JOY OF ENGINEERING

MEDIBOT: SMART MEDICINE REMINDER AND DISPENSER SYSTEM

Project Report

SUBMITTED IN PARTIAL FULFILLMENT REQUIREMENT FOR THE AWARD OF DEGREE OF

BACHELOR OF TECHNOLOGY

SUBMITTED BY

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UNDER THE SUPERVISION OF

Dr.Vishal Baloria

SCHOOL OF ENGINEERING AND TECHNOLOGY

BML MUNJAL UNIVERSITY™

A Hero GROUP INITIATIVE

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Candidate's Declaration

We, *< Akshit Wadhwa , Priyanshu Mishra , Deepak , Nitin Yadav >*, hereby declare that the project entitled *"MediBot*" in fulfilment of completion of the 2nd-semester course – Joy of Engineering as part of the Bachelor of Technology (B-Tech) program at the School of Engineering and Technology, BML Munjal University is an authentic record of our work carried out under the supervision of Dr.Vishal Baloria. Due acknowledgments have been made in the text of the project to all other materials used. This project was done in full compliance with the requirements and constraints of the prescribed curriculum.

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Place: BML Munjal University

Date: 16th May 2024

SUPERVISOR'S DECLARATION

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

Faculty Supervisor Name: Dr.Vishal Baloria

Signature:

ABSTRACT

A smart medicine dispenser that uses Arduino technology provides an innovative alternative for medication administration. Integrated sensors and actuators ensure perfect dosage control, and a programmable scheduling system sends personalized reminders. Arduino's versatility allows for easy connectivity with cell phones for remote monitoring and data reporting. The robot's initial component is the reminder system, which delivers medicine at predetermined intervals, sounds an alarm, and sends alerts. Project management approaches provide ideas and processes for planning and managing any project. The project is divided into five discrete phases: requirements collecting, design, implementation, verification, and maintenance, with each new stage beginning only when the preceding one is done. The second phase of the project consists of the Dosage Control Mechanism, which ensures correct medicine distribution. In addition to the physical prototype, we've want to connect it to the Arduino app that enables users to conveniently set reminders and receive notifications on their mobile devices, enhancing the user experience. Our documentation encompasses the entire design and development journey, including detailed accounts of the challenges faced, strategies employed to overcome them, and thorough test results and evaluations demonstrating the device's performance.

ACKNOWLEDGEMENT

The team at BMU was committed to helping young undergraduates develop their critical thinking and problem-solving abilities so they may always feel empowered. This course gave us the tools to think creatively, tackle challenges in the real world, and come up with a workable, affordable solution. We sincerely appreciate Dr.Vishal Baloria, our JOE Mentor, for continuously motivating us and pointing us in the correct path. Without him, this would not have been feasible. We appreciate your encouragement and strength-giving role during this journey. We would like to express our gratitude to Mr. Amit Gautam for giving up his important time and giving us the resources and materials we needed to finish this project. We team members Akshit Wadhwa, Priyanshu Mishra, Deepak, and Nitin, whose commitment and diligence made the “Medi Bot-The Automatic Medicine Dispenser” much better. The team's cooperation was essential to overcome obstacles and accomplishing our objectives. Finally, but just as importantly, we would like to thank everyone who contributed to this effort in any way.

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INTRODUCTION

The idea of Medi Bot was first brought to the table when we saw our grandparents struggling to take their medications on time. I first brought up the idea to my group members, and after realizing the magnitude of the experience, we talked about creating a medicine reminding and administering device. Medi Bot is a medicine reminder and dispenser system that takes into account the patient's desire and dispenses medication according to the user's input at the best time possible. This allows each patient's needs to be met with a high degree of specificity and guarantees the accuracy and consistency of the medicine administered. It's crucial to emphasize the medication disbursement's accuracy as a significant characteristic. The drug disbursement is the key benefit of the Medicine Dispenser System can be set to a high level of accuracy due to programming and internal machine control and the right dosage can be achieved. After receiving the command from the RTC module , these will transferred to Arduino Nano, and based on the data fed in it all the other IOT devices such as the buzzer, led lights and lcd will start to do their specific role. Arduino's flexibility enables seamless connectivity with smartphones for remote monitoring and data logging. The RTC module in connection with Arduino can timestamp each pill dispensing event, allowing for accurate tracking of medication adherence over time.

CHAPTER-2

LITERATURE REVIEW

We largely researched our topic by breaking the project into two parts: reminder and dispensing system. We designed the system to promote drug adherence, decrease medication errors, and improve overall patient outcomes by sending timely reminders. We examine the present state of research on medication reminder systems, concentrating on their design and effectiveness. Seeing the old designs, we concentrated on improving them with modern technological breakthroughs, such as smart sensors, Internet of Things (IoT) devices, and artificial intelligence (AI). These have facilitated the creation of more personalized and interactive reminder systems that can adjust to specific patient needs and preferences. The design provides customized medication schedules, alerts, and notifications. Internet of Things.

2.1 Table -1: Research Gap

Available in the market project	Our project
Has no linkage to Arduino app and cannot push commands thorough it	Allows the person to set personalized medication schedules and reminders.
Device available in the market does not contain slots for different medicines to be processed at the same time and are just storage units	The dispenser is equipped with multiple compartments to accommodate different medications, dosages.
Has risk of missing doses due to no marking and reminder system.	Reducing the risk of missed doses by timely reminders and promotes medication adherence and improving health outcomes among patients with chronic diseases.

CHAPTER-3

EXPERIMENTAL SETUP

3.1. Conceptual sketch

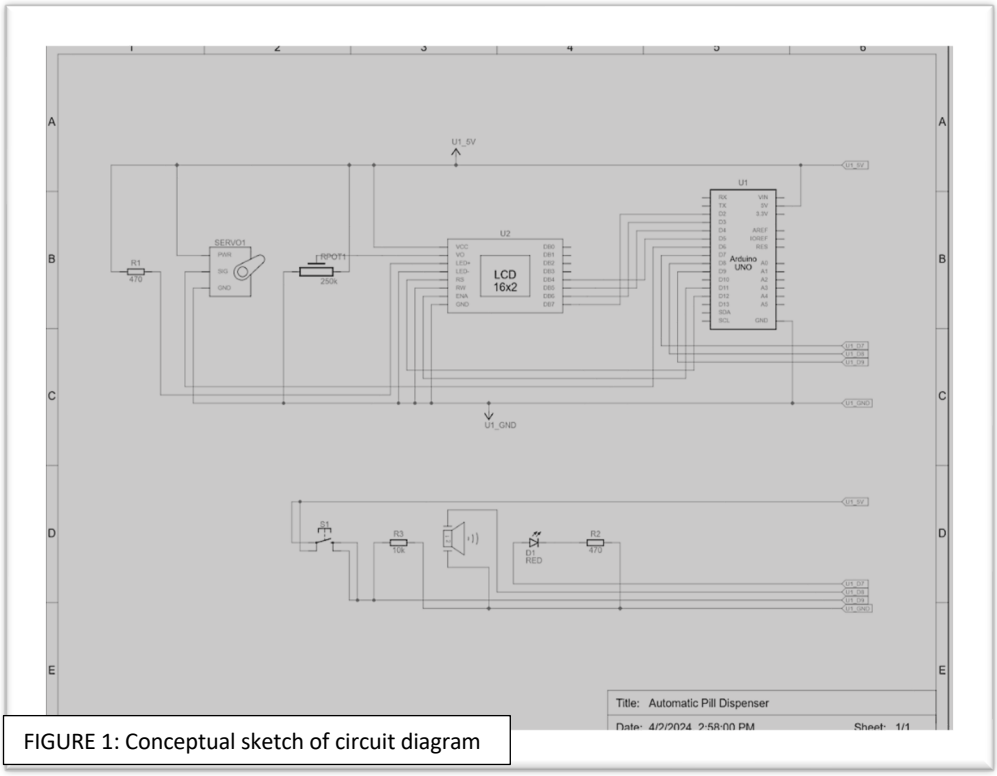


FIGURE 1: Conceptual sketch of circuit diagram

This diagram signifies the circuit diagram for our project which shows the wiring we have connected for our main project. The only difference is that we have joined the vcc and the Gnd on the breadboard for giving more places to the wires.The microcontroller arduino nano has A-1 to A-8 pins which can be used to connect led , lcd and the buzzer. Both the Arduino Nano and the RTC module need power. The Arduino Nano can be powered via USB, or an external power source connected to the VIN pin (7-12V). The RTC module typically operates at 5V, so you can connect its VCC pin to the 5V output of the Arduino Nano. For explaining the problem statement better, we have also attached a flow chart for the same. It displays how and when the robot will function. We have also connected the buzzer and the servo motor for the rotation of the dispensing system which is not present in the previous models of the device.

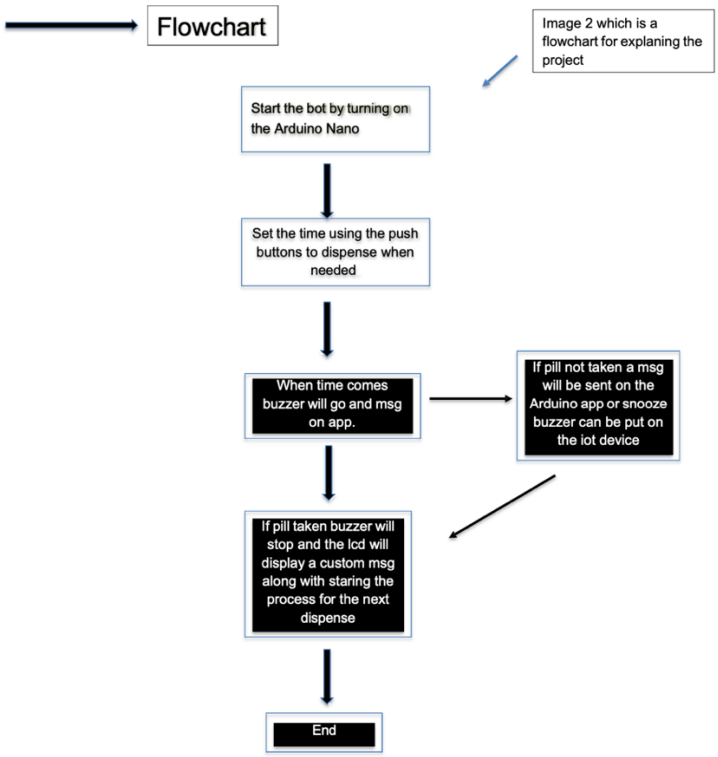
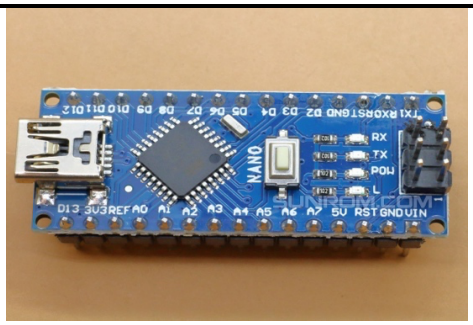
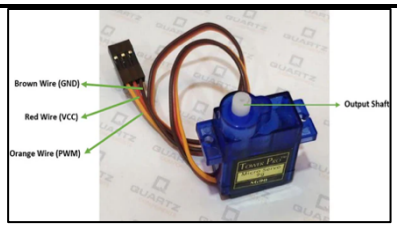


FIGURE 2: Flow chart of MediBot

3.2) Table-2 : Materials used

Name of the product	USE	Picture
Arduino Nano	It is the microcontroller which we have used. Arduino will be connected to the computer and programmed using Arduino IDE. It will help in carrying out the required functions	
RTC Module	It stands for Real Time Clock that is used for monitoring accurate date and time, even when an external power supply is absent.	
16 x 2 LCD display	It is used for displaying the time set by the user.	
Potentiometer	It is used as a voltage divider or variable resistor in a circuit and helps in controlling the brightness of LCD Display.	
Servo motor	It enables easy rotation at very less power consumption.	

CHAPTER-4

RESULTS AND OBSERVATIONS

1. Reminding the user to take medicine: -

It ensures accurate dispensing of medications by the reminding the user so that they will not forget to take medicine.

2. Customizable Scheduling System: -

It allows the person to set personalized medication schedules and reminders. Efforts will be made to make sure these systems are affordable and available to people all over the world, including those in areas with fewer resources.

3. Dispensing Mechanism: -

It releases medication based on scheduled times or user prompts. Manage Medication Automatically: They'll be able to refill prescriptions, adjust doses, and even help diagnose some conditions without needing a doctor.

CHAPTER-5

CONCLUSIONS AND FUTURE SCOPE

The Medicine Dispenser System based on an Arduino system is an appropriate solution to the problem of medication administration in healthcare facilities. By covering accuracy, automation, personalization, and cost, this particular type of technology addresses the major difficulties of the pharmaceutical delivery process, which helps enhance patient safety and treatment compliance. Since the user interface is highly intuitive, and monitoring systems are allowed from a distance, the system is also beneficial and convenient for a variety of healthcare settings. With the growing need for technologically advanced healthcare solutions, Arduino-based medicine dispensers become a flexible and economically justified alternative that helps meet individual patient's needs and improve the efficiency of the healthcare delivery process.

Future Scope:

Future improvements in Arduino-based pharmaceutical dispenser systems offer a wide range of possible applications, providing opportunities for growth and innovation in various critical sectors, including:

- Improved Connectivity: Real-time analytics, remote monitoring, and smooth data interchange will be made possible via integration with cloud-based services and Internet of Things (IoT) platforms. Better treatment outcomes and tailored treatments are made possible by this connection

- Interoperability and Integration: The smooth integration of Arduino-based dispenser systems with pharmacy management systems, electronic health record (EHR) systems, and other healthcare IT infrastructure will be made possible by the standardization of communication protocols and interoperability frameworks. This integration facilitates information sharing, optimizes clinical workflows, and strengthens care coordination.

- Remote Patient Monitoring: By expanding this bots capabilities Arduino-based dispenser systems make medication administration much easier in home healthcare and telemedicine scenarios.

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