

# AUTOMATIC PASSIVE COMPONENT VENDING MACHINE

Prathamesh Jadhav<sup>1</sup>, Prajwal Mathe<sup>2</sup>, Sanket Chaudhari<sup>3</sup>

<sup>1,2</sup>Department of Electronics and Telecommunication Engineering, Dr. D. Y. Patil Institute of Engineering, Management & Research, Akurdi, Pune-44

\*\*\*

**Abstract** - A coin dispensary is an automatic machine that offers items like electronic components, snack, beverages, cigarette, toys, and tickets to customers after money or coin or a note or special cards are inserted into the machine. The first modern working vending machine was developed in England within the first 1880s and dispensed postcards. Vending machine exists in many countries and places, automatic vending machines that provide fewer common products compared to traditional machine items are created. The main objective of our project is launch a new technology application in society. This is Arduino based vending machine that sales different type of electronic components from machine. Attempt is to provide solution in coin based vending machine. Assembly consists of two gear bevel and rack. It will make rotation according to motor movements door assembly consists of door with attached rack gear. For movement as per motor, as the door gets open grains will be dispensed, according to delay. As our vending machine is an electronic component vending machine like resistors, capacitors we can use this machine in colleges and near electronic lab it becomes very useful to the students and people to get electronic components easily for their projects. Considering current covid-19 situation these machines can be used to sell products while ensuring no delays or contamination of products and also preventing any further spread of the disease.

**Key Words:** Automation, Vending machine

## 1. INTRODUCTION

A coin dispensary is an automatic machine that offers items like electronic components, snacks, Size beverages, cigarettes, toys and tickets to customers after money or a coin or a note or special cards are inserted into the machine. The first modern working vending machine was developed in England within the first 1880s and dispensed postcards. Vending machines exist in many countries and places, automatic vending machines that provide fewer common products compared to traditional machine items are created. As technology becomes increasingly important in today's world, it's invaluable to not only learn the due to use technology, but also to understand the due to create it. Since being the engineer, one should have sound knowledge of the opposite discipline. Most of the projects have limited scope to only specific discipline. This might limit one's innovation and creativity. This project inspires to create connections across several disciplines instead of learning topics in isolation because it combines mechanical, electronic, electrical and programming skills. It's introduced for rural

areas. The machine helps to produce a sanitary pad on the insert of a 5/- rupee coin.

A recent report shows that 88% of menstruating women in India are filled with reproductive problems because of their lack of access to sanitary products. About 23% of women drop out of schools and colleges after they menstruate. These reasons throw light to the grave necessity of our project to teach and help the women during this era to fulfill needs.

## 2. SCOPE OF THE SURVEY

Kamalathan [1] proposed microcontroller based automatic paper vending machine. It accepts coins as an input and dispenses sheets as an output. The software used is "embedded". Thus it can be helpful for college and school students. Qureshi [2] proposed FPGA based vending machine which supports four products and two coins. It accepts coins as input in any sequence and dispenses products when required amount is deposited and returns the change if entered amount is greater than the price of product. It also supports cancel feature through which a user can withdraw the request any time and entered money will be returned back. The algorithm is implemented in Verilog HDL and design is implemented on Xilinx Spartan-3 XC3S400FPGA. Preetilatha [3] proposed microcontroller based vending machine. It supports cashless payment as the input by scanning of RFID card and dispenses produces like A4 sheets, pencil, pen, etc. Thus it can be helpful to sale stationary items automatically. Kumar [4] proposed real time vending machine whose design is generated for different regular customers keeping RF-ID code as the base. It describes about real time vending machine whose design is generated for different regular customers keeping RF-id code as the base. When the customer selects the required products Arduino UNO R3 microcontroller will ask to insert RF-id for further processing and then ask to choose the quantity of opted product. After completing above procedure, the required products will be dispensed through vending machine. Thus it can be helpful to purchase day to day needs in various places. Suhail [5] proposed an FSM based automatic dispense machine which has an expiry date feature using VHDL, in this paper the author described Finite State Machine based automatic dispense machine using Xilinx ISE 14.2. This machine accepts money as an input to dispense the products and returns back the money without dispensing the product to the customer if the product is out of date. Thus it can be useful to ensure the good quality of the product along with

quantity and cost. Sharma [6] proposed a Reverse Vending machine based on FPGA and in this paper the author describes FPGA based vending machine. This machine accepts items such as empty containers, coins, snacks, chocolate, cold-drink, etc., According to the number of products the algorithm is implemented in VHDL and simulated using Xilinx FPGA Spartan3 development board. Thus it can attract and motivate the consumer through refund and prevent the environment from pollution of waste material.

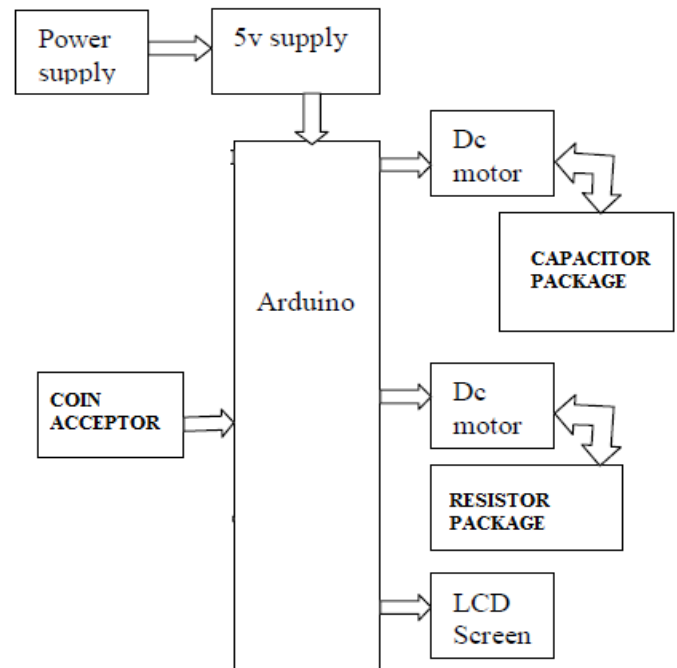
### 3. VENDING MACHINE

Candy machine is a coin worked machine for offering stock. Candy machine gives different item, for example, snacks, refreshments, water, tickets, and others item. Candy machine likewise does not require administrator or laborers for running it. Candy machines can be utilized both for offering an item (stationary, cool drinks, etc) or offering an administration (tickets, coupons, and so forth). After installment has been made the machine will administer the concerned item or administration (Ana Monga, 2012; Ankush, 2012; Shatrughan Modi, 2011; Biplab Roy, 2010). Around 215 B.C, the first candy machine is accepted to have been developed in Alexandria, Egypt. The mathematician Hero presented machine that acknowledged a coin and afterward apportioned a settled measure of blessed water. After that, in A.D1076, candy machine was overhauled by Chinese designers who added to a coin-worked pencil merchant (Subramoney, 2007; Kaushal, 2012; Karthik, 2013, Jasmin, 2015). Mid 1880s, the first present day coin-worked candy machines apportioning post card were presented in London, England. The primary candy machine in the U.S. was implicit 1888 by the Thomas Adams Gum Company. The candy machine administered a bit of tutti-frutti gum.

### 4. PROPOSED SYSTEM

Proposes the design of Automatic vending machine. The main objective of our project is to launch new technology application in society. This is Arduino based vending machine that sales different type of Electronic components from machine. Attempt is to provide solution in coin based vending machine Electronic circuit includes coin acceptor Motor Driver, Relay, Power Supply, Driven IC, Supporting LCD Screen etc. From Circuit processed signal will be given to motor for the rotation according to program requirement. Assembly consists of two gear Bevel and Rack. It will make rotation according to motor movements Door Assembly Consists of door with attached rack gear. For movement as per motor, As the door gets open grains will be dispensed, according to delay.

### 5. BLOCK DIAGRAM



Block diagram of vending machine

- I. Power supply: Provides required power to the devices and components to work.
- II. Coin Acceptor: Takes the coins entered by the user and checks if they are among the ones that are valid and accepts or rejects them. Send the coin value in the form of pulses to the Arduino to work on.
- III. DC Motor: Each motor is connected to a spiral mechanism which houses the products to sell and acts as a delivery mechanism. When payment is made, the Arduino (ATmega328) will alert the respective motor to rotate in order to deliver product.
- IV. Arduino Mega: The Arduino Uno is a microcontroller board based on the ATmega328. It receives inputs from Coin acceptor, works on them to derive the amount paid by the user and then provides the DC motors the inputs to dispatch product accordingly.
- V. LCD Display: It is used display payment and dispatch product.

### 6. SYSTEM REQUIREMENTS

#### 6.1 SOFTWARE REQUIREMENT

Software components are selected in such a way that the use of that specific software may produce efficient output. Software requirements may be the prerequisite that is

needed to be installed on the system for the proposed system to work smoothly. Else it can be the supporting libraries needed for the project to work.

### 6.1.1 ARDUINO

The open source Arduino software (IDE) makes it easy to write a code and upload it to the board. This software can be used on any Arduino board. Arduino board designs use a spread of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins which will be interfaced with varied expansion boards or breadboards (shields) and other circuits. The microcontrollers can be programmed using C and C++ programming languages. The Arduino project also provides a developer system supported by language project.

## 6.2 HARDWARE REQUIREMENTS

### 6.2.1 ARDUINO UNO (ATmega328)

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, 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 started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter.

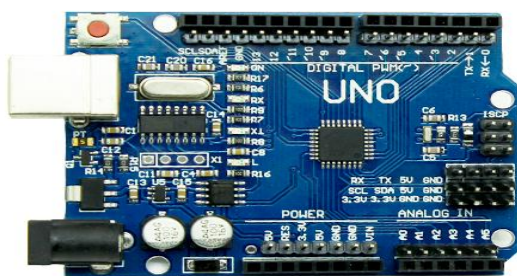


Fig 1. ARDIUNO ATmega328

### 6.2.2 L293D - Motor Driving Module

The L293D device is quadruple high-current half-H driver. The 293D is designed to provide bidirectional drive current up to 600mA a voltage from 5V to 36V. L293D Adapter Board can be used as dual DC motor driver or bipolar stepper motor driver. Useful in robotics application, bidirectional DC

motor controller and stepper motor driver. Separate logic supply to reduce dissipation. L293D includes the output clamping diodes for protections. L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive in either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).

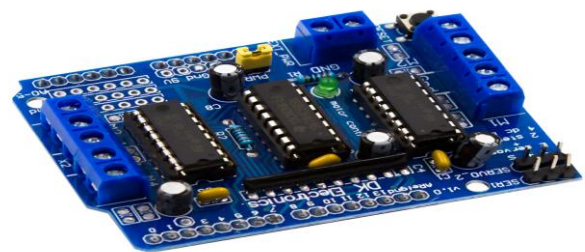


Fig 2. MOTOR DRIVING MODULE L293D

### 6.2.3 LIQUID CRYSTAL DISPLAY (LCD)

LCD is used in a project to visualize the output of the application. We have used 16x2 LCD which indicates 16 columns and 2 rows. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD. LCD can also be used in a project to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a project to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

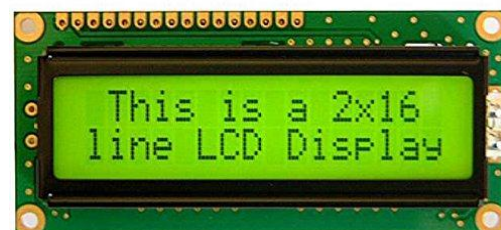


FIG 3. LCD

### 6.2.4 COIN ACCEPTOR

The following component is coin acceptor used as one of the input devices for vending machine. DG600F Series of coin acceptor is an electronic coin acceptor with high reliability, which is widely used in amusement facilities, vending machines and so on. The sensors in this coin acceptor check width, coin diameter and fall time of the coin to identify it

and it can be programmed to accept coins of any nation, denomination.



FIG 3. COIN ACCEPTOR

### 6.2.5 DC MOTOR

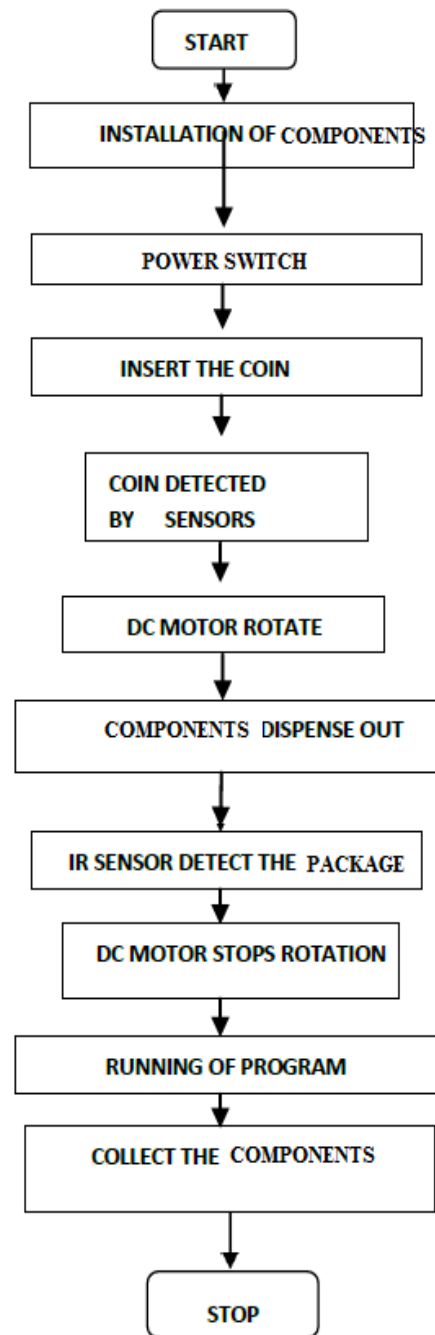
We used geared DC motors that rotate at 30 rpm to ensure smooth and accurate delivery of product. We have programmed the DC motors to rotate for a specific amount of time during which one product is dispatched through the spiral mechanism to ensure no extra product dispatch.



FIG 4. DC MOTOR

### 7. FLOW CHART

In the flow chart given below, we first install all the components. When we start our vending machine means when we switch on power machine will be started and when we insert a coin in vending machine, coin will be detected by sensors after that IR sensor detect the package and DC motor start working and component will be dispense out then DC motor stop rotating after that program will be stop till next command



### 8. Conclusion

Products have become a necessity, taking into consideration about how our environment evolves. There is an immediate demand in dispatching the products with minimum delay and high efficiency, by considering the above problem statement and justification provided. We believe that the technologies suggested and implemented by us will set a benchmark in the industry thus directing the use of technology as a way to ease the lives of people. The proposed method is a more advanced technique to access the product at offices and other buildings with ease, saving precious time and effort of users. The future shop can include these

modules to run in an effective manner so that the malpractice rate is reduced and the every person can get their required components. Human interaction with the functioning of the machine is minimized to a great extent, thereby reducing the opportunities of malpractice.

#### **ACKNOWLEDGEMENT**

The Authors gratefully thank **Prof. Priya Charles** for providing constant support throughout Project

#### **REFERENCES**

- [1] Soegoto, Eddy Soeryanto, Dr. Ir. 2014. Entrepreneurship: Menjadi Pebisnis Ulung. Jakarta: Elex Media Computindo.
- [2] Bodhale, A. P., and Kulkarni, J. S. 201. Case Study on Different Vending Machines. International Research Journal of Engineering and Technology (IRJET). pp. 3531-3535.
- [3] Cardaci, R., Burgassi, S., Golinelli, D., Nante, N., Battaglia, M. A., Bezzini, D., and Messina, G. 2016. Automatic Vending-Machines Contamination: A Pilot Study. Global Journal of Health Science, 9(2),pp. 63.
- [4] Das, N., Mandal, R., Mitra, A., Maiti, B., Nandy, S., and Datta, D. 2018. FPGA Based Vending Machine.