

DESIGN AND FABRICATION OF MASK VENDING MACHINE

Submitted in fulfillment of the requirements for the award of
Bachelor of Engineering degree in Mechatronics

by

Monishwaran K (39090027)

Mokeshwaran V (39090026)



**DEPARTMENT OF MECHATRONICS
SCHOOL OF MECHANICAL ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

MAY - 2023

DESIGN AND FABRICATION OF MASK VENDING MACHINE

Submitted in fulfillment of the requirements for the award of
Bachelor of Engineering degree in Mechatronics

by

Monishwaran K (39090027)

Mokeshwaran V (39090026)



**DEPARTMENT OF MECHATRONICS
SCHOOL OF MECHANICAL ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

MAY - 2023



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited with "A" grade by NAAC | 12B Status by UGC | Approved by AICTE

Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600 119

www.sathyabama.ac.in

DEPARTMENT OF MECHATRONICS

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Monishwaran K (39090027)**, **Mokeshwaran V (39090026)**, who have done the project work entitled "**Design and Fabrication Of Mask Vending Machine**" under our supervision from June 2022 to May 2023.

Internal Guide

Dr.J.Senthil Kumar,M.E.,Ph.D

Head of the Department

Dr. S. Prakash M.E., Ph.D.

Submitted for Viva Voce examination held on ____ May 2023

Internal Examiner

External Examiner

DECLARATION

We **Monishwaran K (39090027)** and **Mokeshwaran V (39090026)** hereby declare that the Project Report entitled “**Design And Fabrication Of Mask Vending Machine**” done by us under the guidance of **Dr.J.Senthil Kumar,M.E.,Ph.D** is submitted in fulfillment of the requirements for the award of Bachelor of Engineering degree in Mechatronics.

1. 

2. 

DATE: ____ May 2023

PLACE: Chennai, Tamil Nadu

SIGNATURE OF THE CANDIDATES

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to the Board of Management of SATHYABAMA for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to Dr. S. Prakash, M.E., Ph.D., Dean, School of Mechanical engineering and Head of the Department, Department of Mechatronics Engineering for providing me necessary support and details at the right time during the progressive reviews.

I Would like to express my sincere and deep sense of gratitude to my Project Guide **Dr.J.Senthil Kumar,M.E.,Ph.D, for his valuable guidance, suggestions and constant encouragement paved the way for the successful completion of my project work.**

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Mechatronics who were helpful in many ways for the completion of the project.

ABSTRACT

A facemask is a necessary product today to prevent the spread of viruses and other diseases through the air. So, the vending machine is a better option to dispense facemasks without using humans. This is a more automated process and does not require human intervention. It is an Arduino - based vending machine with sensors to do multitasking at the time of dispensing. Non-contact infrared thermometers are used in vending machines to measure the buyer human body temperature at the time of dispensing the mask, and also mounted UV lights on the inside of vending machines to kill or inactivate bacteria and viruses in the masks. This device is useful in public places such as hospitals, institutions, train stations, and bus stops. This machine saves the user's time and it is easy to operate. This ensures no contact between buyers and sellers, reducing the spread of viruses and infections.

Keywords: Non-contact Infrared Thermometer, UV light, Microcontroller, Sensors.

TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	V
	LIST OF FIGURES	X
	LIST OF TABLES	IX
	LIST OF ABBREVIATIONS	XII
1	INTRODUCTION	1
	1.1 Introduction	1
	1.2 Benefits For Healthcare	2
	1.3 Saves Time	2
	1.4 24/7 Service	3
	1.5 Better Customer Experience	3
	1.6 Saves Cost	3
	1.7 Benefits For Consumers	3
	1.8 Faster Service	3
	1.9 Fewer Human Interventions	4
	1.10 Advantages Of Vending Machines	4
	1.11 Disadvantages Of Vending Machines	5
	1.12 Types Of Vending Machine	6
	1.12.1 Coffee Vending Machine	6

CHAPTER NO.	TITLE	PAGE NO.
	1.12.2 Coil Or Spiral Vending Machine	7
	1.12.3 Elevator Vending Machine	8
	1.12.4 Conveyor Belt Vending Machine	9
	1.12.5 Screen Vending Machine	10
	1.12.6 Single & Multi Door Vending Machine	11
	1.12.7 Refrigerator Vending Machine	12
	1.12.8 Reverse Vending Machine	13
	1.12.9 Ticket Vending Machine	14
	1.13 Non-Con Infrared Thermo and UV Light	15
2	LITERATURE SURVEY	17
	2.1 Literature Survey	17
3	AIM & SCOPE	24
	3.1 Aim	24
	3.2 Objectives	24
	3.3 Future Scope Of The Project	24
4	MATERIALS & METHODS	25
	4.1 Material	25
	4.1.1 Coin Acceptor	25
	4.1.2 Arduino Uno Atmega328	27
	4.1.3 UV Light	28

CHAPTER NO.	TITLE	PAGE NO.
	4.1.4 LCD Display	30
	4.1.5 Infrared Thermometer	31
	4.1.6 Motor	32
	4.1.7 Power Supply	33
	4.1.8 Connecting Wires	35
	4.2 Cad Render	35
	4.3 Project Images	37
	4.4 Program	38
	4.5 METHODOLOGY	40
5	RESULT & DISCUSSION	41
6	CONCLUSION	43

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
4.1	Coin acceptor Specification	26
4.2	Arduino Uno Specification	28
4.3	LCD Display Specification	30
4.4	DC Motor Specification	33

LIST OF FIGURES

FIG NO.	TITLE	PAGE NO.
1.1	Coffee Vending Machine	6
1.2	Coil Or Spiral Vending Machine	7
1.3	Elevator Vending Machine	8
1.4	Conveyor Belt Vending Machine	9
1.5	Screen Vending Machine	10
1.6	Single & Multi Door Vending Machine	11
1.7	Refrigerator Vending Machine	12
1.8	Reverse Vending Machine	13
1.9	Ticket Vending Machine	14
4.1	Coin Acceptor	25
4.2	Arduino Uno Atmega328	27
4.3	UV Light	29
4.4	Lcd Display	30
4.5	Infrared Thermometer	31
4.6	Motor Drivers	32
4.7	Power Supply	33
4.8	Connecting Wires	35
4.9	Inside Front View of Cad Render	35
4.10	Right View of Cad Render	36

4.11	Front View of Cad Render	36
4.12	Front View of Project	37
4.13	Front View of Project	37

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
UV	Ultraviolet
OTC	Over The Counter
PPE	Personal Protective Equipment
RFID	Radio Frequency Identification
V	Volt
DC	Direct Current
PC	Polycarbonate
EEPROM	Electrically Erasable Programmable Read Only Memory
SRAM	Static Random Access Memory
LCD	Liquid Crystal Display
I/O	Input & Output
RPM	Revolution Per Minute
ADC	Analog To Digital Convertor

CHAPTER 1

1.1 INTRODUCTION

Mask Vending Machine is although not a new concept in its entirety. Today, automation plays an important role in human life. People always look for convenience even in handling commodities and other basic needs in life such as food and medicine. Automation not only refers to reducing human effort but also energy efficiency and time saving. In places such as shopping malls, wholesale and retail outlets, automation is incorporated for the automatic delivery of the products to the customers. As people continue to seek convenience, more and more technologies are invented. One of these technologies is the vending machine. Vending machines come in different types as they are made for purposes. Vending machines are rarely found in the market. They are a coin operated machine for selling merchandise. They have many benefits as well. A vending machine is a machine that dispenses items such as snacks, beverages, alcohol, cigarettes, lottery tickets, consumer products and even gold and gems to customers automatically after the customer inserts currency or credit into the machine. For instance, the automatic cool drink vending machine, ice-cream vending machine, chocolate machine, water, tea, coffee vending machines and etc. Increasingly found to encroach on the shops nowadays, which reduces the time and also reduce the human effort required to recognize, search, count and deliver the product along with the cash handling. The ticket vending machine is the best example of all for the application of engineering principles to reduce time and human effort. Our Project In medical vending machine This project gives clients the free choice to purchase the products at any time of the day any place like national highways. They reduce the overhead costs by not hiring the staff, they increase the profit. These Machines are very easy to manage as nobody has to be there to sell any goods, you need only the machine's The Medicine Vending Machine as the name suggests is a vending machine that will dispense the required medicine as per the user's choice. It provides an encompassing solution to an individual looking for immediate symptomatic relief for trivial health problems. It can also decrease the current costs of open medicine cabinets. By having an over-the-counter vending machine in the workplace, worksites without clinics or pharmacies can benefit from increased work

efficiency and avoid underperformance of ill employees. Moreover, it prevents hours wasted waiting in queues at clinics for trivial problems like colds and headaches. This situation gets especially magnified when a location is suffering from a localized infestation. The demand for pharmaceutical vending machines is rapidly evolving. With the rise of pharmacy intelligence and predictive analytics, as well as an increased need for a comprehensive end-to-end solution, healthcare executives must innovate to solve both new and old prescription management concerns (diversion, patient safety, and rising costs) to stay ahead of the curve.

Pharmaceutical vending machines can help fill this gap. They can augment the declining bandwidth of Pharmaceuticals. There are several applications of vending machines for the pharmacy industry. Sales of non-prescription or OTC drugs can be automated with their help. Automated pharmacy solutions can also help control access to medication or products that need authentication, like narcotics. Other non-medical products like sanitary products, PPE kits, contraceptives and personal grooming products can be sold through vending machines. This frees up the bandwidth of the pharmacist for transactions that need their participation.

1.2 BENEFITS FOR HEALTHCARE UNITS AND MEDICAL VENDING MACHINE

There is a growing demand for an increase in the quality of care provided by the healthcare industry. On the other hand, there are significant cost pressures. The only way this can be addressed for the pharmaceutical retail industry is by improving the efficiency of the channels of transactions. Vending machines can help achieve just that. Some of the benefits that the industry can experience are discussed below:

1.3 SAVES TIME

The staff can continue handling transactions that need attention while customers can buy from pharmaceutical vending machines. Qualified and skilled professionals can save time on non-critical transactions, allowing them to provide better care and attention to their customers. This situation gets especially magnified when a location is suffering from a localized infestation. The demand for pharmaceutical vending machines is rapidly evolving. With the rise of pharmacy intelligence and predictive.

1.4 24/7 SERVICE

Medical Supply Dispensing systems will cut down on waste and human error and better track the life-saving medications that fire paramedics use every day. In busy locations like airports, where the traffic might be high at any time, it is crucial to ensure the store is sufficiently staffed all day. Such sites are ideal for vending machines as they are not impacted by timings-related fatigue.

1.5 BETTER CUSTOMER EXPERIENCE

Faster response and minimal human intervention are becoming the name of the game in almost any customer-facing industry today. Pharmaceutical vending machines are beneficial assets for your organization. Vending machines in medical retail deliver a unique and satisfying experience for customers who do not need access to prescription drugs.

1.6 SAVES COST

The average yearly income of staff who manage pharmaceuticals is almost twice that of the national average. Wasting such an expensive resource on transactions that can easily be automated is a drain on the business profitability. Using vending machines can help avoid this waste and save costs for the business.

1.7 BENEFITS FOR CONSUMERS

Consumers are not always inclined to spend time waiting for medications. Pharmaceutical dispensing machines are placed at emergency service facilities, such as hospitals and fire stations. They expect the service to be fast, accurate, and less invasive. As shown below, some of these problems can be addressed by automated pharmacy vending machines.

1.8 FASTER SERVICE

Some items can be accessed at vending machines without proof of age or prescription. Preloaded product expiration and dose information is available on machines. As a result, an automated system can sell a product considerably faster than a chemist who must carefully study the tiny print to be sure. customer protection Furthermore, the customer,

customer spends the least amount of time possible thanks to features like cashless transactions and digital displays. Before they realise it, the consumer is in and out.

1.9 FEWER HUMAN INTERVENTIONS

Customers have wanted fewer human connections since after the worldwide COVID-19 outbreak. It's possible that the global crisis has passed its peak. Even yet, the lessons it has taught us about maintaining personal hygiene and social distance will stick with us. devices that dispense medications The amount of human touchpoints throughout the buying process are reduced by vending machines.

Certain goods are stigmatised in some way. Examples of products where using a machine makes the client feel safer include contraceptives and medication administration items. Due to a lack of tools for confidential transactions, some clients may turn to dangerous tactics.

Finally, you never know when you'll need hygienic items, personal protective equipment kits, or quick-fix medications like nasal decongestants. Customers will be able to get on with their day without having to spend more time than necessary at the pharmacy if they have easy access to a vending machine that offers these products.

1.10 ADVANTAGES OF VENDING MACHINES

The classic example is the snack vending machine, which may be used for both buying and selling various types of snacks. Vending machines have been utilised to offer a large audience with a variety of items spanning from green foodstuff to processed products.

Because they are mobile and can be relocated to different locations while still providing services, vending machines provide customers the freedom to buy items whenever they want during the day. You may shop for your desired product every day of the year, 24 hours a day. The variety of goods that a vending machine can handle, including fruits, drinks, and other things like drinks and beverages other products. The majority of vending machines are practical, provide consumers

time savings, save overhead costs by not hiring personnel, boost profit, accept credit cards, and provide healthier food.

Vending machines just require an initial investment in the equipment; they do not require marketing or advertising expenses, royalties are not required, they are quickly redeemable, and there are no longer any issues with bounced checks or credit hazards.

1.11 DISADVANTAGES OF VENDING MACHINES

Vending machines offer a number of drawbacks for both the owner and the clients. They do not allow for negotiation, therefore set pricing are in effect, which may not be in the best interests of both the customer and the owner.

Fraud instances involving clients who devise ways of breaking into the system of the machine to distribute the items are frequent in this type of company. The high taxes imposed on the sites of location may serve as a deterrent for this capital-intensive venture. Investors who experience machine failure or improper programming, such as the continual distribution of goods as a result of technological faults, suffer significant losses. Consider where you're planning to start your vending business before starting one since some of the local taxes you'll have to pay are expensive and other authorizations, such as those for vending machines in public locations, need you to spend a lot of money. such as the location permission are very difficult to get.

1. Limited product selection: Vending machines typically have a limited selection of products, which may not always be what the customer wants or needs.

2. Mechanical malfunctions: Vending machines are machines, and like any machine, they can malfunction. This can result in lost revenue for the vending machine owner and frustration for the customer.

3. Dependence on electricity: Vending machines require electricity to operate, which means that they may not work during power outages or in areas without electrical access.

1.12 TYPES OF VENDING MACHINE

1.12.1 Coffee Vending Machine:

Coffee vending machines are self-service machines that dispense hot or cold beverages. Most coffee vending machines dispense coffee, although some also offer tea, hot chocolate, iced coffee, and iced tea with lemon. The most common place to find a coffee vending machine is inside a convenience store or gas station.

Water tank: Coffee vending machines have a water tank that holds the water that will be used to make the coffee. The size of the tank varies depending on the machine's capacity. **Heating element.**



Fig 1.1 Coffee Vending Machine
blogs.vendify.in

1.12.2 Coil or Spiral Vending Machine

In contrast to the more conventional approach of a chain, a coil vending machine is one that is run by a rod (coil) coiled around a cylinder with a number of holes spaced uniformly apart. Another feature of this kind of equipment is its capacity for automated modification. Coil vending machines have the advantages of being more compact and less expensive than conventional vending machines. Moreover, this machine is capable of dispensing a wide range of products, including coffee, soft drinks, fast food, and snacks. Around 88% of the market is made up of coil vending machines that sell snacks and beverages. The bulk of food and beverage vending machines are used by businesses. Coil vending machines use a rod coiled around a cylinder to dispense products and have the advantage of being more compact and less expensive than conventional vending machines.



Fig 1.2 Coil or Spiral Vending Machine
blogs.vendify.in

1.12.3 Elevator Vending Machine

A different kind of vending machine, the elevator vending machine, is utilised to quickly and conveniently deliver food and drinks. In Ekaterinburg, Russia, in 1984, Alexander Turek invented the first lift vending machine. The usage of the lift vending machine was first restricted since at this time people were wary of engaging with machines.

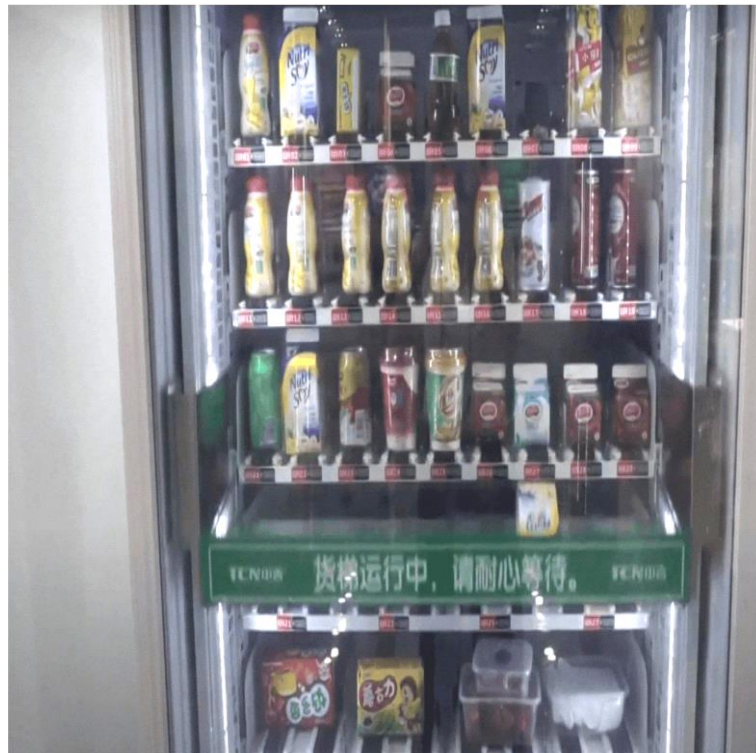


Fig 1.3 Elevator Vending Machine

blogs.vendify.in

You've probably seen that items frequently fall from vending machine tops and need to be cleaned up. It could break during distribution if you're selling electrical products or a bottle of wine. This vending machine contains a lift that will securely rise and disburse your purchases on your behalf. There, products like food, veggies, and delicates can be kept. It consists of a series of shelves that move up and down, controlled by a robotic arm that retrieves the selected product and brings it to the dispenser. This type of vending machine allows for a larger variety of products to be offered, as it can accommodate items of different sizes and shapes.

1.12.4 Conveyor Belt Vending Machine



Fig 1.4 Conveyor Vending Machine
blogs.vendify.in

A vending machine with a conveyor belt pulls goods through the device using a number of plastic or metal belts. Powered machinery and software are used by vending machines to store, manage, and dispense goods—typically at a small profit. A conveyor belt that pulls the goods through the machine is operated by a motor in conveyor belt vending machines. The machine contains a series of shelves, each with its own conveyor belt, which can move up and down to bring the desired product to the dispensing area. This type of vending machine can hold a wide range of products, from small items like candy to larger items like sandwiches and drinks. The use of a conveyor belt allows for a smooth and efficient dispensing process, making it popular in high-traffic areas such as airports and train stations. As gears and conveyor belts are used to operate this sort of vending machine, they are often a little more expensive than coil vending machines. When a product doesn't fit within a coil vending machine, this sort of vending machine is employed.

1.12.5 Screen Vending Machine



Fig 1.5 Screen Vending Machine

blogs.vendify.in

Given that it features a touch screen and an easy-to-use interface, some people refer to this kind of machine as a "smart vending machine. There is a large one on the front of vending machines where you may move between the items and decide which ones to purchase. Because this screen's material is totally opaque, you cannot see inside the vending machine. Most of the time, this kind of vending machine is utilised for selling consumable goods like pizza, ramen, and other foods. The major goal of this vending machine is to pique customers' attention by displaying mouthwatering pictures and photographs of the food. vending machine that uses a touchscreen display to allow customers to select their desired product. These machines typically have a digital interface that displays product information, pricing, and nutritional information. They can offer a variety of products, such as snacks, beverages, and even fresh food. Some screen vending machines also come equipped with cameras that can be used for security purposes, as well as to analyze customer demographics and preferences.

1.12.6 Single & Multi Door Vending Machine



Fig 1.6 Single & Multi Door Vending Machine

blogs.vendify.in

For frozen goods, this kind of vending machine is employed. Its temperature ranges between 4 and 30 degrees Celsius. A single door and a multi door differ mostly in their number of shelves. Several shelves on a multi-door vending machine have varying temperatures. You must first link your wallet to the vending machine in order to use it; after you have, the machine will be unlocked. With the use of a camera and vending machine, you may now take things of your choosing and money will be taken from your machine. Single and multi-door vending machines are two common types of vending machines used to dispense products. A single door vending machine typically has a single dispensing area and can hold a limited number of products. They are often used for smaller items such as snacks and drinks. In contrast, multi-door vending machines are larger and can hold a greater variety of products. These machines typically have multiple dispensing areas and can offer different products in each section. They can also offer products of varying sizes and shapes.

1.12.7 Refrigerator Vending Machine



Fig 1.7 Refrigerator Vending Machine
blogs.vendify.in

These vending machines function similarly to a refrigerator. This machine features a built-in refrigerator to keep the products cold. These appliances are frequently used to keep products like fruit juices, sodas, and other beverages at the right temperature so that the drink may be consumed at the right temperature. This machine has the ability to maintain the object at a low temperature, which ranges from 4 to 20 degrees Celsius. A refrigerator vending machine is a type of vending machine that is designed to keep perishable products fresh. It uses a refrigeration system to maintain a consistent temperature inside the machine, allowing it to hold a range of products, such as fresh food, beverages, and dairy products. They typically come equipped with a payment mechanism, such as a coin or card reader, and a digital display that shows product information and pricing.

1.12.8 Reverse Vending Machine



Fig 1.8 Reverse Vending Machine
blogs.vendify.in

Plastic bottles, tins, cans, and other materials are collected by this kind of vending machine. This machine's primary function is to gather all plastic bottles in the area around it. In return for empty plastic bottles, cans, tins, and other containers, this machine provides reward vouchers. The bottles are broken down into tiny fragments by this machine so that retailers cannot use them again. To use this machine, you must first place a plastic bottle within the receiving hole, following which the reader scanner scans the bottle and verifies its plastic composition. The machine then smashes the plastic into little bits and prints coupons or discount tickets. India produces 62 metric tonnes of plastic garbage annually. A reverse vending machine is a type of recycling machine that accepts used items, such as plastic bottles or aluminum cans, and provides a reward or refund to the user.

1.12.9 Ticket Vending Machine



Fig 1.9 Ticket Vending Machine
blogs.vendify.in

Any vending machine that sells travel tickets is referred to as a ticket vending machine. These devices are installed at airports, train stations, and other locations. You only need to pay for the ticket and input your journey destination on the vending machine's touch screen display to utilise this machine. A ticket vending machine is a self-service machine that allows users to purchase tickets for transportation, events, or other services. These machines are commonly found in public transportation hubs, such as train stations and airports, and can offer a range of ticket options, such as one-way or round-trip fares. They typically accept payment in the form of cash, credit or debit cards, and sometimes mobile payments. Some ticket vending machines also provide customers with printed receipts or electronic tickets.

1.13 EXPLORING NON - CONTACT INFRARED THERMOMETER AND UV LIGHT

Since the COVID-19 pandemic began, mask vending machines have grown in popularity. For consumers to buy face masks to shield themselves and others from the virus' transmission, these devices offer a simple and frictionless method. The application of mlx90614 and UV light in a mask vending machine will be discussed in this article. Temperature measurement applications frequently employ the non-contact infrared thermometer sensor known as the mlx90614. It is capable of measuring temperatures between -70°C and 380°C with a high precision of 0.5°C . Before a customer buys a mask, the mlx90614 can be integrated into a mask vending machine to measure their forehead temperature. This is important because fever is one of the main symptoms of COVID-19, and people with a high temperature should not be out in public. If the customer's temperature is too high, the vending machine can deny them the purchase of a mask and advise them to seek medical attention. The UV light is a powerful disinfectant that can kill bacteria and viruses, including the COVID-19 virus. UV light is widely used in hospitals, laboratories, and other healthcare facilities to sterilise equipment and surfaces. In a mask vending machine, UV light can be used to disinfect the mask before it is dispensed to the customer. This is important because masks can become contaminated with bacteria and viruses, especially if they are not handled properly. The vending machine may guarantee that the consumer receives a clean and secure mask by sterilising it using UV light.

It is possible to construct the mask vending machine to function as follows: The client comes up to the vending machine and takes a position in front of it. The customer's forehead temperature is measured using the mlx90614 sensor. The vending machine refuses to let a customer purchase a mask if their fever is too high and suggests that they get medical help instead. If the client's temperature is within normal range, the vending machine moves on to the following action. The sort of mask the buyer wants to buy is chosen by them. The UV light chamber receives the mask from the vending machine. The mask is sterilised by the UV light. The customer receives the sterilised mask from the vending machine. It is crucial to remember that

A mask vending machine with mlx90614 and UV light is not a replacement for existing COVID-19 prevention strategies. Customers should continue to maintain social distance and practise proper hygiene, such as often washing their hands. However, by guaranteeing that clients receive clean and secure masks, a mask vending machine with mlx90614 and UV light can add an extra degree of security. In conclusion, a UV and MLX90614-equipped mask vending machine is a helpful weapon in the fight against COVID-19. The customer's temperature can be taken in order to prevent those with fevers from entering public areas, and the mask can be cleaned before being given to the customer. By utilising these elements, a mask vending machine can offer a secure and practical method for individuals to buy masks and safeguard others as well as themselves against the spread of the infection.

Face masks are a crucial piece of equipment for halting the transmission of the COVID-19 virus, therefore their demand has increased significantly as a result of the pandemic. The creation of mask vending machines is one invention that has arisen in response to this demand. Customers can purchase face masks from automated machines called "mask vending machines." These machines offer a simple and practical way for customers to buy face masks, and they are generally found at high-traffic locations like airports, train stations, shopping centers, and office buildings. The demand for contactless solutions that can aid in stopping the spread of COVID-19 has fueled the development of mask vending machines. These devices provide touch-free functionality and accept contactless payments from credit cards and mobile devices. Some vending machines that sell masks can also give out other personal protection equipment, such as hand sanitizer. The demand for a more effective face mask distribution system has also fueled the creation of mask vending machines. Face masks are in short supply due to the pandemic, which means vending machines can assist guarantee that individuals have access to masks when and where they need them. In general, the invention of mask vending machines is a reaction to the special difficulties brought on by the COVID-19 pandemic. They aid in stopping the virus's spread while also giving individuals a quick and practical option to buy face masks.

CHAPTER 2

2.1 LITERATURE SURVEY

Prathamesh Jadhav et al, [1] The main objective of there project is to make a brand-new technical application available to society. This vending machine, which is driven by Arduino, offers numerous sorts of electronic parts. The plan is to provide a vending machine that accepts coins as a remedy. The assembly consists of two gear bevels and a rack. In reaction to motor movements, it will revolve. The door assembly is made up of the door and the attached rack gear. Grain distribution will begin with the necessary delay as soon as the door opens, in order to move in accordance with the motor.

This vending machine sells electrical components. Machines For university or neighbouring electrical laboratories, this machine's ability to employ components like resistors and capacitors is particularly helpful. For students and individuals whose project requires simple access to electronic components. With the present Covid-19 issue, these machines might be utilised to speed up product sales, stop product contamination, and stop the transmission of sickness to other people.

Girish Mahajan et al, [2] They explained, vending machines are only mentioned as being used to sell tiny goods like food and beverages, however they are now being used to sell larger items like cameras and mobile phones. In wealthy nations like Japan, the USA, and the UK, vending machines are quite common. Cash has historically been the accepted form of payment for vending machines. Nowadays, however, individuals choose digital payment methods over physical ones in order to avoid the trouble of carrying currency with them. They are establishing a two-way payment system that takes both currency and digital payments via UPI, online wallets, etc. to reduce the demand for both conventional and contemporary payment methods.

Prof. R. S. Patil et al, [3] The item that is now most essential in the COVID-19 pandemic emergency is Face-Mask, it has become clear. The demand put on the many mask resources is caused by a number of factors. The progressively deteriorating COVID-19 situation on the one hand, and people's shifting lifestyles on the other, have increased the need for masks. In remote areas, masks are still hardly distributed. Also, it is clear from the amount of money spent on masks that households in the majority of rural areas spend more than what is generally charged in urban areas.

J.Parvathavarthini et al, [4] This automated vending machine may be used by people in public spaces to purchase needs. Based on a "EMBEDDED SYSTEM," the vending machine is used constantly and is in high demand. People frequently neglect to bring their own essential essentials with them in today's busy world and instead opt to buy the products locally, turning to vending machines to sate their hunger. Yet, due to the cashless aspect of using digital payment systems, many people today prefer to utilise them instead of carrying cash. Hence, to lessen the need for contemporary payment methods, we build a digital payment system that uses RFID tags. To avoid machine misuse, this system limits access to only RFID-enabled devices. Here, we have designed a vending machine for educational establishments where students may buy needs like sanitary products, masks, and first aid items. The machine will dispense the goods and deduct the necessary amount from the RFID tag when a product is selected and the tag is visible. One RFID tag is given to each student in a given class, which they can all use. The responsible party can use a Mastercard to update the RFID tag. The product's balance and remaining quantity may both be shown on the LCD display.

Sonika Rao et al, [5] They held that vaccinations are crucial for treating sickness, controlling symptoms, avoiding disease, and preserving health. The term "All Time Medicine" comes from the All Time Medicine (ATM) system, which guarantees medicine availability and dispenses medication in emergency circumstances around-the-clock. An ATM will be particularly beneficial in preserving life in the case of an accident on a motorway, in a remote place, in a rural region, or somewhere else where access to medical supplies is not easily available in an emergency. This approach might at least make first aid easily accessible. The bulk

of its components include dispenser, ARM CPU, audio preloading and recording module, IR sensor, RFID reader, and GSM module.

Kai Kit Wong et al, [6] They suggested work is based on the 3Rs theme, which refers to three words frequently used to describe waste and promotes reduce, reuse, and recycle. Recycling is becoming important as a strategy for managing waste effectively due to the rising amount of waste produced and the limited number of landfill space available. The existing manual recycling process, which requires the user to transport the waste in bulk to the recycling centre, may be inconvenient and may thus discourage people from recycling. Reverse Vending Machines (RVMs) are specifically created for the recycling concept with a reward element to address this problem. The concept is anticipated to help Malaysians become more motivated to recycle their rubbish and can serve as a part of frameworks to address the problem of urban poverty by utilising the waste to wealth concept. Basically, Arduino is used to implement the system and applying sensors and microcontrollers. User will receive an alert once it recognises the appropriate metal for recycling item immediate prize. This is done to encourage continued use and drive up collection rates even more.

Shilpa R et al, [7] It's critical to promptly deliver prescriptions to elderly folks. Programmable medicine bottles are made specifically for individuals who take their drugs without ongoing expert monitoring. It shields the client from risky responsibilities like managing the incorrect solution at the incorrect moment. The actual parts of this solution allocator are a microprocessor connected to an alphanumeric keyboard, an LED display, a motor controller, an alarm system, and numerous pill holders and containers. The client must press a catch in order to release the drug. The key objective is to maintain the device's simplicity and economy. The utilised item is dependable and solid. The elderly are helped by this device because it reduces their need for pricey in-home medical care.

Eriyeti Murena et al, [8] They figured out, "the design emphasis was concentrated on the product retrieval system for this. Various concepts were idealised, such as Spiral Conveyor System, Chute System, Robotic Arm, Rotating Shaft System, and

Belt System, but the chute type driven by rack and pinion gear system was the decision made. Based on the material's effect on the environment and ability to prevent food contamination under various working situations, it was chosen for the machine. Although it is not covered in this article, the control system was created to provide a platform for cordial customer care. The machine's alarm system and fingerprint detection are what keep it safe and secure. Using a credit card, a cell phone, or cash are the three methods available for making purchases.

Eriyeti Murena et al, [9] The design presented in there paper can handle vending processes automatically with use of gateway device. The objectives were met which offers the systemability to offer flexible payment methods, mobile and card swiping thus making it a multipayment system device with a high degree of compatibility with all mobile phone types. Built on the IoT gateway device, the control system has ability to incorporate foreseeable future technological changes. Vending machines strategically located in various centers for competitive advantages can be linked through wide area networks (WAN) and local area networks (LAN) technologies. Use of cellphone applications can be used to control and regulate the machines and get the necessary information as and when needed. It offers quite a reliable system with fast response.

P. Saikiran et al, [10] The main objective of there tiny project is to design and build a multi-drink vending machine. The purpose of this machine is to provide consumers with a wide range of products, including water, drinks, coffee, tea, etc. A vending machine is an item-selling device. Different things are created using a method that is more akin to automation than man handling, which is what we often see in crowded cities. These systems are now available at some of India's top hotels and restaurants as well as MNCs. The proprietor of the shop or restaurant handles the billing and making of change in most systems where operations are carried out manually by the operator. Interactive devices used in public places must adhere to tight guidelines, which include having user-friendly user interfaces. The vending machine in this model is constructed using plywood, fevicol gum, a DC motor, batteries, etc.

Fulgence Habumugisha et al, [11] The purpose of there paper was to embrace modern technology by designing and implementing a self-service airtime vendor machine that will serve as an alternative method to the current methods of buying and selling airtime, which include mobile money, banking, airtime agents that involve money theft and airtime loading errors. Rural residents will benefit from the ability to purchase airtime using coins. To do so, a customer must first enter their mobile number on a keypad before inserting their coin in an airtime vending machine. The machine will then immediately distribute the quantity of airtime according to the entered coin. approach: The consumer will access the vending machine by putting it into a coin to purchase airtime under the IOT system's approach.

Hemawathi Ms et al, [12] They includes a device designed to automatically dispense medication with the aid of an RFID reader. Every single medicine has an RFID reader. The medication can be automatically equipped using an RFID reader. Through IOT, the stock vendor will be alerted of the medicine's expiration date. They will take out the expired medication and replace it once they receive the alert information. Low-quantity medication is permitted; higher quantity medication is not offered. If the customer requires a large dosage of the medication, an alarm will sound. The cloud-based stock management will preserve the tablet's specifics. Tablets are administered to people according to their predetermined health status as determined by sensors such as the HBS (HeartBeat Sensor), PS (Pulse Sensor), and TS (Temperature Sensor). In addition, there is an add button for adding tablets to the vending machine.

Sanket Dessai et al, [13] Systems for beverage vending machines are rising in popularity in India. These systems are now accessible in some of the best-rated restaurants and hotels in India as well as MNCs. The proprietor of the shop or restaurant handles the billing and making of change in most systems where the operation is carried out manually by the operator. In this article they referred In India, the colonial control of the British and the Portuguese shaped the culture of tea and coffee consumption. Even though the colonial rule is no longer in effect, people still have habits of regularly consuming these beverages. To serve the Indian market, it is necessary to comprehend beverage vending machine

technologies. In this article, the system design has been reached by doing a critical study of the requirements. An ARM-based controller is required per the system specifications for improved system performance. An LPC2148 was chosen because of its inexpensive cost and ability to support the widest range of peripherals and system performance requirements. Utilizing motors, LCDs, a water heater, a solenoid valve, a money box, a change making and dispensing device, and other components, the system is more effective at analysing change making and identification. The system is evaluated and verified using the listed test scenarios. 200 milligrammes of milk powder were transported to the container to make tea or coffee after 10 rotations of the milk motor. To reduce power losses, dc motors can be used in place of the stepper motor that was previously used in this system. These systems may eventually incorporate an ATM- or credit card-based payment system.

M Irmansyah et al, [14] The goal of this work is to use a microcontroller to run a vending machine for newspapers. a PLD to count coins, a light sensor to identify coins, a sensor called the TCS3200 to identify the colour of money, a dc motor to eject newspapers from the machine, and an LCD to display instructions for making a purchase. This vending machine uses an ARDUINO ATMEGA328 microprocessor and a GAL 22V10 PLD IC. To find coins, photodiodes and infrared sensors can be utilized. The voltage output of the photodiode is 3 volts while the light is open and 0 volts when the light is closed when the photodiode is receiving infrared light. With seven segment displays, For coin counting, a Programmable Logic Device (PLD) can be utilised as a decoder from binary to decimal. Each RGB value for money is unique and is read from all four sides. If the RGB value of the money entered is recognised and matches the RGB design, a DC motor to push will turn on.

Jagruiti Sahuji et al, [15] suggests utilising IOT to construct an automatic chocolate vending machine. Arduino UNO, a coin acceptor module, an RFID reader, RFID cards, servo motors, an LCD display, IR sensors, and switches are all used in this design. This autonomous chocolate vending machine offers a wide range of products as well as numerous payment options.

Aye Aye Nyein et al, [16] demonstrates a wireless system that uses RFID technology. The Arduino UNO, DC motors, RFID card reader, power supply, and LCD display are all used in this design. Inside of this vending machine. Along with an RFID tag and reader, Arduino serves as the master controller.

Shweta Dour et al, [17] described the design of a vending machine using an 8051 microprocessor. The detection of the coin that accepts it and the calculation of the coin's value is the most crucial component of a vending machine. If the coin is genuine, the coin detector will accept it; nevertheless, if the coin is not the same as the one that has been trained, it will be sent back to the customer.

Girish Mahajan et al, [18] methods to various product dispensing systems. It may dispense products in accordance with the amount received and can accept a variety of coin denominations. The system also makes use of cashless payment and online payment through a GSM module to accept payments online.

CHAPTER 3

AIM AND SCOPE OF THE INVESTIGATION

3.1 AIM:

To provide a safe and convenient way for people to purchase face masks while also ensuring that the masks are clean and free from any harmful particles. By using uv light to sanitize the masks and a temperature sensor to ensure that the temperature inside the machine is optimal for storage, this type of vending machine can help to promote public health and safety in a time of increased concern about infectious diseases.

3.2 OBJECTIVE:

The objective of a mask vending machine with UV light and temperature sensor is to provide a convenient and accessible solution for individuals to purchase masks, while also ensuring that the masks are properly sanitized and stored in a controlled environment. By doing so, it aims to promote public health and safety by reducing the risk of spreading infectious diseases, especially in areas with high foot traffic or where social distancing may be difficult to maintain. Additionally, this type of vending machine can offer a contactless payment method, further reducing the risk of transmission through physical contact.

3.3 SCOPE OF THE PROJECT:

- 1) We designed this mask vending machine for safety from covid-19 pandemic, but after covid-19 pandemic this mask vending machine can be installed in hospitals wherein the necessity of mask will be there forever.
- 2) Currently, the machine can dispense only one type of mask. But we can increase its capacity by adding more motors & springs sets so that it can be implemented in general stores, supermarkets, etc. to dispense a variety of masks of different quality and cost.

CHAPTER 4

4.1 MATERIAL AND METHODS

4.1.1 COIN ACCEPTOR



***Fig 4.1 Coin acceptor
IndiaMART***

Six channels of coin-value may be set up simultaneously, each channel having a maximum memory capacity, using the intelligent single chip technology to automatically detect the material, thickness, and diameter of the coin. 6 types of coins fine-tuned against better quality slugs and frauds can connect to the counter supply digital output and make some modification in the output programme according to the demand an intelligent multi-coin selector can memorise and recognise 1-6 different type coins with different sig the product.

- When a coin is inserted into the coin slot, it travels down the coin channel and passes through the coin discriminator, which is responsible for detecting the coin's size, shape, and metal composition. The coin then passes through the coin sorter, which separates valid coins from counterfeit or foreign coins.

- Once the coin has been validated and sorted, it is stored in the coin hopper, which is a container that holds the accepted coins until they are removed for counting and deposit. The coin acceptor is usually connected to a vending machine's payment system, which can be programmed to accept specific types of coins or to reject coins that do not meet certain criteria.
- Coin acceptors can be designed to accept a wide range of currencies, and they are often equipped with advanced features such as anti-counterfeiting measures and self-diagnostic capabilities to ensure accurate and reliable operation.

4.1 Table Coin acceptor Specification

Parameters	Values/Range
Accuracy	Rate 95 %
Coin diameter	15-29 mm
Operating voltage	12 V DC
Back shell material	PC plastic

- Modern coin acceptors also often include sensors to detect the orientation of the coin, as well as mechanisms to prevent coin jamming or theft. They may also feature digital interfaces for communication with the vending machine or other equipment, allowing for real-time tracking of payments and inventory.
- The coin acceptor may also be equipped with a reject mechanism, which can be triggered when the coin is not accepted or when there is a malfunction in the system. The reject mechanism typically returns the coin to the user, providing a visual or audible indication that the coin was not accepted.

4.1.2 ARDUINO UNO ATMEGA328

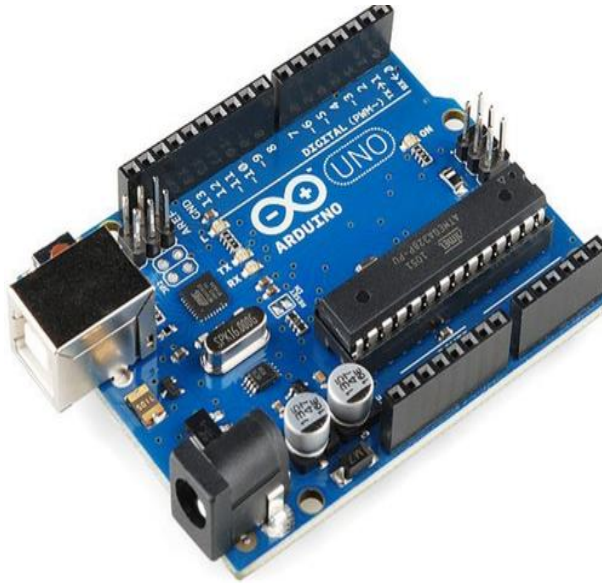


Fig 4.2 Arduino Uno
IndiaMART

The microcontroller used in the simplest Arduino boards, such as the Arduino UNO, Arduino Pro Mini, and Arduino Nano, is called Atmega328. It features a 1KB EEPROM memory and a 2KB SRAM memory. It has 8 pins for ADC operations, and together they make up PortA. (PA0 - PA7).

- The ATmega328P microcontroller on the Arduino Uno board is an 8-bit AVR microcontroller with a 16 MHz clock speed. It has 32KB of flash memory for storing the user's code, 2KB of SRAM for variable storage, and 1KB of EEPROM for non-volatile storage. It also has 23 general-purpose I/O pins, including 6 analog input pins, which can be used for various sensors and actuators.
- The Arduino Uno board also includes a USB interface for programming and communication with a computer, as well as a voltage regulator that can accept a range of input voltages and provide a stable 5V output to power the board and any attached components.

- In addition to its hardware components, the Arduino Uno is also supported by a software development environment that includes a simple programming language and a rich library of pre-written code for interacting with various sensors, actuators, and other devices. This environment allows users to quickly and easily program the board to perform a wide range of functions, from simple LED flashing to more complex robotics and automation projects.
- Overall, the technical components of the Arduino Uno make it a powerful and flexible platform for DIY electronics projects, prototyping, and learning about embedded systems and programming.

4.2 Table Arduino Uno Specification

Parameter Specification	Specification
Microcontroller	ATmega328P
Operating voltage	5V
Input voltage	7-12V (recommended), 6-20V (limit)
Digital I/O pins	14 (of which 6 provide PWM output)
Analog input pins	6
DC current per I/O	20 mA
DC current for 3.3V	50 mA
Flash memory	32 KB (ATmega328P)
USB interface	Type B
Clock speed	16 MHz

This table includes various technical specifications for the Arduino Uno, such as the microcontroller type, operating voltage, input voltage, number of digital and analog I/O pins, flash memory, SRAM, EEPROM, clock speed, and size. These specifications are important for designing and building projects using the Arduino Uno, as they provide information on the board's capabilities and limitations.

4.1.3 UV LIGHT



Fig 4.3 UV Light

genengnews.com

An example of electromagnetic radiation is UV (ultraviolet) light. While it cannot be seen with the human eye because to its shorter wavelength than visible light, it may be identified by its effects on certain substances.

UV light has several advantages, including:

- **Disinfection:** UV light can effectively kill bacteria, viruses, and other microorganisms, making it a powerful disinfectant. It is commonly used in hospitals, laboratories, and other settings where cleanliness is critical.
- **Chemical-free:** Unlike many other disinfection methods, UV light does not use chemicals or produce harmful byproducts, making it an eco-friendly and cost-effective solution.
- **Speed:** UV light disinfection is a fast process, often taking just a few minutes to complete, which makes it ideal for use in high-traffic areas.
- **Safe:** While UV light can be harmful to the skin and eyes in high doses, it is generally considered safe for disinfection purposes when used properly.
- **Low maintenance:** UV light systems require very little maintenance and are easy to install, making them a practical and convenient solution for a wide range of applications.

4.1.4 LCD DISPLAY



Fig 4.4 LCD Display

sunrom.com

Data that make up the desired image are placed in the data registers as part of the control process for the display, and instructions are subsequently placed in the instruction register. This is sped up for you by the Liquid Crystal Library so you don't need to know the low-level commands. There are two control modes available for the Hitachi-compatible LCDs: 4-bit and 8-bit. The Arduino needs seven I/O pins for the 4-bit mode and eleven for the 8-bit mode. This illustration demonstrates how to operate a 16x2 LCD in 4-bit mode as almost everything for displaying text on the screen can be done in this form.

4.3 Table LCD Display Specification

Feature	Specification
Display Type	LCD (Liquid Crystal Display)
Screen Size	16x2 (16 characters per row, 2 rows)
Resolution	5x8 dots per character
Backlight Type	LED backlight
Operating Voltage	5V
Pin Count	16

4.1.5 NON-CONTACT INFRARED THERMOMETER



Fig 4.5 Non-Contact Infrared Thermometer
IndiaMART

An infrared thermometer is a type of thermometer that determines temperature using some of the thermal radiation generated by the item being measured, often known as "black-body radiation." When a laser is used to help aim the thermometer, they are also sometimes referred to as laser thermometers, non-contact thermometers, or temperature guns to reflect their capacity to measure temperature at a distance. The temperature of the item may frequently be estimated within a given range of its real temperature by knowing how much infrared energy it emits and how emissive it is. A subclass of equipment referred to as "thermal radiation thermometers" includes infrared thermometers.

- **Measurement Range:** The measurement range of a non-contact infrared thermometer typically ranges from -50°C to 550°C (-58°F to 1022°F).
- **Accuracy:** The accuracy of the measurement is typically $\pm 2\%$ or $\pm 2^{\circ}\text{C}$, whichever is greater.
- **Response Time:** The response time is usually around 500ms.
- **Distance to Spot Ratio:** The distance to spot ratio is typically 12:1, which means that the thermometer can measure the temperature of a 1-inch diameter area from a distance of 12 inches.

- Emissivity: The emissivity of the thermometer is adjustable and can range from 0.1 to 1.0.
- Display: The thermometer usually has a backlit LCD display that shows the temperature reading.
- Power Source: The thermometer is typically powered by a 9V battery.
- Features: Many non-contact infrared thermometers come with features such as automatic shut-off, low battery indicator, and a laser pointer for aiming.
- Spectral Response: The spectral response of a non-contact infrared thermometer is usually between 6 and 14 microns, which makes it suitable for measuring the temperature of most surfaces.
- Operating Temperature Range: The thermometer can operate in temperatures ranging from 0°C to 50°C (32°F to 122°F).
- Storage Temperature Range: The thermometer can be stored in temperatures ranging from -20°C to 60°C (-4°F to 140°F).

4.1.6 MOTOR DRIVERS

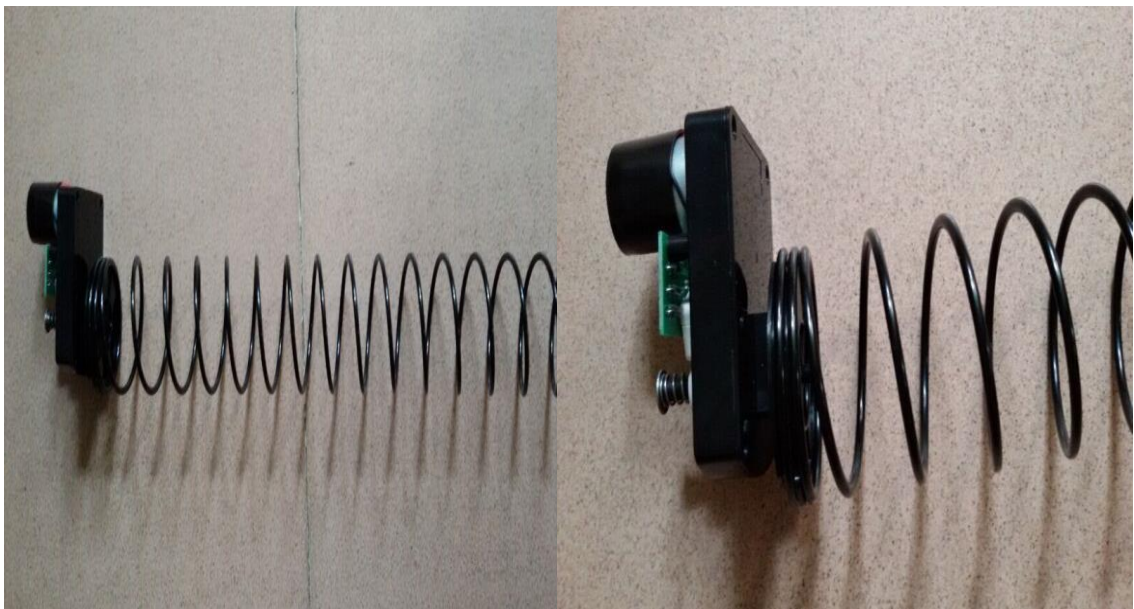


Fig 4.6 Motor Drivers

IndiaMART

The 24V DC spur gearbox motor used in commercial vending machines offers the greatest torque for the machine's operation, as well as excellent efficiency, little noise, a small design, and reliable quality.

4.4 Table DC Motor Specifications (Indiamart.com)

Parameters	Values/Range
Operating Voltage	12 V DC
Maximum torque	17.05 kg-cm
Speed	20-32 RPM

4.1.7 POWER SUPPLY



Fig 4.7 POWER SUPPLY
blogs.vendify.in

A power supply box, also known as a PSU (power supply unit), is an electronic device that converts incoming AC (alternating current) power from a wall outlet to DC (direct current) power that can be used to power electronic devices. Here is a summary of the key features of a power supply box:

- **Input Voltage Range:** The input voltage range indicates the range of AC voltage that the PSU can accept. Common input voltage ranges are 100-240V AC.
- **Power Rating:** The power rating of the PSU indicates the amount of power it can supply to connected devices. It is typically measured in watts (W).
- **Efficiency:** The efficiency of the PSU is the ratio of output power to input power. A higher efficiency rating means that the PSU is more efficient at converting AC power to DC power.
- **Form Factor:** The form factor of a power supply box refers to its physical size and shape. Common form factors for desktop computers are ATX, microATX, and SFX.
- **Connectors:** The connectors on a PSU determine what devices can be powered by the unit. Common connectors include 20+4 pin ATX, 4+4 pin EPS, SATA, and PCIe.
- **Safety Features:** Power supply boxes typically have safety features such as overvoltage protection (OVP), overcurrent protection (OCP), and short circuit protection (SCP) to protect connected devices from damage.
- **Cooling:** Most power supply boxes have a fan to help cool the unit and prevent overheating.
- **Certification:** Some power supply boxes are certified by organizations such as 80 PLUS, which rates the efficiency of PSUs.
- **Overall,** a power supply box is a critical component in any electronic device that requires DC power, and it's important to choose one that is appropriate for the specific device and meets the required specifications.

4.1.8 CONNECTING WIRES



Fig 4.8 CONNECTING WIRES
IndiaMART

A straight line is used to depict the connecting wire. To link electrically between two sites, it is often formed of copper and has insulation.

4.2 CAD RENDER

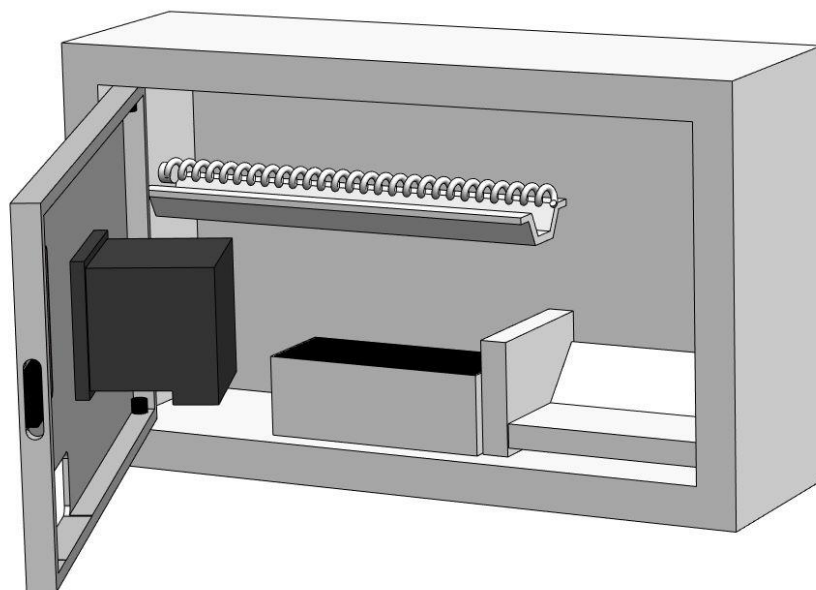


Fig 4.9 INSIDE FRONT VIEW OF CAD RENDER

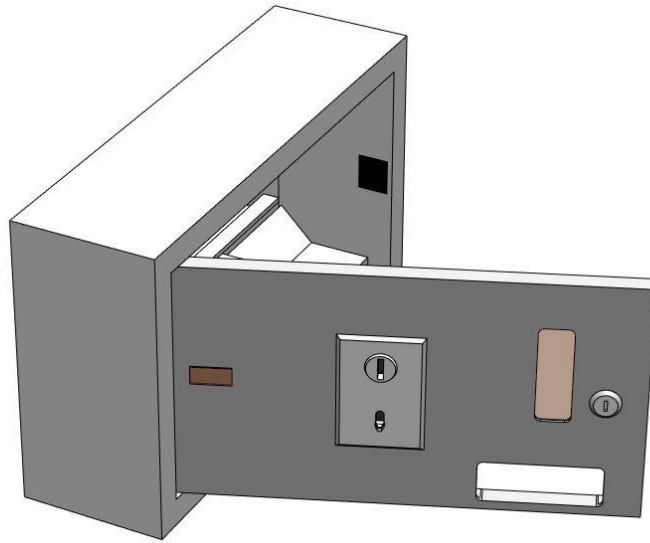


Fig 4.10 RIGHT VIEW OF CAD RENDER

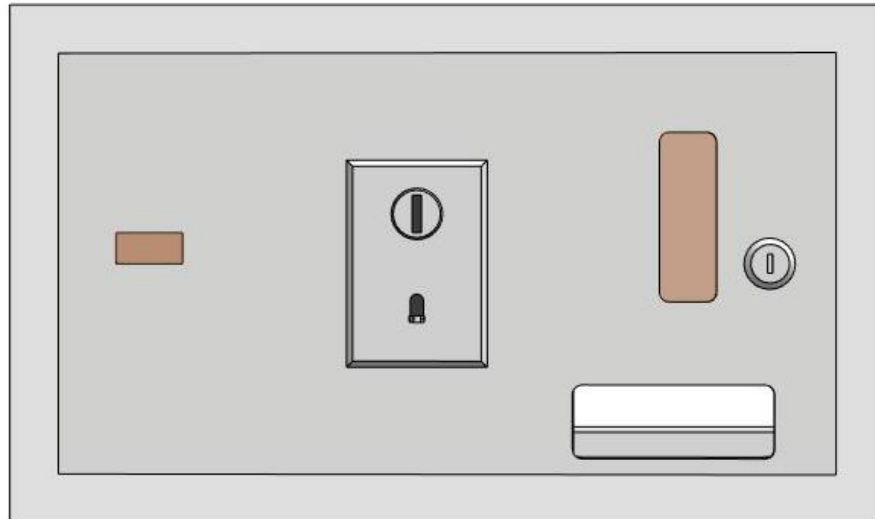


Fig 4.11 FRONT VIEW OF CAD RENDER

4.3 PROJECT IMAGES



Fig 4.12 FRONT VIEW OF PROJECT



Fig 4.13 INSIDE FRONT VIEW OF CAD RENDER

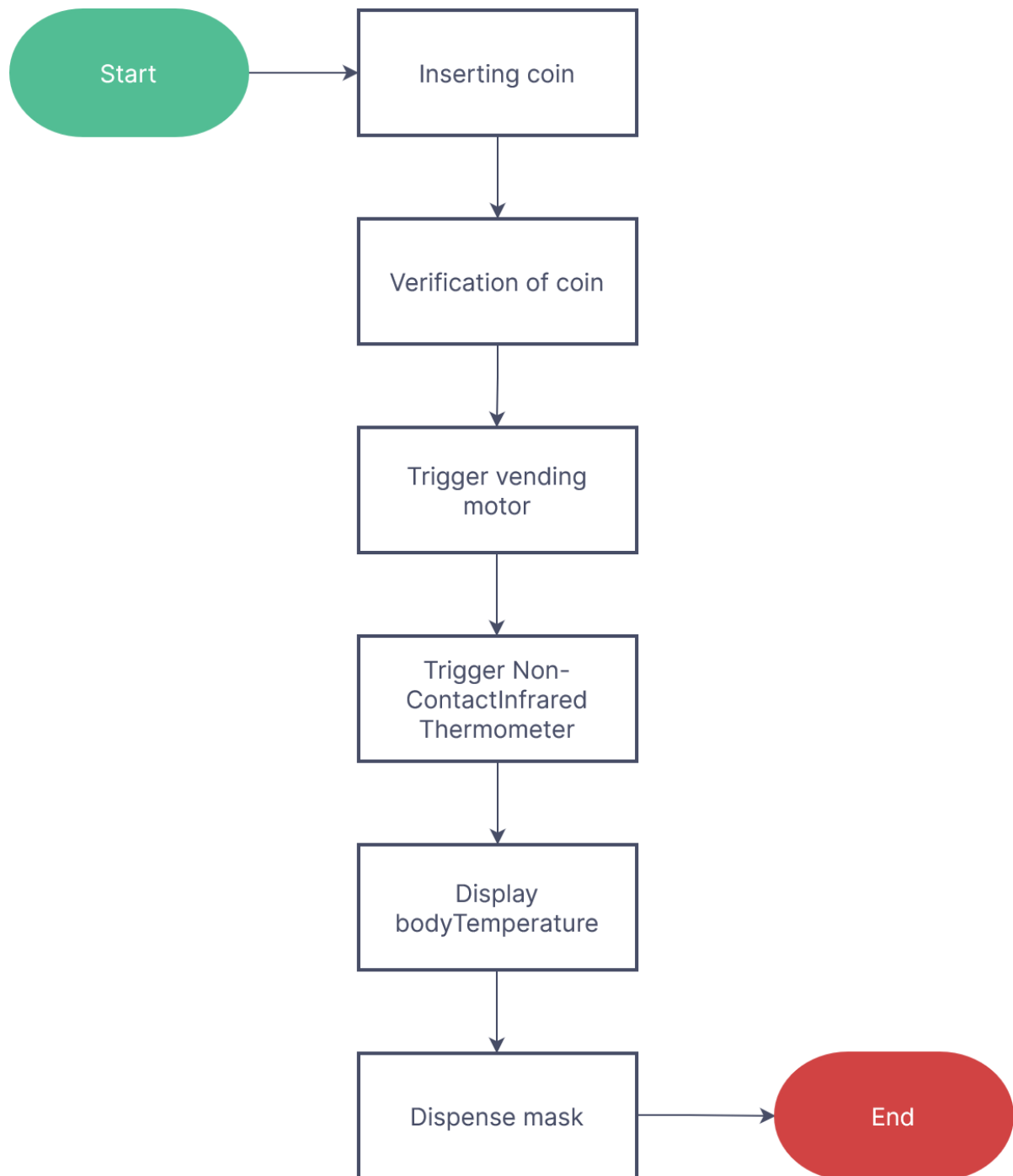
4.4 PROGRAM FOR ARDUINO UNO ATMEGA328

```
1 import smbus
2 import time
3
4 # MLX90614 address on the I2C bus
5 MLX90614_ADDRESS = 0x5A
6
7 # Register addresses for reading temperature values
8 TA_REG = 0x06
9 TOBJ_REG = 0x07
10
11 # Open the I2C bus
12 bus = smbus.SMBus(1)
13
14 # Read temperature values for 5 seconds
15 end_time = time.time() + 5
16 while time.time() < end_time:
17     # Read the ambient temperature value
18     ta = bus.read_word_data(MLX90614_ADDRESS, TA_REG)
19     # Convert the ambient temperature value to degrees Celsius
20     ta = (ta * 0.02) - 273.15
21
22     # Read the object temperature value
23     tobj = bus.read_word_data(MLX90614_ADDRESS, TOBJ_REG)
24     # Convert the object temperature value to degrees Celsius
25     tobj = (tobj * 0.02) - 273.15
26
27     # Print the temperature values
28     print("Ambient temperature: {:.2f} °C".format(ta))
29     print("Object temperature: {:.2f} °C".format(tobj))
30
31     # Wait for 0.5 seconds before reading again
32     time.sleep(0.5)
33
34 # Close the I2C-bus
35 bus.close()
```

- This code is used to read the temperature values from an MLX90614 sensor connected to the I2C bus. The first two lines import the necessary libraries, "smbus" for accessing the I2C bus and "time" for measuring the time. The next line specifies the address of the MLX90614 sensor on the I2C bus. The following two lines define the register addresses for reading the temperature values. The next line opens the I2C bus.

- The main loop of the code starts by measuring the current time and storing it in the "end_time" variable. It then enters a while loop that runs until the current time exceeds the "end_time" variable. Inside the loop, the code reads the ambient temperature value from the MLX90614 sensor by sending a request to the TA register and stores it in the "ta" variable.
- It then converts the ambient temperature value from Kelvin to Celsius and stores it back in the "ta" variable. The code then reads the object temperature value from the MLX90614 sensor by sending a request to the TOBJ register and stores it in the "tobj" variable. It then converts the object temperature value from Kelvin to Celsius and stores it back in the "tobj" variable. Finally, the code prints the ambient and object temperature values.
- After printing the temperature values, the code waits for half a second before starting the loop again. This delay is achieved using the "time.sleep(0.5)" function. Finally, the I2C bus is closed using the "bus.close()" function. The first section of the code sets up some constants such as the address of the MLX90614 sensor on the I2C bus (0x5A) and the register addresses for reading the temperature values (0x06 for the ambient temperature and 0x07 for the object temperature).
- Next, the script opens the I2C bus using the SMBus library and enters a loop that reads the temperature values every 0.5 seconds for a total of 5 seconds.
- Inside the loop, the script first reads the ambient temperature value (ta) from the sensor by sending a command to the MLX90614 to read the value from the TA register. The script then converts this raw value to degrees Celsius using the formula $(ta * 0.02) - 273.15$.
- The script then reads the object temperature value (tobj) from the sensor by sending a command to the MLX90614 to read the value from the TOBJ register. The script then converts this raw value to degrees Celsius using the same formula as before.
- Finally, the script prints the temperature values to the console using the print function and waits for 0.5 seconds before starting the loop again. After 5 seconds, the script closes the I2C bus using the close() method of the SMBus object.

4.5 METHODOLOGY



CHAPTER 5

RESULT

Detailing About Mask Vending Machine As the world continues to grapple with the COVID-19 pandemic, mask-wearing has become a crucial part of everyday life. While many people are now used to wearing masks regularly, there are still instances where people forget to bring a mask or need a new one in a pinch. This is where mask vending machines come in. Mask vending machines are a convenient solution for people who need to purchase masks quickly and easily. These machines can be placed in a variety of locations, such as shopping centers, hospitals, airports, and other public places. One of the main benefits of mask vending machines is that they provide a contactless way to purchase masks. This is important in a pandemic where minimizing contact with high-touch surfaces is key to staying safe. Users can simply use their credit or debit card to purchase a mask, eliminating the need for physical cash. Another benefit of mask vending machines is that they can be stocked with a variety of mask types, sizes, and styles to accommodate different preferences and needs. Some machines even offer other pandemic-related items, such as hand sanitizer and gloves. Mask vending machines are also easy to maintain and restock. The machines are typically

Mask Vend machine with Non-Contact This machine is designed to dispense face masks to people who need them, especially in public areas where there is a risk of infection. The mlx90614 sensor is a non-contact infrared thermometer that measures temperature with great accuracy, making it an excellent addition to the mask vending machine. The mlx90614 sensor in the mask vending machine detects the temperature of the person approaching the machine. If the temperature is within the acceptable range, the machine will dispense a mask. If the temperature is too high, the machine will not dispense the mask, indicating that the person may have a fever and should seek medical attention. The advantages of a mask vending machine equipped with mlx90614 sensor are many. It ensures that people who need masks can get them easily, without having to go to a store or pharmacy. It also ensures that people who have a fever do not come into close contact with others, reducing the risk of spreading infections. Additionally, the machine can be placed in

high-traffic areas such as airports, train stations, and Shopping Centers, Making It Accessible To A Large Number Of People.

Mask Vend With UV Light Not only does it dispense high-quality masks, but it also has a built-in UV light sensor. This sensor detects the presence of a face mask and ensures that the mask being dispensed is clean and hygienic. The UV light kills any bacteria or germs on the mask's surface, making it safe to use right away. The Mask Vending Machine is easy to use, with clear instructions and a touch screen display. Customers can choose from a variety of mask types, including disposable, cloth, and N95 masks. The machine is also customizable, with the option to add your company logo or design to the exterior. In addition to promoting public health and safety, the Mask Vending Machine also presents a new business opportunity. It can be placed in high-traffic areas such as airports, malls, and office buildings, providing a convenient way for people to purchase masks on the go.

CHAPTER 6

CONCLUSION

Mask vending machines have become increasingly popular in recent times due to the COVID-19 pandemic. They are an innovative solution that helps people to conveniently access masks while on the go. These vending machines are located in high-traffic areas such as airports, shopping malls, schools, and hospitals, making it easy for people to purchase masks and protect themselves and others. The use of mask vending machines has several benefits. Firstly, they provide access to masks for people who may have forgotten to bring their own or who may need additional masks. This helps to ensure that everyone can comply with mask mandates and reduce the spread of COVID-19. Secondly, mask vending machines can be used to distribute high-quality masks that are more effective than homemade masks. This is important as the quality of the mask worn can impact its effectiveness in preventing the spread of COVID-19. Moreover, mask vending machines are easy to operate and maintain. They can be set up quickly and do not require any additional staff to manage them. They are also convenient for customers as they can accept various payment methods such as cash, credit cards, and mobile payments. Additionally, the machines can be programmed to dispense different types of masks, such as disposable masks, cloth masks, or N95 respirators, depending on the location and the needs of the customers.

In conclusion, mask vending machines have become an essential tool in the fight against COVID-19. They provide a convenient and accessible way for people to access masks and protect themselves and others. They are easy to operate, maintain, and can dispense a variety of masks. As the pandemic continues, the use of mask vending machines is likely to become even more widespread. One of the applications of these sensors is in the development of mask vending machines, which can detect the temperature of a person's face and dispense a mask if necessary. The mlx90614 sensor is a popular choice for this application due to its accuracy and ease of use. In conclusion, the development of a mask vending machine with an mlx90614 sensor can be a valuable tool in promoting public health and safety. This technology can provide a contactless and efficient way to ensure that individuals entering public spaces are wearing masks and can help to prevent

the spread of infectious diseases. As the world continues to navigate the ongoing pandemic, the use of such technology can be a crucial step in protecting public health. The Mask Vending Machine with UV Sensor is a technological innovation that has been introduced in response to the global pandemic situation. It is designed to dispense masks and sanitize them with UV light before the customer takes them. The machine is a convenient solution that ensures the safety and well-being of individuals as they go about their daily routines.

The UV sensor is an important feature of the machine as it helps to detect if a mask has been sanitized properly before it is dispensed. This is a critical feature as it ensures that customers receive masks that are safe to use and free from any potential viruses or bacteria. The Mask Vending Machine with UV Sensor also helps to promote the use of masks, which is an essential component in preventing the spread of COVID-19. It encourages individuals to always have a mask available, even if they have forgotten to bring one from home. Moreover, the machine provides a contactless solution, which reduces the risk of transmission of the virus. This is because customers can purchase masks without having to touch any surfaces or interact with any other individuals. In conclusion, the Mask Vending Machine with UV Sensor is a significant technological advancement that promotes safety and hygiene during the pandemic. Its features ensure that individuals have access to clean and safe masks while minimizing contact with others. This innovation is a valuable addition to the fight against COVID-19 and is likely to have a lasting impact on the way we approach public health and safety.

Mask vending machines with or without UV sensors have become an important tool in promoting public health and safety during the COVID-19 pandemic. They provide a convenient, contactless, and accessible way for individuals to access masks, which helps to ensure compliance with mask mandates and reduce the spread of the virus. The machines are easy to operate, maintain, and can dispense a variety of masks, including high-quality masks that are more effective than homemade masks.

The development of mask vending machines with temperature sensors, such as mlx90614, can further enhance the safety and efficiency of these machines. These sensors can detect the temperature of a person's face and dispense a mask if

necessary, which can help to prevent the spread of infectious diseases. Moreover, mask vending machines with UV sensors can sanitize masks before dispensing them, ensuring that customers receive masks that are safe to use and free from potential viruses or bacteria.

Overall, mask vending machines with various sensors are a significant technological advancement that promotes safety and hygiene during the pandemic. They provide a convenient, accessible, and contactless solution that encourages individuals to always have a mask available and helps to prevent the spread of COVID-19. As the pandemic continues, the use of these machines is likely to become even more widespread, and they may have a lasting impact on the way we approach public health and safety.

REFERENCE

- [1] Akanksha Dhurve, Ashavi Patil, Nikita Narwaria, Pooja Dhapade, Poonam Choudhari, Dr. Abhay Kasetwar “Face Mask Vending Machine” - International Journal of Scientific Research in Engineering and Management (IJSREM) Volume: 05 Issue: 05 May – 2021
- [2] Asmita Bodhale. P., and Kulkarni, J. S “Case Study on Different Vending Machines” - International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 04 Apr -2017.
- [3] Aye Aye Nyein, Ohnmar Win “RFID Based Vending Machine” - International Journal of Trend in Scientific Research and Development, Volume 3, August 2019
- [4] Aye Aye Nyein, Ohnmar Win, “RFID Based Vending Machine” - International Journal of Trend in Scientific Research and Development, Volume 3, (August 2019)
- [5] Darshan. Y. L , Harshitha. L. C , Lekhana. R , Ranjitha. L “Any Time Medicine Vending Machine” - International Journal of Engineering Science and Computing IJESC, Volume 10 Issue No.8, August 2020)
- [6] Darshan. Y. L, Harshitha. L. C, Lekhana. R, Ranjitha. L, “Any Time Medicine Vending Machine” - International Journal of Engineering Science and Computing IJESC, Volume 10 Issue No.8, (August 2020).
- [7] Emerging Devices and Smart Systems, March 2017
- [8] Eriyeti Murena, Vennan Sibanda, Solomon Sibanda, Khumbulani Mpofu Procedia “Design of a control system for a vending machine”, Elsevier CIRP 91, Pp.758-763, 2020.
- [9] G Srinivasachar, Pavithra B, Sumana R, Swati kumari, T Divya, “Automatic Medicine Vending Machine”, Volume 5 Issue 5 –(MAY 2019).
- [10] Ganesh Sreepadham, Dr. Jisha P Abraham, Nithin Benny, Sijo Saji, “Medicine Vending Using IoT Unique Product Key” – IJSART, Volume 6 Issue 11 –(NOVEMBER 2020).

- [11] Girish Mahajan, Vaibhav Phale, Sanket Mane, Prof. Ajit B. Patil "Vending Machine with Cash and Cashless Payment Support" - International Research Journal of Engineering and Technology (IRJET), Volume: 07 Issue: 06 June 2020
- [12] Girish Mahajan, Vaibhav Phale, Sanket Mane, Prof. Ajit B. Patil,"Vending Machine with Cash and Cashless Payment Support" - International Research Journal of Engineering and Technology (IRJET), Volume: 07 Issue: (06 June 2020).
- [13] H. A. Rahman, A. R. A. Aziz, and S. A. S. Zawawi, "Development of an Intelligent Mask Vending Machine for Public Safety during the COVID-19 Pandemic," Journal of Physics: Conference Series, 2021.
- [14] H. J. Chae, J. H. Lee, and S. K. Han, "Development of an Intelligent Mask Vending Machine with a Remote Monitoring System for COVID-19 Prevention," Sensors, 2021.
- [15] H. J. Kim, J. M. Kim, and Y. J. Choi, "Design and Implementation of a Smart Vending Machine for COVID-19 Protective Equipment," Journal of Communications and Networks, 2021.
- [16] Hemawathi Ms, Deepikashree P, Kowsalya Ns, Kanimozhi,"Cloud Based Automated Medicine Vending Machine" Volume 6 Issue 3 – (MARCH 2020)
- [17] Irmansyah M, Madona M,"Newspaper Vending Machine" - 2nd Workshop on Multidisciplinary and Applications (WMA).
- [18] J. H. Kim, M. J. Kim, and K. H. Kim, "Smart Mask Vending Machine for Public Health and Safety," International Journal of Engineering and Advanced Technology, 2021.
- [19] J. T. Lin, Y. C. Wu, and C. C. Tsai, "An Automated Mask Vending Machine System with a Real-Time Image Processing Based on Embedded System for Public Health and Safety," Sensors, 2021.
- [20] Jabbar, Mohd Helmy Abd Wahab, Mohd Fauzi Zakaria; IEEE International Symposium on Robotics and Intelligent Sensors (IRIS 2016) Pp.75-80.
- [21] Jagruti Sahuji, Dnyaneshwari Takle , Bhagyashree Tongire , Vishwashri A. Kulkarni "Automatic Chocolate Vending Machine using IOT" - The International Journal of Analytical and Experimental Modal Analysis, Volume XII, June2020

- [22] K. R. Chaudhari and A. V. Kadam, "Smart Mask Vending Machine for Public Safety using IoT and Blockchain," Proceedings of the International Conference on Emerging Trends in Computer Science and Electronics, 2021.
- [23] K. S. Sagar and S. S. Waghmare, "Design and Development of Smart Mask Vending Machine with AI-based Sanitization and Health Monitoring System," Proceedings of the International Conference on Inventive Communication and Computational Technologies, 2021.
- [24] K. V. Kadam and P. V. Mahamure, "Smart Face Mask Vending Machine using Internet of Things," International Journal of Recent Technology and Engineering, 2020.
- [25] Kai Kit Wong, Nur Atikhah Abu Samah, Mohamad Safwan Sahimi, W. A. F. W. Othman " Development of Reverse Vending Machine using Recycled Materials and Arduino Microcontroller" - International Journal of Engineering Creativity and Innovation (IJECI), Volume 1) 7-16, 2019
- [26] Kam Nathan "Automatic Paper Vending Machine" - International Journal Of Science Engineering and Technology Research, Volume 4 Issue 4 April 2015
- [27] Kanagasabapathi V., Naveenraj K., Neelavarnam V., Naveen raj S., "Automatic chocolate vending machine", International Conference on Advanced Computing & Communication Systems(ICACCS), 2019, Pp.584-587.
- [28] M. Y. Chen, C. S. Liang, and C. Y. Chen, "Development of a Smart Mask Vending Machine with QR Code and Mobile Payment Function for Contactless Transactions," Applied Sciences, 2021.
- [29] Mahima Mehra, Vidhi Mehta, Rajat Maurya, Purav Rawal, "Medicine Vending machine" Volume 9, Issue 2, (2019).
- [30] Malashree.G, Ubaidulla, Shilpa R S, Divya U "ATM (All Time Medicine) Counter For Medicine Self-Dispensing"-International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS) Volume VI, Issue VS, May 2017
- [31] Mrs. Rajitha T.B, Himanshu Pandey, Siddhesh Pansare, Nishant Pawar "Automatic Medicine Vending Machine" - International Journal of Advanced Research in Science\ (IJARSCT), Volume 6, Issue 1, June 2021

- [32] N. Das and S. K. Mandal, "Design of an IoT-based Smart Mask Vending Machine for Contactless Transactions," Proceedings of the International Conference on Computing and Network Communications, 2021.
- [33] Prathamesh Jadhav, Prajwal Mathe, Sanket Chaudhari "Automatic Passive Component Vending Machine" - International Research Journal of Engineering and Technology (IRJET) Volume: 08 Issue: 02, Feb 2021
- [34] Prathamesh Jadhav, Prajwal Mathe, Sanket Chaudhari "Automatic Passive Component Vending Machine" - International Research Journal of Engineering and Technology (IRJET), Volume: 08 Issue: (02 | Feb 2021).
- [35] Prof. Patil R.S, Ankush Borse, Pooja Basate, Sudarshan Chaudhari, Devendra Deshmukh "Mechanically Operated Mask Vending Machine" - IJARIIIE Vol-8 Issue-2 2022
- [36] Rakshitha A, Hema E, Priya G V, Rakshitha V, Sapna L "Automatic Medicine Vending Machine" - International Journal of Management, Technology And Engineering Volume 8, Issue X, OCTOBER 2018.
- [37] Ravisankar. S, Assit Prof, "Efficient design of ATM Based Remote Healthcare Monitoring System" - Indonesian Journal of Electrical Engineering and Computer Science IJEECS, Volume-3, Issue-3 (2015).
- [38] Ravisankar. S, Asst Prof "Efficient design of ATM Based Remote Healthcare Monitoring System" - Indonesian Journal of Electrical Engineering and Computer Science IJEECS, Volume-3, Issue-3 2015
- [39] Rosa Cardaci, Sandra Burgassi, Davide Golinelli, Nicola Nante, Mario A. Battaglia, Daiana Bezzini & Gabriele Messina, "Automatic vending machines contamination: A pilot study", Global Journal of Health Science, Vol. 9, No. 2, 2017.
- [40] S. D. Bokade and R. D. Baviskar, "Smart Mask Vending Machine using Edge Computing and Deep Learning for Health and Safety," Proceedings of the International Conference on Electronics, Communication, and Aerospace Technology, 2021.
- [41] S. J. Lee and S. W. Kim, "Design and Implementation of Smart Vending Machine for Safety Masks," International Journal of Control and Automation, 2020.

- [42] S. M. Kim, J. H. Kim, and M. J. Kim, "Development of a Smart Vending Machine for Health and Safety Products with Facial Recognition Technology and Social Distancing Measures," *Sensors*, 2021.
- [43] S. R. Park, S. H. Kim, and J. H. Kim, "A Smart Face Mask Vending Machine with Cloud-based Inventory Management System for COVID-19 Pandemic," *Journal of Convergence Information Technology*, 2021.
- [44] S. S. Desai and S. S. Shinde, "Design and Development of Smart Mask Vending Machine for Health and Safety," *International Journal of Engineering Research & Technology*, 2020.
- [45] Sanket Dessai, Chetan R "Software Design and Development of Beverage Vending Machine System Using ARM Architecture with LPC2148" - *International Journal of Reconfigurable and Embedded Systems (IJRES)*, Vol. 4, No. 1, March 2015.
- [46] Shilpa R, Nithin H S, Sonika Rao, Susmitha Anand, Kanakaraju R "Survey on Pharmaceutical Vending Machine" - *National Conference on Communication and Image Processing-Volume-1, Issue-6, September- 2019*
- [47] Shweta Dour, Rishikesh Shukla, Dishita Makwana, Neelima Satuluri, Lakshmi Mahiwal "Vending Machine using 8051 Microcontroller"- *International Journal of Advanced Research in Science and Engineering*, Volume 06, May2017.
- [48] Sonika Rao, Susmitha Anand, Shilpa R, Nithin H S, Kanakaraju R "All Time Medicated Vending Machine"-*National Conference on Communication and Image Processing, Volume 8, Issue 7- 2017*.
- [49] Steven Woodbine, "The Complete Vending Machine" Published on (18 May2011).
- [50] Suhail, Beg, "Implementation of FSM Based Automatic Dispense Machine with Expiry Date Feature Using VHDL," *International Journal of Modern Engineering Research (IJMER)*, vol. 4, p.p. 1-5, April 2014.
- [51] Sure, here are the references for the research papers on mask vending machines in order with the author names, paper titles, journal names, and years:
- [52] Vennan Sibanda, Lorraine Munetsi, Khumbulani Mpofo, Eriyeti Murena, John Trimble, *Procedia "Design of a high-tech vending machine" - Elsevier CIRP 91, Pp.758-763, 2020*

- [53] Vennan Sibanda, Lorraine Munetsi, Khumbulani Mpofu, Eriyeti Murena, John Trimble, "Design of a high-tech vending machine", Elsevier, Procedia CIRP 91, 2020, Pp. 678-683.
- [54] Vennan Sibanda, Lorraine Munetsi, Khumbulani Mpofu, Eriyeti Murena, John Trimble, Procedia, "Design of a high-tech vending machine", CIRP 91, Pp. 678-683, (2020).
- [55] Vishal Tank, Sushmita Warriar, Nishant Jakhiya "Medicine Dispensing Machine Using Raspberry Pi and Arduino Controller"- IEEE Conference on 2019

ANNEXURE:

- THE REVIEW PAPER TITLED “ DESIGN AND FABRICATION OF MASK VENDING MACHINE - A REVIEW “BY J.SENTHILKUMAR, K.MONISHWARAN, V.MOKESHWARAN HAS BEEN PRESENTED IN ICAARS 2022 CONDUCTED BY PSG COLLEGE OF TECHNOLOGY, COIMBATORE ON 9TH DECEMBER 2022.
- THE REVIEW PAPER TITLED “DESIGN AND FABRICATION OF MASK VENDING MACHINE - A REVIEW” BY J.SENTHILKUMAR, K.MONISHWARAN, V.MOKESHWARAN HAS BEEN PRESENTED IN ICCRAME 2023 CONDUCTED BY RAMCO INSTITUTE OF TECHNOLOGY , RAJAPALAYAM ON 25TH MARCH 2023.
- THE RESEARCH PAPER TITLED “ EXPLORING THE POSSIBILITIES OF UV - PROTECTED MASK VENDING MACHINE WITH BODY TEMPERATURE SENSOR” BY J.SENTHILKUMAR, K.MONISHWARAN , V.MOKESHWARAN HAS BEEN PRESENTED IN ICCRAME 2023 CONDUCTED BY RAMCO INSTITUTE OF TECHNOLOGY , RAJAPALAYAM ON 25TH MARCH 2023.

RE-2022-115299-plag-report

ORIGINALITY REPORT

19%

SIMILARITY INDEX

15%

INTERNET SOURCES

3%

PUBLICATIONS

9%

STUDENT PAPERS

PRIMARY SOURCES

1

www.idsvending.com

Internet Source

5%

2

ijariie.com

Internet Source

3%

3

archive.org

Internet Source

2%

4

Submitted to SCHOOL OF PEDAGOGICAL & TECHNOLOGICAL EDUCATION(A.S.PE.T.E.)

Student Paper

1%

5

ijesc.org

Internet Source

1%

6

www.pramanaresearch.org

Internet Source

1%

7

www.researchgate.net

Internet Source

1%

8

hanjindata.lgnas.com:10000

Internet Source

1%

9

Submitted to University of Greenwich

Student Paper

<1%

10	www.ijaema.com Internet Source	<1 %
11	Submitted to Asia Pacific University College of Technology and Innovation (UCTI) Student Paper	<1 %
12	ijeam.com Internet Source	<1 %
13	Submitted to American University of the Middle East Student Paper	<1 %
14	www.online-sciences.com Internet Source	<1 %
15	Submitted to MAHSA University Student Paper	<1 %
16	sportdocbox.com Internet Source	<1 %
17	Submitted to University Politehnica of Bucharest Student Paper	<1 %
18	archive.epa.gov Internet Source	<1 %
19	Submitted to College of the North Atlantic-Qatar Student Paper	<1 %
20	Submitted to The London College UCK Student Paper	

<1 %

21

Submitted to Visvesvaraya Technological University, Belagavi

Student Paper

<1 %

22

www.ijarse.com

Internet Source

<1 %

23

universitycity.fiu.edu

Internet Source

<1 %

24

Submitted to Management & Science University

Student Paper

<1 %

25

Submitted to Tarleton State University

Student Paper

<1 %

26

Submitted to Troy State University (main campus)

Student Paper

<1 %

27

El-Gehawe, Nader. "Development of Advisory System for Safe Gap Acceptance by Older Drivers", The University of Akron, 2022

Publication

<1 %

28

bkprecision.typepad.com

Internet Source

<1 %

29

files.hawaii.gov

Internet Source

<1 %

30	www.frankshospitalworkshop.com Internet Source	<1 %
31	Gomes, Pedro Miguel Francisco. "Software Framework Implementation for a Robot that Uses Different Development Boards", Universidade do Algarve (Portugal), 2022 Publication	<1 %
32	pbphonebook.com Internet Source	<1 %
33	www.gamersware.de Internet Source	<1 %
34	Mohannad Jabbar Mnati, Raad Farhood Chisab, Azhar M. Al-Rawi, Adnan Hussein Ali, Alex Van den Bossche. "An Open-Source Non-Contact Thermometer Using Low-Cost Electronic Components", HardwareX, 2021 Publication	<1 %

Exclude quotes On
Exclude bibliography On

Exclude matches Off

1.Exploring the Possibilities Of UV-Protected Mask Vending Machines With Body Temperature Sensors

J.Senthilkumar, K.Monishwaran ², and V.Mokeshwaran ³

*1, Associate professor, School of Mechanical Engineering,
Sathyabama Institute of Science and Technology, Chennai – 600119
Email id: j.senthilkumar1981@gmail.com*

*2,3 Final year UG student, Department of Mechatronics, School of Mechanical
Sathyabama Institute of Science and Technology, Chennai-600119
Email id Author ²: monishwaran728@gmail.com , Author ³: mokeshwarankpm@gmail.com*

ABSTRACT

This research paper aims to provide an overview of the mask vending machine industry. The COVID-19 pandemic has highlighted the importance of face masks as a personal protective equipment, and vending machines that dispense masks have become an increasingly popular option for obtaining them. The paper covers the types of mask vending machines available, the technology used, and the advantages and challenges facing the industry. The types of mask vending machines discussed include standalone machines, machines integrated with microcontroller and some sensor. when a mask is being dispensed, non-contact infrared thermometers are utilized in vending machines to detect the vendor's body temperature. UV lights are also put within the vending machine to disinfect the masks of any bacteria. The advantages of mask vending machines include convenience for consumers, increased sales for vendors, and cost savings for businesses. The challenges facing the industry include competition from other sales channels and concerns about the security of cashless payment systems. The paper concludes that the mask vending machine industry is expected to continue growing in the future, driven by the increasing demand for personal protective equipment and the convenience of vending machines. However, it is important for vendors to address challenges such as security concerns and competition from other sales channels in order to be successful in the industry.

KEYWORDS:

Mask Vending machines, Microcontroller, Non-contact infrared thermometer, UV lights,

2.INTRODUCTION

When customers insert coins or dollars into a vending machine, it automatically dispenses things like food, drinks, cigarettes, and lottery tickets to them. In the early 1880s, England produced the first modern vending machines that gave out postcards. Many nations have these machines, and more recently, specialist vending machines with a smaller selection have been developed. The face mask is one of the most popular products of the century. The scarcity of masks is due to several factors, including the rapidly growing population and changing lifestyles that increase the demand for fresh masks. one of the advanced devices that benefit humanity is the coin-operated mask dispensing machine. It has been designed for use in railway stations, schools, colleges, bus depots and public places and operates based on a microcontroller. The inputs are coins, and the output is a face mask. The microcontroller was chosen for its simplicity and suitability for the mask dispensing machine. Today, Automatic vending

machines are frequently utilized because they simplify and accelerate a number of processes. The machine may service clients through a variety of inputs and outputs. Similar to other vending machines, this one is coin-operated, takes only coins, and dispenses masks. Mask control systems are crucial to society because of the lack of masks, which has led to the introduction of several monitoring systems with integrated mask level detection. The vending machine will be upgraded so that clients may get masks from it. The necessary quantity of masks and associated cost are intended to be within the reach of the general people

3.LITERATURE REVIEW

The design on paper [1] concentrated on the method for retrieving products. The rack and pinion gear system-driven chute system was determined to be the optimum choice. Based on its effect on the environment and its capacity to prevent food contamination under various operating situations, the material utilised was chosen. The safety and security of the machine were based on fingerprint

1. Design and Fabrication of Mask Vending Machine

J. Senthilkumar ¹, K. Monishwaran ², and V. Mokeshwaran ³

1 Associate professor, School of Mechanical Engineering, Sathyabama Institute of Science and Technology, Chennai, Tamilnadu, India - 600119.

Email - j.senthilkumar1981@gmail.com

2,3 Final year UG student, School of Mechanical Engineering, Sathyabama Institute of Science and Technology, Chennai, Tamilnadu, India -600119

Author³Email - monishwaran728@gmail.com , Author³Email - mokeshwarankpm@gmail.com

ABSTRACT:

A facemask is a necessary product today to prevent the spread of viruses and other diseases through the air. So, the vending machine is a better option to dispense facemasks without using humans. This is a more automated process and does not require human intervention. It is an Arduino - based vending machine with sensors to do multitasking at the time of dispensing. Non-contact infrared thermometers are used in vending machines to measure the buyer's human body temperature at the time of dispensing the mask, and also mounted UV lights on the inside of vending machines to kill or inactivate bacteria and viruses in the masks. This device is useful in public places such as hospitals, institutions, train stations, and bus stops. This machine saves the user's time and it is easy to operate. This ensures no contact between buyers and sellers, reducing the spread of viruses and infections.

KEYWORDS:

Non-contact Infrared Thermometer, UV light, Microcontroller, Sensors.

2. INTRODUCTION

A vending machine is basically a machine that sells goods such as Drinks, snacks, consumables, etc. after you deposit money or credit. Due to the Covid-19 outbreak, everyone is being advised to protect themselves and stay safe. Masks have become the most commercial product of the century. World Health organisations and medical experts recommend wearing a face mask. mainly outside Wearing a face mask in public can help prevent viral transmission. To be aware that face masks are made available for all individuals and families for safety precautions. Face mask vending machines have been developed to facilitate access to face masks and personal care products for the general public. Therefore, putting such a machine into use in real time will be very helpful to people. The machine's merits include the fact that it does not require human supervision, is extremely effective, small, portable, and simple to use and maintain.[1], In this paper, we present a concept for an Internet of Things (IoT) based automated medicine dispenser machine. This machine is a computerised medicine storage system that ensures the availability of the medication around-the-clock, earning it the moniker Any Time Medicine (ATM) machine. It can also deliver the medication in an emergency. We use an Arduino Mega controller to manage the many subsystems of this Internet of Things-based automated medication dispenser, including the RFID reader, GSM module, medicine dispenser, Inventor control, Wi-Fi module, and Servo motor. Three different OTC medications—for diabetes, hypertension, and first aid—are the major focus of this investigation. The study ends by discussing the benefits, drawbacks, and potential applications of an automated medicine dispenser based on the Internet of

Things.[5] In the event of a crisis, ATM will be crucial in saving lives if an accident occurs on public roads, distant mountains, provincial territories, or in areas without access to medical facilities. In any case, with the aid of this framework, first aid might be made effectively accessible. The Global System for Mobile Communications (GSM), a pharmaceutical allocator, and stock control are among the additional subsystems that this project includes and are controlled by the Advanced RISC Machine (ARM) CPU. When the solutions need to be refilled, GSM notifies stock control. The machine's storage capacity for prescriptions is called the pharmaceutical allocator.[6] A remote health care monitoring system built on an ATM is what the system framework attempts to build and deploy. This enables a person to use the proper sensors to monitor medical parameters including blood pressure, heart rate, body temperature, height, and weight after inserting their smart card into the reader that is connected to the microcontroller. The funds are transferred from the smart card for the specific test after the check. The health information is then transmitted through GSM to the person's cell phone. The primary server houses the whole database. Physical advice is supplied to the people from the main server, which is regarded as a common healthcare monitoring system and is managed by a distinct health care unit.

3. Automatic Passive Component Vending Machine

This project's primary goal is to introduce a novel technological application to society. This vending machine, which is powered by Arduino, sells various



RAMCO INSTITUTE OF TECHNOLOGY

RAJAPALAYAM, VIRUDHUNAGAR Dist., TAMIL NADU-626117

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited by NAAC and ISO 9001:2015 certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and Mech

DEPARTMENT OF MECHANICAL ENGINEERING

INTERNATIONAL CONFERENCE ON CONTEMPORARY RESEARCH
ADVANCEMENTS IN MECHANICAL ENGINEERING - 2023 (ICCRAME 2023)

CERTIFICATE OF PRESENTATION

This is to certify that

Mr. K. Menishwaran

UG STUDENT, SCHOOL OF MECHANICAL, SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY has presented a paper titled "EXPLORING THE POSSIBILITIES OF UV-PROTECTED MASK VENDING MACHINES WITH BODY TEMPERATURE SENSORS" in the International Conference on Contemporary Research Advancements in Mechanical Engineering - 2023 (ICCRAME 2023) organized by Ramco Institute of Technology on 24th & 25th March, 2023 through online.


Organizing Secretary
Dr. V. Sivakumar


Vice-Principal
Dr. S. Rajakarunakaran


Principal
Dr. L. Ganesan

Follow us



RAMCO INSTITUTE OF TECHNOLOGY

RAJAPALAYAM, VIRUDHUNAGAR Dist., TAMIL NADU-626117

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited by NAAC and ISO 9001:2015 certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and Mech

DEPARTMENT OF MECHANICAL ENGINEERING

**INTERNATIONAL CONFERENCE ON CONTEMPORARY RESEARCH
ADVANCEMENTS IN MECHANICAL ENGINEERING - 2023 (ICCRAME 2023)**

**CERTIFICATE
OF PRESENTATION**

This is to certify that

Mr. V. Makeshwaran

UG STUDENT, SCHOOL OF MECHANICAL, SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY has presented a paper titled "EXPLORING THE POSSIBILITIES OF UV-PROTECTED MASK VENDING MACHINES WITH BODY TEMPERATURE SENSORS" in the International Conference on Contemporary Research Advancements in Mechanical Engineering - 2023 (ICCRAME 2023) organized by Ramco Institute of Technology on 24th & 25th March, 2023 through online.

V. Sivakumar

Organizing Secretary

Dr. V. Sivakumar

S. Rajakarunakaran

Vice-Principal

Dr. S. Rajakarunakaran

L. Ganesan

Principal

Dr. L. Ganesan

Follow us



RAMCO INSTITUTE OF TECHNOLOGY

RAJAPALAYAM, VIRUDHUNAGAR Dist., TAMIL NADU-626117

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited by NAAC and ISO 9001:2015 certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and Mech

DEPARTMENT OF MECHANICAL ENGINEERING

INTERNATIONAL CONFERENCE ON CONTEMPORARY RESEARCH
ADVANCEMENTS IN MECHANICAL ENGINEERING - 2023 (ICCRAME 2023)

CERTIFICATE OF PRESENTATION

This is to certify that

Mr. K. Menishwaran

UG STUDENT, SCHOOL OF MECHANICAL, SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY has presented a paper titled "DESIGN AND FABRICATION OF MASK VENDING MACHINE" in the International Conference on Contemporary Research Advancements in Mechanical Engineering - 2023 (ICCRAME 2023) organized by Ramco Institute of Technology on 24th & 25th March, 2023 through online.

V. Sivakumar

Organizing Secretary

Dr. V. Sivakumar

S. Rajakarunakaran

Vice-Principal

Dr. S. Rajakarunakaran

L. Ganesan

Principal

Dr. L. Ganesan

Follow us



@ritmechrpm

RIT MECHANICAL

mech@ritrpm.ac.in

mechanical-rit



RAMCO INSTITUTE OF TECHNOLOGY

RAJAPALAYAM, VIRUDHUNAGAR Dist., TAMIL NADU-626117

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited by NAAC and ISO 9001:2015 certified Institution

NBA Accredited UG Programs: CSE, EEE, ECE and Mech

DEPARTMENT OF MECHANICAL ENGINEERING

INTERNATIONAL CONFERENCE ON CONTEMPORARY RESEARCH
ADVANCEMENTS IN MECHANICAL ENGINEERING - 2023 (ICCRAME 2023)

CERTIFICATE OF PRESENTATION

This is to certify that

Mr. V. Mokeshwaran

UG STUDENT, SCHOOL OF MECHANICAL, SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY has presented a paper titled "DESIGN AND FABRICATION OF MASK VENDING MACHINE" in the International Conference on Contemporary Research Advancements in Mechanical Engineering - 2023 (ICCRAME 2023) organized by Ramco Institute of Technology on 24th & 25th March, 2023 through online.

V. Sivakumar

Organizing Secretary

Dr. V. Sivakumar

S. Rajakarunakaran

Vice-Principal

Dr. S. Rajakarunakaran

L. Ganesan

Principal

Dr. L. Ganesan

Follow us