



Design And Development Of Medicine Vending Machine

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Abstract: Vending machines automatically distribute commodities such as food, beverages, fragrances, luxury products, and even gold and diamonds to customers once they put money or credit. As the name indicates, this is a vending machine that will dispense medication according to the customer's preferences. This medicine provides immediate symptom relief for minor health concerns. Medicine vending machines are automated devices that dispense drugs, offering 24-hour access to basic over-the-counter and prescription medications. These devices aim to increase healthcare accessibility, particularly in places with limited or cumbersome pharmacy access, and offer a convenient means to receive necessary prescriptions.

Index Terms – Medicine, vending.

I INTRODUCTION:

Degrees of socioeconomic class are closely related to health inequities. Poor health is linked to poverty, while good health leads to health. The World Health Organization reports that lower socioeconomic groups have the worse health results within their respective countries. Health is heavily influenced by social factors such as education and access to information. Health-related poverty includes poor earnings, unemployment, social isolation, and environmental deterioration. Poverty in most nations leads to poor health and malnutrition. Our project may not be innovative, but it could still be beneficial.

Convenient locations, such as hospitals, airports, and public spaces, make them accessible to those who may not have access to traditional pharmacies.

Convenience: Medications can be obtained quickly and simply, without waiting in large lines or limited business hours.

Vending machines may be a more cost-effective option for drug distribution compared to traditional methods, according to studies.

Modern technology includes RFID tags, inventory management systems, and cashless payment choices. Potential benefits for certain demographics include people living in rural locations, those with mobility challenges, and those who require medication at irregular hours.

In India, many individuals die due to inadequate care or delayed access to drugs. Problems arise when medications are urgently needed and medicine stores are closed or out of stock, especially at night. In remote, rural, and low-health-turnover areas, the availability of medical items outside the patient's scope is a major concern. These are some of the most pressing issues facing civilization today. ATMs can alleviate these issues by providing 24-hour access to medications.

II. LITERATURE REVIEW

Rapid advancements in technology, including microelectronics, nanotechnology, mobile phones, and foldable phones, have led to significant innovation and change. New systems have simplified daily tasks, industrial processes, and medical procedures. What should be done if a person's health worsens during a long journey by rail or highway? There are no hospitals or medical facilities available in such areas. This is where advanced systems come into play. There are various drugs available in the market that can help in such situations, but if they are not available when needed, it might lead to death. This allows the individual to receive first assistance on time. Medicinal medicines sold from vending machines must meet the requirements set by the Indian Medical Council.

Vending machines automatically distribute snacks, beverages, alcohol, cigarettes, lottery tickets, perfumes, consumer products, and even gold and diamonds to clients who insert currency or credit into the machine. Automated vending machines, such as those for cool drinks, ice cream, chocolate, and water/tea/coffee, are becoming more common in shops. These machines save time and effort by recognizing, searching, counting, and delivering products, as well as handling cash.

The inventory management system tracks expiry dates for each batch of medicine and provides alerts to refill storage when pills run out. It includes a payment system for drug dispensing. A central CPU monitors all systems, receiving user input via scanner and controlling all components to dispense medication as needed. The system functions as an automated pharmacy on a commercial scale, allowing for unlimited user access at any time.

III. PROBLEM DEFINITION:

The major problem definition for medicine vending machines focuses on improving access to important pharmaceuticals, especially in locations with limited pharmacy access or during crises. These machines are intended to provide 24-hour supply of basic medicines for common ailments, overcoming gaps in healthcare infrastructure and assuring quick relief. A crucial concern is the requirement for a user-friendly, secure system that administers the appropriate medication based on user input or prescription. This study focuses on dispensing pharmaceuticals to meet consumer demands. The Microcontroller will process and make suitable decisions based on the user's keypad feedback. The Microcontroller uses motor drivers to operate the medicine cabinet and get the desired medication for the user. The motor drivers regulate the rotation of the medicine cabinet, dispensing medications. The motor turns the attached disk, which features a hollow.

Objectives of the proposed work

- To address the shortage of drugs in rural areas.
- Create a small gadget that can deliver various medications based on patient needs.

IV.COMPONENTS USED

LCD Display

Liquid Crystal Displays are electronic display modules that have a wide range of uses. A 16x2 LCD display is a simple module widely utilized in numerous devices and circuits. These modules are recommended over seven-segment and other multi-segmented LEDs. LCDs are cost-effective, programmable, and capable of displaying customized characters and animations. A 16x2 LCD displays 16 characters per line, with two lines.

ARDUINO

Arduino is a user-friendly open source prototype platform that allows for direct module interfaces and a comprehensible program language. The Arduino serves as the system's principal controller, reducing the need for additional interface components due to its built-in functionality. The RFID card reader, keypad, TFT display, GSM, and servo motor are the essential modules that will interface with the controller.

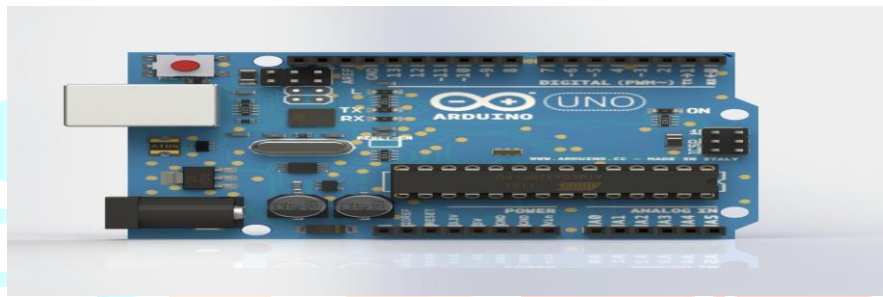


Fig: 1 Arduino

Arduino Uno R3 Specifications

The Arduino Uno R3 board includes the following specifications.

- It is an ATmega328P based Microcontroller
- The Operating Voltage of the Arduino is 5V
- The recommended input voltage ranges from 7V to 12V
- The i/p voltage (limit) is 6V to 20V
- Digital input and output pins-14
- Digital input & output pins (PWM)-6
- Analog i/p pins are 6
- DC Current for each I/O Pin is 20 mA
- DC Current used for 3.3V Pin is 50 mA

Stepper Motor

A stepper motor, or step motor, is a brushless DC electric motor that divides a whole rotation into equal steps. The motor's position can be controlled without a position sensor, provided the motor is properly scaled for the application's torque and speed requirements.

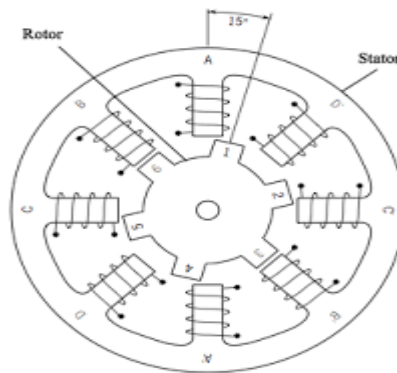


Fig :2 Stepper motor

V. Methodology of Work:

1. User Identification and Authentication

RFID or Keypad:

The user may be required to swipe an RFID card or enter a PIN on a keypad to authenticate their identity.

Data Retrieval:

1. The system reads the user's profile, which may include health status, medication preferences, and any relevant information for dispensing the correct medication.

2. Medication Selection:

UI Display:

The machine displays a list of available medications, either through a touchscreen or a keypad interface.

User Input:

The user selects the desired medication and specifies the required quantity.

- **Payment Methods:** The machine may accept cash, credit cards, or other digital payment methods.
- **Transaction Processing:** The system processes the payment and updates the user's balance or card.

Storage and Retrieval:

The machine utilizes a pill-dispensing mechanism, often a carousel with slots that rotate to select and drop individual pills.

VI. WORKING OF THE PROJECT

The panel and display are used to provide instructions to the user. To activate the buttons, users first insert a coin. The screen has four push buttons for different medicines. When pressed, the tablet's name is displayed on the LCD panel.



Fig :3 Medicine Vending prototype

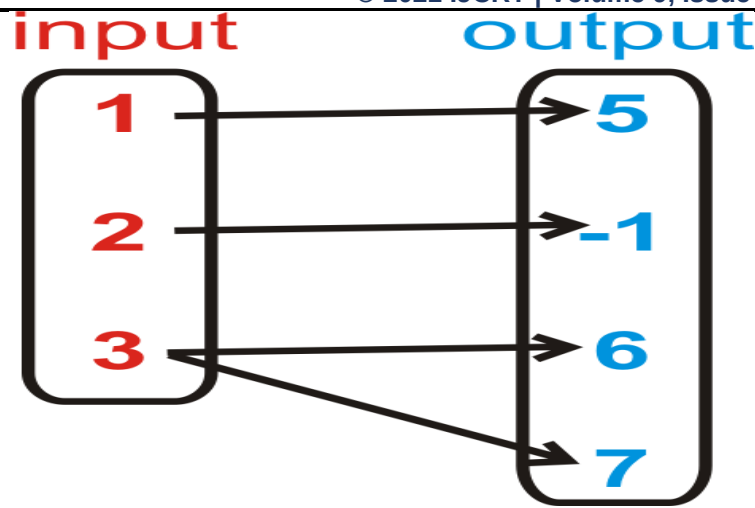


Fig :4 Vending coding

IV. RESULT AND DISCUSSION

To begin, import the Servo and Liquid Crystal libraries and define the LCD pins, servo motors, stepper motors, coin detector, four buttons, and two micro switches.

In the setup section, we specify the pin modes for each of the aforementioned pins. We activated internal pull-up resistors for buttons and micro switches. The logic level at these pins is always HIGH, but when pressed, it switches to Low. Before entering the main loop, we set the carrier to its beginning position, as indicated by the two micro switches. Using the while loop, we advance the carrier to its beginning position. When the two micro switches are pressed, the motors halt and return to the intended position.

V. CONCLUSION

Medical vending machines are a possible alternative for improving healthcare access, particularly in impoverished areas, by giving 24-hour access to medication while potentially lowering prices. They can simplify medicine delivery, enhance adherence, and provide a simple option for people who need immediate treatment from mild conditions. Concerns exist about potential usage, prescription errors, and the need for thorough recommendations to guarantee safe and effective use.

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