

# Smart Vending Machine

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**Abstract:** The modern vending machines, coin-operated, were introduced in London, England in the early 1880s, dispensing postcards. The machine was invented by Percival Everitt in 1883 and soon became a widespread feature at railway stations and post offices, dispensing envelopes, postcards, and notepaper. The Sweetmeat Automatic Delivery Company was founded in 1887 in England as the first company to deal primarily with the installation and maintenance of vending machines. In 1893, Stollwerck, a German chocolate manufacturer, was selling its chocolate in 15,000 vending machines. It set up separate companies in various territories to manufacture vending machines to sell not just chocolate, but cigarettes, matches, chewing gum and soap products.

**Keywords:** Vending machine, LCD, arduino

## 1. INTRODUCTION

### 1.1 Smart vending machine

Twenty first century is the era of automation and therefore we are making a revolutionary dispenser machine. This machine will provide vital item that are used in daily life by all of us, like packaged snacks, sanitizers, toothpaste, etc. The unique attribute of this dispenser machine is, it will provide all of this on the go i.e on trains. Now let's have a look on the vending machine that was invented by 17th-century German engineer of Hero of Alexandria, His machine accepted a coin and then dispensed holy water.

There are different types of vending machine throughout the globe such as:

1. Newspaper vending machine - This vending machine can dispense different newspaper at any time 24 x 7.
2. Change vending machine – Many times we face a problem of possessing high value currency and we need smaller currency unit, so this machine will give smaller unit of money equal in value to that of the higher currency unit.
3. Ticket vending machine – On airports and railway stations we find machines from where we can generate our ticket by entering the pnr number.
4. Photo booth- It has a camera, a film processor and a bench which is surrounded by curtains. After the payment is made, it takes photos of the person and provide him/her with the print.
5. Automobile vending machine- An automobile company named Carvana launched first of its kind automobile vending machine in united states of America. Autobahn Motors, a car dealership in Singapore, opened a 15- story-tall luxury car vending machine containing 60 cars, dispensing Ferrari and Lamborghini vehicles.

Now we have some knowledge about the history of vending machine and different types of vending machine, it becomes imperative to discuss about our vending machines, its working, application and what is different in our model.

Our vending machine right now will dispense snacks like Kurkure, dairy milk and uncle chips. The working of this vending machine is that if consumers need a dairy milk which is of twenty rupees. So, for that they will open up app PAYTM/BHIM. Thereafter click the pay button then it will redirect them to the Paytm website from where they can pay using their Paytm wallet. Once the payment is done then the vending

machine will dispense the commodity and thank you message will be printed on the screen. After this the latest number of commodities will be updated.

in the database. We have used Paytm gateway because it is one of the popular platforms and secure in the country, later on we will also add BHIM and TEZ payment options. We are also using camera to ensure dispensing of the commodity.

To keep up with the latest trend, we have also used data science to analyze the sales of the commodity and determine which commodity is more popular and is in more demand.

We have also used internet of things in our project through which we are monitoring real time sales of the commodities using wi-fi enabled controller like nodemcu.

Having discussed the technologies used, the answer to the question how it is different from other existing vending machine is that our vending machine is smart because it has using IOT and data science.

Coming to the application part, our vending machine will be installed on the trains of Indian railway coaches. It will improve the overall service of Indian railway and provide the passengers with vital things required in travelling.

If some products are exhausted then it will be notified to the merchant and it will be refilled on the station where that commodity is available.

This smart vending machine is in line with digital India as instead of using the coins we are using digital platforms for payments. This vending machine is also in line with the government's Make in India initiative as this vending machine is fully made in India.

## 2. PROJECT ANALYSIS

### 2.1 Motivation

The motivation for doing this project was primarily an interest in undertaking a challenging project in an interesting area of research. The opportunity to learn about a new area of computing not covered in lectures was appealing. This area is possibly an area that we might study at postgraduate level or want to go in the embedded system-based company.

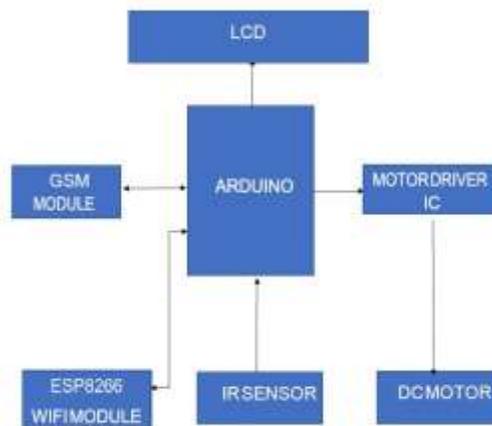
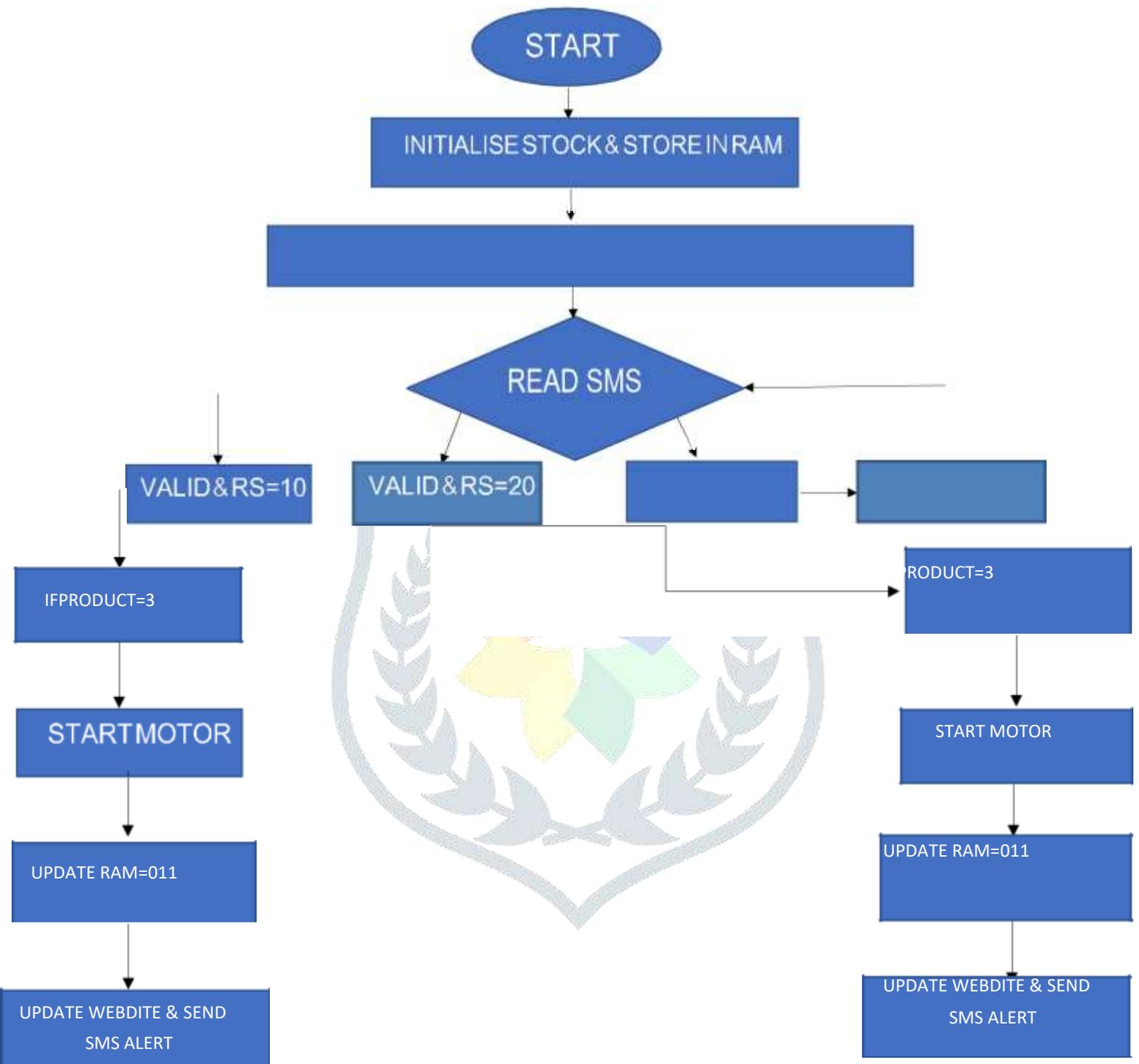


Fig 1: Equipment's used for designing machine

### 2.1.1 Major Achievements

The major achievements of this project will be to integrate the knowledge of advance embedded system like Arduino, various types of sensors and modules, introduction to internet of thing and make a wonderful project like Smart Vending machine, which is completely different from the existing vending machines.

2.2.1 FLOW CHART



### 2.3.2 WORKING OF THE PROJECT

The methodology of the project is quite simple, firstly customers have to scan the QR code against the desired product through BHIM app and then make payment. After payment is made, a SMS will be sent to the SIM attached to the vending machine, which will be read by the GSM module. After the payment is confirmed, it will be displayed on the LCD. Then the machine will start the conveyor belt and product will be dispensed. After that a SMS alert, about the remaining product, will be sent to the owner of the vending machine also, we are using the Thing speak cloud platform where data about the number of products will be displayed in the graphical form, which can be accessed by the administrator through Thing speak website or Thing view android app. If the stock is low or empty then also a SMS alert will be sent to the owner. All this attribute of this machine surely makes it a smart vending machine.

## Chapter 3 SOFTWARE REQUIRED

### 3.1 IDE (integrated development environment)

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License or the GNU General Public License permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment based on the Processing language project.

The Arduino project started in 2003 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy, aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors.

## Chapter 4. LIMITATIONS

- ☒ This project is dependent on the internet, so it may not work properly in areas having poor internet connection.
- ☒ It uses digital payment method such as Paytm, which is popular in cities not in rural areas.
- ☒ It is prone to fraud through hacking.
- ☒ Vandalism of the machine by unruly groups or jealous competitors.

## Chapter 5. FUTURE ENHANCEMENT

We can enhance our project in future by adding more technologies like android app and websites. Given below we mention the some of the future features which we can add into our project:

- ☒ Our own app.
- ☒ GPS for location capturing.
- ☒ Camera for security.
- ☒ A website for monitoring quantity of the product.

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