolates, snacks, lottery tickets, cold drink, candy's, paper, food etc. The first modern coin operated vending machine was introduced in London in early 1880's, it dispensed post card. The machine was invented by Percival Everett in 1883 and earlier used at railway station and post office, dispensing post card and newspaper.

Today's intelligent vending machines offer tremendous opportunities for business transformation through the Internet of Things (IOT) and cloud-based technologies. Vending machine owners and operators can look forward to more effective ways to engage customers, increase sales, and save money through remote management and predictive maintenance. Advanced data analytics helps them better match machines and stock to each location, as well as obtain valuable insights on the effectiveness of promotions, pricing, location, weather, season, and other factors.

The implementation of IOT based vending machine helps the customer to dispense the chocolate. They just need to select the type they want and just click on button and dispense chocolate. In this paper we are using RFID cards and UPI for cash less payment.

II.   OBJECTIVE

The main Objectives of this project are as follows:
1. To use the mechatronics principle and provide solution for the faster delivery of item with digital payment based dispatch.
2. To reduce the wastage of time and the unnecessary crowd near the shops.
3. To monitor sales in order to identify which products are selling best or worst to help to increase sales.

III.   LITERATURE SURVEY

3.1 "Stationery Vending Machine – IJISET, vol-1, Issue-9, November-2014." This Proposed System a Microcontroller based Stationery Vending Machine that Dispense the A4 sheet, pencil, pen, etc,. for payment process this system uses a metal coil which when is ordered rotates to release the product using RFID card, once the RFID card is read the customer can select this required item after the RFID card is scanned and item may become available by the machine releasing it.

3.2 "Architecture of Beverage Vending Machine – IJACEN, vol-2, Issue-8, Aug-2014" This Proposed System ATM Card is the primary required for ordering the Beverage. This Machine Accompanies the request for ATM card number

along with the request for PIN, once the PIN has been validated by the financial institution, after this Beverage ordered is debited from the Customer account. Finally Beverage being served to the Customer.

3.3 "Automatic Paper Vending Machine – IJSETR, vol-4, Issue-4. April-2015" This proposed system design and fabricate an automatic paper vending machine, the payment setup is arranged in such a way that one sheet of paper would be delivered when a one Rupee(Indian Rupees-INR) is inserted, And two sheets of paper would be delivered when a two Rupees is inserted. After coin is inserted to machine delivers the paper when a customer asks for the number of papers, by using IOT devices and microcontrollers based on the mechatronics principles.

3.4 "A Review Paper on IOT Based Coffee Vending Machine – IJARCCE, vol-6, Issue-10, October-2017" In this Coffee Vending Machine based on the technology of internet of things and its remote management system. This proposed system is designed in such a way that a customer can order his coffee via a mobile app. It provides Authentication of the customer using RFID reader. This design not only makes the Beverage sales and supply information available, it can survey this information into Cloud Database through WIFI as well.

3.5 "Automatic Chocolate Vending machine – ICACCS, Issue-2019" This Proposed System sales different types of Chocolates. Here they used RFID card along with Arduino Uno, The external devises such as keypad, stepper motor, display can be connected through the various pins on the Arduino Uno. The Stepper motor is connected to the spiral ring, those chocolates are inserted in the ring, Finally the Product can be selected and then the motor rotates to deliver the product.

This paper attempt to provide solution in coin based vending machine which is not returned the amount of money that is no any change from machine. The plan is to use Radio frequency Identification and UPI along with RaspberryPi. Once RFID is to be read then User can select the product after card is scanned and collects the product at output unit. Also user can pay using Qr scan code via UPI application and dispense the product.

IV. METHODOLOGY
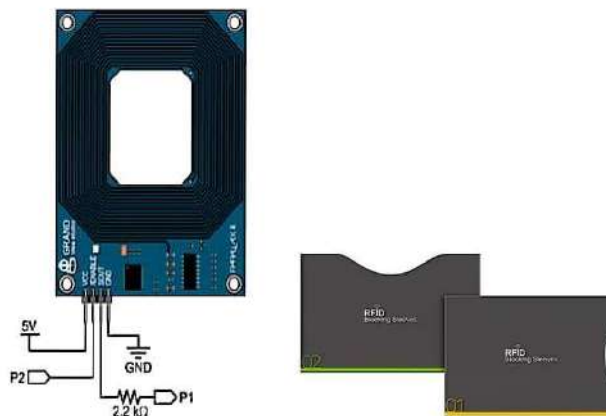
1] RFID Reader

Fig 2: RFID Card

• RFID or Radio Frequency Identification System is a technology based identification system which helps identifying objects just through the tags attached to them, without requiring any light of sight between the tags and the tag reader. All that is needed is radio communication between the tag and the reader.
• This module works on an excellent frequency of 125 KHZ and comes with an inbuilt antenna. Designed in accordance with the set industrial standards, these low cost RFID reader modules have both weight and serial output.

2] Raspberry pi 3:
This work uses Raspberry Pi 3 Model B. It has used due to its features and performance. It introduces Raspberry Pi as a world's most inexpensive and powerful Single Board Computer. Ever since the launch of Raspberry Pi from 2012, this is worlds cheapest microprocessor unit specially built for learner and makers

Figure 3: Raspberry Pi 3

The Raspberry pi 3 running raspberries serves as a master control over the other subsystem. It is a single board computer with microprocessor whereas Arduino is considered as microcontroller unit. The Raspberry pi is programmed in Python language. The first main task for the Raspberry pi is receiving and processing the UID from the scan RFID card. As the user drops the coin or swipes the RFID card, the coin acceptor or the RFID reader detect the coin or card and raspberry pi 3 send signal to turn on the relay.

3] Matrix Keypad

Fig 3: Push to on Switch

A push button switch is a mechanical device used to control an electrical circuit in which the operator manually presses a button to actuate an internal switching mechanism. A push switch (button) is a momentary or non-latching switch which causes a temporary change in the state of an electrical circuit only while the switch is physically actuated. An automatic mechanism (i.e. a spring) returns the switch to its default position immediately afterwards, restoring the initial circuit condition.

Features:
・ Crisp clicking by tactile feedback
・ Prevent flux rise by insert-molded terminal
・ Ground terminal is attached
・ Snap-in mount terminal

4] LCD
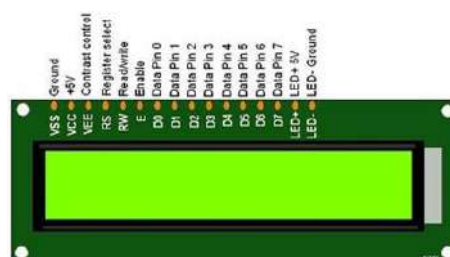
Fig 5: LCD

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light- modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as present words, digits, and seven-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.
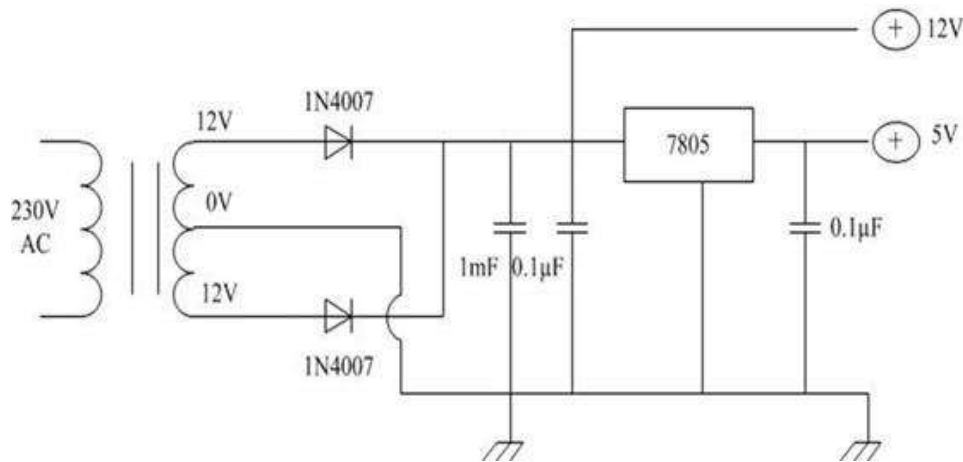
5] Power Supply

Fig 6: Power Supply

We need a power supply of DC voltage (5V) to run the servo motor, proximity sensor (5V), relay (5V), raspberry pi 3 (5V). Due to some interruption of power supply, it has a provision i.e. battery. Battery can feed the power to the device and battery can be charged via the solar panel. This work uses a 12 V rechargeable battery.

6] Relay:

Our system used two relays. One relay is used to switch ON the raspberry pi 3 and another is used to switch on the motor results in rotate the spring mechanism.
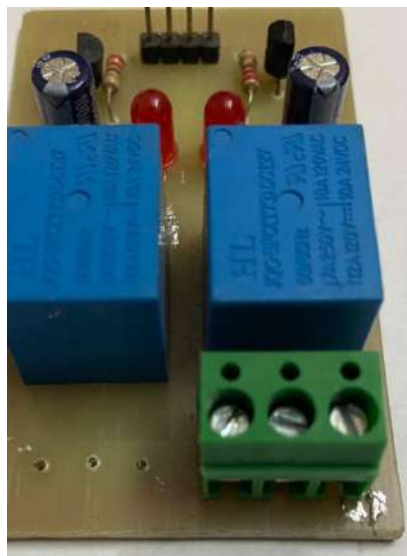

Figure 4: Relay circuit

V. CONCLUSION

This automatic chocolate vending machine offer variety of product as well as many different types of payment option. In the recent time use of digital is increasing day by day due to their accuracy and feasibility. Due to time saving feature

people can use vending machine in busy area like airport, bank , office, etc. By using the IOT easy to maintain the concerned department and counts of chocolate. This system is portable, affordable, consumes less power and can be made easily available so that the user can use this system whenever and whatever.

VI. FUTURE SCOPE

1] Multiple coin detection can be enabled and utilized. Since the coin acceptor is a 6-type coin detection system , multiple coinmode can be easily achieved.

2] Can be used for other beverages and drinks also.

3] RFID tag identify action reading can be developed to accept the money cards.

REFERENCES

1] Madhumati R, Reshma sultana, Dharshana R, "Smart water ATM in India using cloud model". IEEE 2017

2] Aditi Mohan, Niyati Tiwari, Rajdeep Ghosh, Prof.A.A Shinde, "Coin Operated Water Dispenser".ISO 9001:2008 Certified Journal: IEEE, 2017.

3] Manish Navlakha, Imran, lokendra Singh Rathore, Luvkush Sharma, "Water Vending Machine".ISSN:2250-0758, ISSN: 2394-6962, p.p:581-584©2016

4] Roy Want (2006), "An Introduction to RFID Technology" .IEEE press. Pp.25-33

5] Pulvirenti, F. Milazzo, P. Ursino, R, Analog and Mixed IC Design, 1997. Proceeding. 1997 2nd IEEE-CAS Region 8 Workshop, 12-13 Sep 1997, Pg. 97 -100

6] Anjana S , Sahana M N , Ankith S , K Natarajan , K R Shobha , IEEE ANTS 2015 1570192963

7] Pasture, M. Krummenacher, F. Robortella, R. Simon-Vermot, and R. Kayal, M. Ecole Polytech. Feb. De Lausanne, A fully integrated solar battery charger circuits and System and TAISA Conference, 2009. NEWCAS-TAISA '09. Joint IEEE North-East Workshop.

8] Eduardo Garcia Breijo, Luis Gil Sanchez, Javier Ibañez Civera, Alvaro Tormos Ferrando, Gema Prats Boluda,"Thick-Film Multisensor for Determining Water QualityParameters" Proceedings of the IEEE, 2002.

9] A. Dunkels, B. Gronvall, T. Voigt, "Contiki - a lightweight and flexible operating system for tiny networked sensors" in LocalComputer Networks, 2004. 29th Annual IEEE International Conference on, Nov. 2004, pp. 455-462.

10]Barth, H. Schaeper, C. Schmidla, T. Nordmann, H. Kiel, M. Van der Broeck, H. Yurdagel, Y. Wieczorek, C. Hecht, F. Saure, D. U., Development of a universal adaptive battery charge As an educational project Power Electronics Specialists Conference, 2008. PESC 2008. IEEE, 15-19 June 2008, Pg 1839-1845.