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Stationery Vending Machine

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***Abstract*—Automation is a significant part of modern living. Even while handling necessities of existence like food and medicine, people constantly seek convenience. Automation includes time and energy savings in addition to reduced human effort. The study's main goal is to use an Arduino microcontroller to create an automated stationery vending machine. As we all know, a machine is a device that can dispense various goods andis more like an automated procedure that doesn't require manual handling, which is typically seen in fast-paced cities due to a fast-paced lifestyle. This essay contrasts a variety of vending machine characteristics, including size, timing restrictions, speed, and power use.The product's major objective is to distribute the item into the delivery compartment from the level at which it is positioned, making it easier to hold heavy things as well.The present vending machines cannot stack heavy items because they drop from a high to the low compartment. The proposed project makes use of electrical and electronic components in the hardware development process, including sensors, actuators, coin-based users, etc. The software component is implemented in the Arduino-Uno microcontroller, which helps to speed up system development.**

Keywords: -Microcontroller, DC motor, Coin sensor, Vending machine.

I. INTRODUCTION

More technologies are developed as longas people are looking for ease. The vending machine is a prime example of such a technology. It is uncommon to find vending machines in the market. For the purpose of selling goods, they are coin-operated devices. Snacks, drinks, water, tickets, and other goods are available from vending machines. Consequently, vendible refers to things that can be sold. In other words, vendible indicates that they can be purchased and sold. For a particular form of retail establishment with a stationery product at its center and ATMs, groceries, snacks, fuel, bookings for virtually any kind of service, and orders for almost any kind of merchandise, all of these things could be seen as vendible. The usual problem is that if students want some stationery product, then they must go to shops if it is available in schools or colleges. In other cases, consumers, the service counter is slow in dispensing the medicine. Some drug stores also dispense the wrong number of pills. The development of automated medicine vending machines can hopefully minimize these problems.This project's primary goal is to create an affordable, efficient vending

machine. The vending machine can produce different small products like pens, pencils, and scales. It operates automatically and dispenses different small products, so it is called an automatic dispensing machine.Additionally, it takes up very little room, is compact, and is a low-cost to set up driven machine.

II. LITERATURE SURVEY

Authors of [1] have proposed contend that it offers an Allen compassing answer to a person seeking instant symptomatic relief for minor health issues. It can minimize presenteeism and absenteeism at work by treating minor symptoms there. It can also lower the costs associated with open medicine cabinets today. It avoids wasting hours standing in line at clinics for unimportant issues like colds and headaches. This problem is made worse when a place is experiencing a limited pandemic or epidemic.

The author of [2] has proposed that the 16-bit PIC microcontroller has complete control over the system. Automated dispensing devices and decentralized drug distribution systems, which offer computer-controlled medication tracking, storage, and dispensing, have been suggested as a viable ways to boost productivity and patient safety. These devices are now commonly employed in many hospitals. Automated dispensing devices offer safe pharmaceutical storage in patient care areas combined with electronic monitoring of the consumption of prohibited substances like narcotics. Making pharmaceuticals more

accessible in patient care units & automated dispensing equipment enhances rest-dose accessibility and makes timely medicine administration easier.

Authors of [3] have introduced to save time and energy and manpower. It functions like an ATM, allowing us to withdraw the needed funds whenever and wherever we need them. It is possible to acquire medications for high blood pressure, diabetes, colds, fever, headaches, and first aid supplies such as bandages, cotton, ointments, and other commonly used drugs. When an RFID card is inserted, the RFID reader reads the user's information and displays it. Following the legitimate person's identification, a list of medications will appear on the TFT display. The user can then choose the necessary medications by keying in the matching number of chosen medications using the keypad. The amount will be determined after entering the necessary list in accordance with the medicine and its quantity. The sum will be taken out of theRFID card, and the user will receive the transaction information right away via GSM. The chosen medication is automatically sent from the system after payment deduction.

Authors of [4] have proposed that the system idea entails the creation of a touchscreen-based medical vending machine that is designed for usage in remote locations and sells basic medications depending on symptoms as well as information about the accessibility of surrounding medical facilities, including clinics, doctors, and ambulance services. The design and construction of vending machines using IR standard touch technology and medicine outlet mechanisms powered by inexpensive yet effective motors are discussed in this study. The circuit would have features like an ambulance station, first aid station, direct GSM calling station, dynamic GPS, smart card station, and alert for refilling drugs.

Authors of [5] haveproposed that users who take prescriptions without careful professional supervision are the target audience for an automatic medication dispenser. It frees the user from the risky duty of giving the incorrect medication at the incorrect time.The major components of this medication dispenser are a microprocessor coupled to an alphanumeric keyboard, a multi-pill container, a dispenser, an alarm system, a motor controller, and an LED display.To obtain the medication, the user must touch a button. The main goal is to maintain the device's simplicity and economy. The software is stable and dependable. This technology is advantageous for the elderly since it reduces the need for costly home healthcare.

III. PROPOSED SYSTEM

The block diagram of the proposed system is shown in Fig.1.

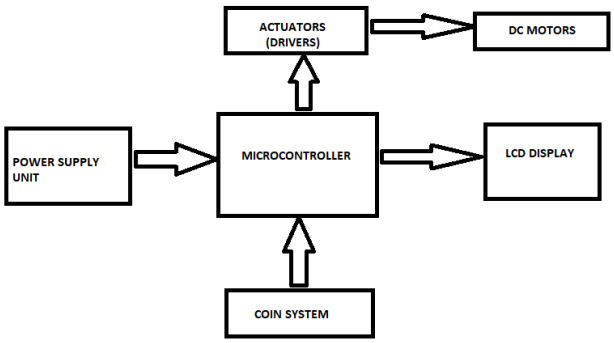

Fig.1: BLOCK DIAGRAM

It consists of an Arduino-Microcontroller, keypad/switches, LCD module, actuator/driver unit, motor mechanism, power supply unit, etc.

The light sensor detects the presence of a coin when it is inserted, and the coin dispenser reads and displays the user's information after that. The user chooses the required stationery by inputting the relevant number of selected stationeries using the keypad after viewing a list on the LCD display and selecting what they need. The money will be deducted from the coin machine, and the transaction information will be shown on the LCD. The system will immediately supply the chosen stationery when payment has been deducted. With the assistance of motors that offer a rotational mechanism, the arduino controller uses a slider arrangement for this distribution method.

VI. EXPERIMENTAL SETUP

Fig. 2 depicts the suggested system's experimental setup.

This section demonstrates how the system's many parts effectively monitor a vending machine.

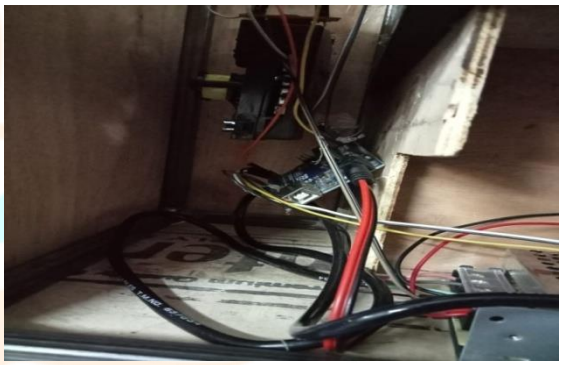

Fig 2: SETUP OF THE SYSTEM

In Fig. 2, Design and Build the Vending Machine Enclosure: Construct a robust cabinet or enclosure that can safely contain all the parts. Make sure to include spaces for the coin dispenser, LCD display, microcontroller, DC motor, and actuators as well as compartments for holding stationery supplies. Connect the DC motor, LCD screen, Drivers, and Coin dispenser to the microcontroller. Integrate the Microcontroller: Mount a microcontroller within the vending machine enclosure, such as an Arduino or Raspberry Pi. The microcontroller will act as the system's brain, managing all of the parts and carrying out the vending machine's logic. An open-source microcontroller board called the Arduino UNO is built around the microchip ATmega328P microcontroller. It is possible to connect to other circuits using the board's several digital and analog (I/O) pin sets. and expansion boards(shields).The Arduino IDE (Integrated Development Environment) can be used to program the board's 14 digital pins and 6 analog pins over a type B USB cable.It can be powered by a USB connection or an outside 9-volt battery even though it handles voltages between 7 and 20 volts. Install the LCD Display: Mount an LCD display module to the enclosure's front panel. The user interface for interacting with customers will be provided by this display. Connect it to the microcontroller so that it may show information like item choices, and prices the parallel interface of LCDs requires the microcontroller to simultaneously control many interface pins in order to control the display. Install a DC motor and actuators within the vending machine casing, then connect them. The actuators will release and dispense the chosen stationery items while the DC motor powers the dispensing mechanism. Make sure the microcontroller is properly

wired and functional before connecting the motor and actuators. Write the appropriate code for the microcontroller to control the full vending machine system to program the microcontroller. Functions for receiving cash, processing user input from the LCD display, turning on the DC motor and actuators for item dispensing, and updating inventory levels should all be included in the code. Now Installing the Coin Dispenser:The sorting machines' primary basis for operation is the size of the coins, and the coin system is coupled to a microcontroller. Much like ordinary vending machines, they distribute the coins into several channels' dependent on their size. These devices might conduct a magnetic test. The metals used to make each coin have somewhat varying magnetic characteristics, so the coin machine can identify which coins it is working with and how much each one is worth by subjecting the coins to a magnetic field and measuring their measurements.Test and troubleshoot: Run numerous simulations to test the vending machine system. Make that the coin dispenser reliably counts coins, and the LCD display gives clear instructions. Finalize and Improve: After the vending machine has been put into use, make any necessary modifications or improvements in lightof testing results. better the dispensing mechanism, improve the coin validation's precision, better the user interface, and take care of any other problems discovered during testing. Install the stationery vending machine in a suitable position, and then keep an eye on it to see how it's doing. Check inventory levels frequently, take care of any maintenance issues, and gather information on sales and consumer usage for additional analysis and improvement.

V. RESULTS

The resulting setup of the proposed system is shown in Fig.3.

This section demonstrates how the system's result works together to monitor a vending machine effectively.

Fig 3a: Insert the coin into vending machine

Fig.3b: Shows the product [scale]

Fig 3c: Acquired desired product

The implementation of stationery vending machines has yielded several positive outcomes or results: convenience and accessibility stationery vendingmachines provide customers with convenient access to stationery supplies at any time of the day. They eliminate the need to visit physical stores during specific operating hours, saving time and effort for individuals and organizations. Increased Efficiency: The self-service nature of stationery vending machines improves the efficiency of the purchasing process. Customers can quickly select and purchase the stationery items they need without waiting in long queues or dealing with manual transactions. Cost Savings: Stationery vending machines can help reduce costs for both customers and suppliers. Customers can compare prices and choose the most cost-effective option, while suppliers can save on labor and operational expenses by automating the sales process. Expanded Market Reach: By strategically placing stationery vending machines in various locations, suppliers can tap into new markets and reach a wider customer base. These machines can be installed in schools, universities, offices, airports, and other high-traffic areas, providing access to stationery supplies where they are needed the most.

VI. CONCLUSION

The stationery vending machine is a highly convenient and efficient solution for individuals and organizations in need of immediate access to stationery supplies. It offers several benefits such as round-the-clock availability, easy accessibility, and a wide range of stationery items to choose from. The machine eliminates the need for physical stores and allows customers toquickly and easily purchasetheirrequired stationery items whenever and wherever they need them.Additionally, the stationery vending machine promotes self-service, reducing the need for human intervention and streamlining the purchasing process. It can be strategically placed in various locations such as schools, offices, libraries, airports, and shopping malls, catering to a diverse range of customers. This ensures that individuals can conveniently purchase stationery items at their convenience without any time constraints.

VII. REFERENCES

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