Smart Pill Dispenser

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Abstract— This paper discusses a smart medicine dispenser prototype. The purpose of the system is to enable patients, especially the aged, to take their medication as needed without fear of forgetting their doses. Additionally, it exposes individuals to minimal risk related to overdosing or underdoing. Abusing medication could result in fatal consequences, such as severe illness or even death and a slower recovery pace. However, all these issues can be mitigated with the use of a smart medicine dispenser, which sends alerts to the patient reminding them to take the appropriate amount in the appropriate manner. Its immediate capability to alert a caregiver in the event of a dose being missed also allows for liberal contact between patients and caregivers.

Index Terms— smart pill dispenser, Arduino, notification, pill, dosage.

I. INTRODUCTION

From the recent survey carried out the rate of pills in take by the critical patients or are those patients who are under medical care have decreased as they are not able to intake the pills that are been prescribed by the doctor. This will minimize the patient health in a great scale. Hence our proposed Idea would help to increase the rate of pills in take by this kind of patients.

In today's world where modern medicine is relied upon heavily, there is always someone we know who requires long-term prescription medication to maintain a healthy lifestyle. Our focus in this project is to ensure that elderly individuals, those suffering from memory loss, or anyone having difficulty remembering their medication schedule, consistently take their pills at the correct time. This will be made possible through the use of a smart pill dispenser that is capable of following a set schedule from any location in the world.

Our proposed model aims to automatically distribute medication at the exact time to avoid any instances of missed medication. The medication dispenser is beneficial for individuals who need help with taking their meds. Our main target groups include visually impaired individuals, physically disabled patients, and people over the age of 50.

II. NEED FOR PILL DISPENSER

A. The following merits of the smart pill dispenser creates the need for this system in our society

- The system is automatic
- Avoids collision
- It sends notification message to caretakers if pill wasn't taken at specified time.
- The system is provided with keypad for making the modifications easier.
- The pills are dispensed at right time of interval.
- The system is provided with voiceover alert.
- The system is also provided with LCD display.

III. PROTOTYPE AND ITS WORKING

The working of the smart pill dispenser is below,

Whenever the supply is given to the Arduino and the apply is then pass through the servo motor and upon receiving the command from the Arduino these are motor rotates at the specified interval of time like morning afternoon, evening and night.

During the particular in travel of time the pills that are being placed in the pill container, dispenses at that specified time from the pill container and falls on the tray which is placed over the load sensor. If the dispensed pill hasn't been taken more than 1 minute then the GSM module since a notification alert message to the registered number.

The number can be registered to the GSM module using the provided keypad. A voiceover alert is made once the pills fall over the tray.

The Buzzer buzzes for 1 minute until the pills are taken away from the tray. The notification message to the register mobile number can also contain the following information like,

- if the dispenser is in fault condition or
- if the pill hasn't been dispensed from the bill container or
- pill hasn't been taken by the patient

These are the following possible conditions or possible messages that are sent to the registered mobile number, if the Buzzer makes noise for more than 1 minute of duration.
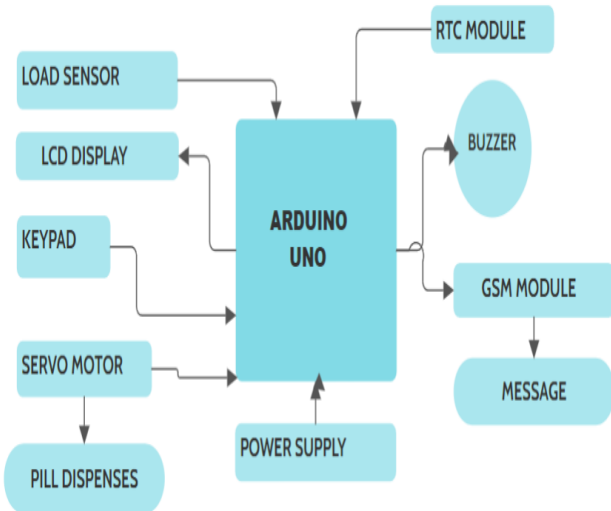
IV. HARDWARE REQUIREMENTS

Components Used
- Arduino UNO
- Stepper motor
- Motor Driver
- Buzzer
- LCD display
- SMPS
- LM2596
- Amplifier
- GSM Module

A. Arduino UNO

The Arduino UNO is a microcontroller board based on the ATmega328P. It features 6 analog inputs, a 16 MHz ceramic resonator, 14 digital input/output pins (6 of which can be used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button. With everything required to support the microcontroller onboard, getting started is as easy as plugging in a USB cable, an AC-to-DC adapter, or a battery. The ATmega328P is not soldered to the board, so it can be easily replaced. Moreover, it includes 1 kb of EEPROM, a type of memory that retains information even when the device is powered off. The barrel plug connector of the Arduino UNO is compatible with a standard 9V battery.

B. LCD Display

A popular type of thin, flat-screen display found in various electronic gadgets is the liquid crystal display (LCD). LCDs are commonly found in items like digital watches, calculators, TV screens, computer monitors, and other devices needing a compact, lightweight screen. LCDs represent a significant advancement in technology compared to their predecessors, gas-plasma and light-emitting diode (LED) displays. In comparing LCD technology with CRT technology, it is apparent that LCD screens are now much thinner. LCDs consume less power than gas-display and LED screens as they operate by blocking light rather than producing it.

C. Buzzer

An audio signaling device, such as a beeper or buzzer, can come in different types - electromechanical, piezoelectric, or mechanical. Its primary purpose is to convert audio signals into sound. Typically powered by DC voltage, these devices are commonly used in timers, alarms, printers, computers, and other devices. Depending on the design, they can produce various sounds like alarms, music, bells, and sirens.

When an electric current flows through the coil, it generates a magnetic field that either pulls or pushes the magnet, resulting in the movement of the diaphragm and the generation of sound waves. The operation of a buzzer is rooted in the idea of electromagnetic induction.

D. Stepper Motor
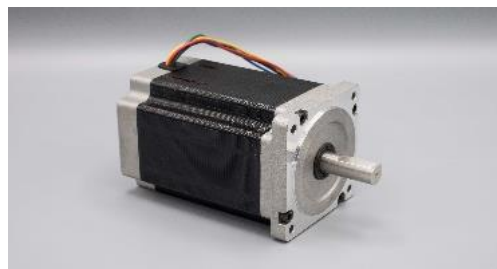
A stepper motor, also referred to as a step motor or stepping motor, is an electric motor that rotates in small

angular steps instead of continuously. Stepper motors function as digital actuators, converting electric energy into mechanical energy for various tasks. These motors are brushless and synchronous, converting digital pulses into shaft rotation.

E. Motor Driver

A motor driver, also known as a control motor, is an electronic device that controls and monitors the operation of an electric motor. A motor drive refers to a system that includes a motor. An adjustable speed motor drive is a system with a motor that can work at various speeds. A variable speed motor drive is a system with a motor that can operate at a continuously adjustable speed.

F. SMPS

An electronic power supply with a switching regulator integrated for efficient electrical power conversion is known as a switched-mode power supply (SMPS), also called a switching-mode power supply, switched power supply, or simply switcher. This type of power supply is used to obtain a regulated DC supply, similar to other power supplies. Like other power supplies, an SMPS changes the voltage and current characteristics when transferring power from a DC or AC source, typically mains power, to DC loads such as personal computers. It utilizes a high-frequency switched DC to DC switching converter.

G. GSM Module

A specialized piece of hardware known as a GSM (Global System for Mobile Communications) module makes use of GSM technology to facilitate communication via cellular networks. An apparatus that facilitates communication between electronic devices over the GSM network is called a GSM module. GSM is a standard for digital cellular communications, meaning it offers a channel for wireless communication between mobile devices.

H. LM2596

Monolithic integrated circuits (MICs) in the LM2596 series of regulators include all the active features of a step-down (buck) switching regulator, enabling it to drive a 3-A load with A particular kind of voltage regulator known as a step-down (buck) converter is the LM2596. The integrated circuit has all the features required to change an input voltage from a higher value to a lower value. Applications for power supplies and other electrical equipment often employ the LM2596.

Stated differently, the LM2596 is a particular kind of voltage regulator known as a step-down (buck) converter. The integrated circuit has all the features required to change an input voltage from a higher value to a lower value. Applications for power supplies and other electrical equipment often employ the LM2596.
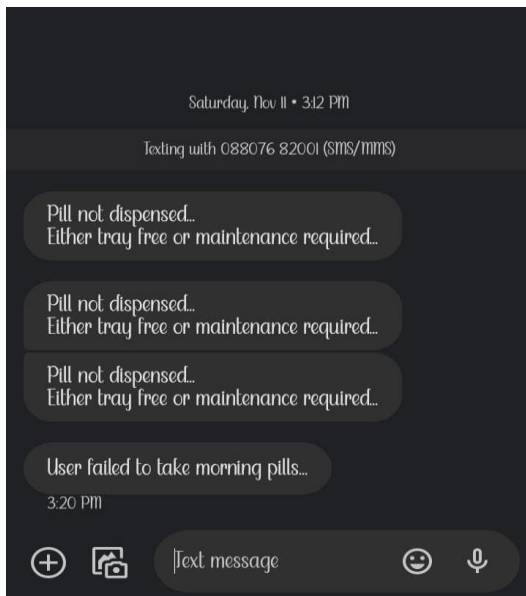
V. RESULTS AND FUTURE SCOPE

The system automatically dispenses the pills are the right interval of time. During the dispensing phase the LCD works and it displays "PILLS WERE TAKEN", once the pills are taken.

If the patient fails to take the pills ,the GSM module sends notification to the provided mobile number

The smart pill dispenser has a greater scope in the current as well as the future market. The bench products aren't automatic whereas ours is automatic. The system would create a great demand among the people who need someone to assist them for pills intake. Moreover our system reduces the issues faced by the blinds and the bedridden ones.

VI. CONCLUSION AND FUTURE SCOPE

Our system helps elderly patients who forget medicines or can't recognize them. It sends reminde-rs, alerting caregivers if medicines aren't taken after alarms. Prescriptions can be changed as needed. As technology advances, this could become an IoT product for tracking health anytime, anywhere. Hospitals could use it so nurses can monitor patients easily. The simple design is user-friendly for seniors. Medicine management is streamlined through digital convenie-nce. Straightforward functionality prioritizes accessibility for those with memory issues. Caregivers receive real-time updates ensuring proper treatment. Customizable pre-scriptions accommodate changing medical needs. Potential IoT integration opens opportunities for comprehensive health tracking solutions. Large scale hospital deployments support efficient patient care coordination. The intuitive interface empowers indepe-ndent living for the elderly population.

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