International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 03 | March - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Automatic Drug Dispensing Machine for Aayush Medicines

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Abstract-*A vital component of society is healthcare, which is being improved by governments employing cutting-edge methods. With the use of an automated drug dispenser machine for Aayush Medicine (ADMAM), patients can fill urgent care and emergency prescriptions after clinic hours, increasing efficiency and cutting down on the amount of time pharmacists must spend working. The card reader, paper outlet, drug outlet, and touch screen are among the mechanical components of the ADMAM, which blends electrical, mechanical, and user interface components with a frame layout. The microprocessor, which connects all electrical parts, harmonically controls the dispensing procedure. With a barcode scanner for drug selection and an RFID card for prescriptions, the ADMAM design prioritizes safety. The ADMAM is simple to use; they only need a card and password to take their prescription. The ADMAM's continued existence is essential for bolstering.*

Keywords: *card reader, drug, Automatic Drug Dispenser Machine for Aayush Medicine.*

1. INTRODUCTION

One of the main concerns of society everywhere is healthcare. Governments work hard to advance this field by utilizing cutting-edge techniques and tools. After a diagnosis and prescription, getting pharmaceuticals and medications is one of the most crucial parts of healthcare. This explains the existence, growth, and evolution of pharmacies across the globe. Still, many people struggle to get their medications and prescriptions filled, particularly for people who reside in remote areas with few pharmacy options. Moreover, a lot of folks have trouble finding pharmacies that are open on Fridays or late at night!

The Automated Drugs Dispenser Machine for Aayush Medicines (ADMAM), which enables patients to fill their emergency and urgent care prescriptions wherever and outside clinic hours, was necessary as a result. This device is comparable to bank ATMs, however instead of dispensing cash, it delivers medications. Additionally, this device will improve productivity in pharmaceutical operations. It might also shorten the hours that pharmacists work.

While certain machines share the ADMAM concept, it was intended to be distinct from other machines in several ways. For instance, it operates by a brand-new, unique mechanism. Additionally, the ADMAM works with medications of different sizes, forms, and sorts. However, compared to other similar machines, the ADMAM's construction costs are significantly lower. To accomplish the machine's primary goals, the ADMAM's design combines mechanical, electrical, and user interface components with a frame layout. The machine's exterior frame houses the card reader's inlet, the machine's paper outlet, the drug outlet, and the user interface (touch screen). The movable frame in the X-Y plane and a few mechanisms to remove the necessary medications make up the majority of the mechanical components. The microprocessor, which is regarded as the machine's heart since it regulates every component to carry out the dispensing process harmonically, is connected to all of the electrical components, including the motors, card reader, barcode scanner, and other devices.

Successful belting of the ADMAM machine has been achieved, and a strong correlation has been observed between its specifications and the established goals. The attainment of a high degree of safety has been the primary focus of the ADMAM design. Therefore, a prescription is needed for the recommended medications.

Healthcare is a crucial aspect of society, and governments are working to improve it using advanced techniques. The Automated Drugs Dispenser Machine for Aayush Medicine (ADMAM) is a device that enables patients to fill emergency and urgent care prescriptions outside clinic hours, improving productivity and reducing pharmacists' work hours. The ADMAM combines mechanical, electrical, and user interface components with a frame layout, with the mechanical components containing the card reader, paper outlet, drug outlet, and touch screen. The microprocessor regulates the dispensing process harmonically, connecting all electrical components. The ADMAM design focuses on safety, using an RFID card for prescriptions and a barcode scanner for medication selection. The ADMAM is user-friendly, requiring only a card and password to take their medication. The ADMAM's existence is crucial for strengthening the healthcare system, especially in the Indian community, to provide easy access to prescription drugs.

2. LITERATURE REVIEW

Automatic medicine dispenser is designed specifically to reduce manpower and shopping time in pharmacy. Normally when we go to pharmacies, we have to wait for a long time to get our medicines [1]. When people get older, as their memory may start to decline, they often forget to take their medicine on time. So, some people may need a medication reminder machine [4]. It is necessary to provide medication to the aged in time. Automatic medication dispenser is designed specifically for users who take medications without close professional supervision. It relieves the user of the error-prone tasks of administering wrong medicine at wrong time. The major components of this medication dispenser are a microcontroller interfaced with an alphanumeric keypad, an LED display, a Motor Controller, an Alarm system, a multiple pill container and dispenser [3]. Automated pharmacy is mainly made up of automated medicine supplying system, dense depositing system, automated medicine dispensing system, automated medicine sorting system, database system, prescription information

processing system and interface with the hospital HIS system etc [2]. Studies show that up to 2 million hospitalized patients are injured each year in the United States because of medication errors and that these patients stay an average of two days longer in the hospital at an additional cost of $4865 per patient [6]. Patient care areas were categorized as general medical areas intensive care areas, and ASDCs in two patient areas were randomly selected from each of these categories. In addition, days of the week and work shifts were randomly selected for each of the four study areas until an appropriate number of observations were made [7] Radio Frequency Identification (RFID) technology was first introduced at World War II and used to distinguish where the enemy aircrafts are. Typically, RFID system has three basic components: tags, readers and the application system [5].

3. DESIGN METHODOLOGY

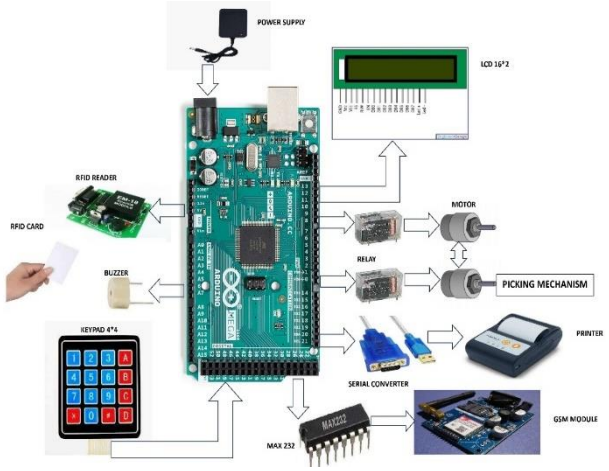


Fig1.Block Diagram

The block diagram shown above illustrates several blocks, including the ATmega16 controller, which, with the aid of motor drivers, operates the relevant medicine cabinet containing the medication the user requires. These motor drivers regulate the motor's rotation, which is responsible for dispensing medications from the medicine cabinet. The GSM module will facilitate communication between the user and the controller. The availability and the price of the drug are displayed on the LCD screen. The RFID Reader makes Payment easy for the user. The Buzzer will indicate the dispensing of drugs.

4. HARDWARE COMPONENTS AND SPECIFICATIONS

1. AtMega 2560

Fig2. **AtMega 2560**

Arduino Mega Specifications: -

- The ATmega2560 is a Microcontroller
- The operating voltage of this microcontroller is 5volts
- The recommended Input Voltage will range from 7volts to 12volts
- The input voltage will range from 6volts to 20volts
- The digital input/output pins are 54 where 15 of these pins will supply PWM o/p.
- Analog Input Pins are 16
- DC Current for each input/output pin is 40 mA
- DC Current used for 3.3V Pin is 50 mA
- Flash Memory like 256 KB where 8 KB of flash memory is used with the help of a bootloader
- The static random-access memory (SRAM) is 8 KB
- The electrically erasable programmable read-only memory (EEPROM) is 4 KB
- The clock (CLK) speed is 16 MHz
- The USB host chip used in this is MAX3421E
- The length of this board is 101.52 mm
- The width of this board is 53.3 mm
- The weight of this board is 36 g

2. SIM800A Quad Band GSM/GPRS Serial Modem

Fig3. **SIM800A Quad Band GSM/GPRS Serial Modem**

GSM Specifications: -

- Frequency: 900/1800 MHz
- GPRS: Multi-slot class 12/10, class B mobile station
- GSM: 2/2+ standards, class 4 (2W @900MHz)
- Control: AT commands (GSM 07.07, 07.05, and SIM COM enhanced AT command set)
- Power: 9–12 V, low power consumption
- GPRS coding schemes: CS-1, CS-2, CS-3, and CS-4
- Bands: Quad-band 850/900/1800/1900 MHz
- Outputs: TTL Rx and TTL Tx, DB9 connector-based RS232

3. DC GEAR MOTOR

Fig4. **DC GEAR MOTOR**

Voltage: 12V DC
Rated Speed: 300 RPM (rotations per minute)
Rated Torque: 2.2 kg-cm
No-load Current: 0.1A
Rated Current: 0.8A
Shaft Diameter: 6mm
Gear Ratio: 1:48
Motor Type: Brushed DC motor with gearbox
Operating Temperature: -10°C to 50°C
Dimensions: 52mm x 23mm x 34mm
Weight: 83g

4. 4x4 keypad

Fig5. **4x4 keypad**

Key type: Membrane

Operating voltage: 3V–5V DC

Interface: 8 digital pins

Maximum rating: 24 VDC, 30 mA

Operating temperature: 32–122°F (0–50°C)

Dimensions: 2.7 x 3.0 in (6.9 x 7.6 cm)

Cable: 0.78 x 3.5 in (2.0 x 8.8 cm)

5. LCD Display 16*2

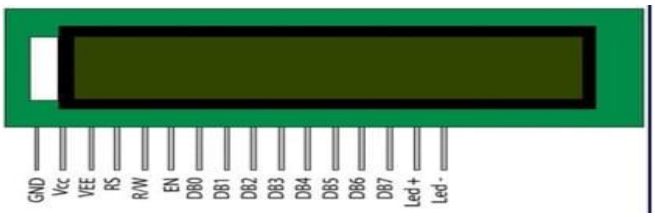


Fig6. **LCD Display 16*2**

We are using an LCD to display the Drug Availability and their price. 16*2 LCD is named because it has 16 columns and 2 rows. It mainly operates on 4.7-5.3 volts. It uses liquid crystal to produce a visible image. It consists of 2 registers namely, command and data register. We use 4 data pins (D4-D7) it is connected to the controller pin (PB4-PB7). These displays are preferred for multi-segment light-emitting diodes and seven segments.

6. Batteries

Fig7. **Batteries**

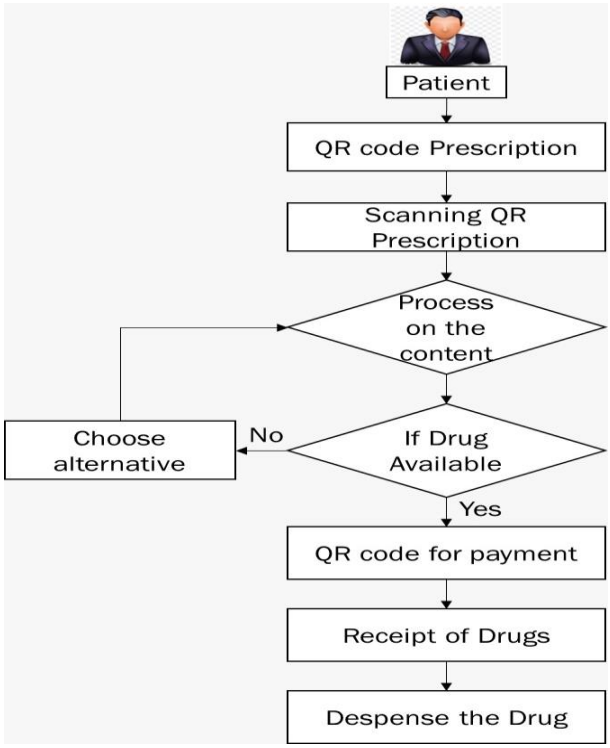
specifications and information about 12-volt batteries:
Voltage: A 12-volt lead-acid battery has a nominal voltage of 12 volts, but the actual voltage can range from about 10.5 volts to 14.5 volts, depending on the state of charge and other factors.
Capacity: The capacity of a lead-acid battery is measured in ampere-hours (Ah) and represents the amount of energy the battery can deliver over some time. The capacity of a 12-volt lead-acid battery can range from a few ampere-hours for small batteries used in motorcycles or lawn tractors to several hundred ampere-hours for large batteries used in backup power systems or RVs.
Chemistry: Lead-acid batteries use a combination of lead and sulfuric acid to store and deliver electrical energy. They are relatively inexpensive and have been used for over a century in various applications.
Charging: Lead-acid batteries must be charged with a compatible charger that is designed to provide the correct voltage and current. Overcharging or undercharging can damage the battery and reduce its lifespan.
Lifespan: The lifespan of a lead-acid battery depends on several factors, including the quality of the battery, the amount and frequency of use, the temperature and humidity of the environment, and the maintenance and charging practices. A well-maintained lead-acid battery can last for several years, while a poorly maintained battery may fail after only a few months.

7. Relay

Fig8. Four-Channel Relay
Channels: 4 independent channels
Relay Type: Electromagnetic

Load Voltage: 250VAC, 30VDC
Load Current: 10A per channel (max)
Input Voltage: 5V DC
Input Current: 70mA (max)
Control Signal: TTL logic level
Connection: Screw terminals for easy connection
Dimensions: 75mm x 55mm x 18mm
Weight: 40g

5.FLOWCHART



6. RESULT

Every drug in the system has complete inventory control. Access to the system is restricted to authorized users. Ascertains that the appropriate drug is administered to the appropriate patient at the appropriate time and amount. has an interface with the hospital information system and is powered by a patient-profile system. permits the pharmacist to check for drug allergies and interactions before to distributing medication. Removes the need to fill and inspect unit dose carts. Does not require replacing the majority of floor stock. Provides the pharmacist on the nursing unit with time for clinical intervention. To stop troublesome orders from being processed, for instance, the pharmacist can accompany doctors on rounds. Is simple to complete. Allows for the use of medications and supplies, bulk products, and transfer things. Able to inform the pharmacy about (a) patient transfers and (b) specific medications that your institution need moved. You can modify the above principles to suit the needs of your institution, but they will serve as a solid starting point. Lastly, align the features of the automated dispensing systems you want with your needs. Our efforts to automate the dispensing process have improved drug control, improved documentation and tracking, improved medicine accessibility for nurses and patients, and freed up more time for pharmacists and nurses to deliver direct patient care. Furthermore, automation has strengthened the bond between pharmacists and nurses, as we discovered.

7. APPLICATIONS

1. The idea is highly helpful to average people in their daily lives.
2. This is applicable everywhere, even in malls.
3. It applies to National Highways.
4. Stations of railroads can have it installed.
5. The majority of uses for this medication vending machine are in the medical industry.
6. In giving the necessary medical facility right at the patient's door.
7. It will help provide medical services in crowded places like marketplaces, airports, and train stations, among others.
8. As amenities may be put on ships, trains, and airplanes, provide them to travelers.
9. The military, the Air Force, and other defense agencies can use this technology.
10. It would make improved healthcare more affordable for rural India.

8. FUTURE SCOPES

Ayurvedic or herbal requirements, medical histories, and individual health profiles can all be taken into account when recommending a dosage if AI and machine learning algorithms are integrated into the dispensing system. Telemedicine platforms and wearable medical equipment can be connected to the dispensing machine to enable remote health monitoring. By using the device, patients might get virtual consultations with Ayurvedic doctors, wellness advice, and medication reminders. Adding a greater selection of herbal cures and vitamins to the machine's lineup of Ayush medicines. By doing so, traditional treatment solutions may become more accessible and meet a wider range of health needs and preferences. By integrating the machine with electronic health records (EHRs) or blockchain-based health platforms, medicine dispensation, adherence, and patient outcomes can be tracked securely and accurately over time. Placing these devices in rural or underprivileged regions helps provide access to Ayush medications in locations where traditional pharmacies are rare. To increase access, mobile units or kiosks could be placed in community health clinics or public locations. Aggregating anonymised data from dispensing devices could provide significant insights into Ayurvedic medication usage patterns, efficacy, and potential combinations with mainstream treatments. This information could help with future study and development in the sector.

9. CONCLUSION

This model will improve the lifestyle of people. People face difficulties in searching out the medicines at drug store and waste their valuable time in the long queue in the medical shops/drug store.

By making this advancement not only the consumers time will save but also the time required to make efforts to hunt for medicine from one drug store to another will also get reduced. The efforts required to search the medicine is also a hectic task for chemist so it will also reduce their efforts and make them more productive to do the task.

ACKNOWLEDGMENT

Our sincere appreciation goes out to everyone who helped us to successfully finish this project. First and foremost, we want to express our gratitude to Prof. Anil Kumar Pathak for his help and assistance, which has been invaluable to us in solving each issue that has arisen. Their feedback was crucial in helping to improve the system's accessibility and usability.

To conclude, we express our gratitude to our families, friends, and coworkers for their unwavering support and spiritual encouragement during the project. Without their help, we could not have finished this job. I appreciate your contributions, everyone.

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