

# Telehealth Medication Management System Using Gsm

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**ABSTRACT-** The most part, patients tend to forget to take their medications at the appointed time. Patients occasionally remember to take their medications at the appointed time, but they sometimes forget which tablet to take at that specific moment. One solution to prevent these issues is to utilize a smart medicine box. There are five switches on the gadget that allow the user to set an alarm. The information is kept in the microcontroller's EEPROM. The system sounds the buzzer and shows a message on the LCD as soon as the time on the EEPROM matches the time on the RTC. The LED that indicates the box from which the medication must be taken likewise begins to blink simultaneously.

## INTRODUCTION

Monitoring and managing patients in critical care settings entails determining the patient's status and

responding to situations that could be hazardous to their health. Monitoring every patient during the day is not feasible. In order to support physicians and nursing personnel in patient monitoring, solutions are needed. These days, a lot of new diseases and their corresponding treatments are developing. Because of this, busy schedules frequently cause people to forget to take their medications on time. Consequently, ineffective treatment results. This paper's goal is to encourage readers to construct a gadget that makes use of a microcontroller and a GSM module. It mostly targets those who regularly utilize drugs or vitamin supplements. With the widespread usage of smartphones and the advancement of technology, using a smart phone as a medication reminder has never been simpler. The tablets in this medicine box are designated for each day thanks to programming. It is divided into three distinct sections. If the patient fails to take their medication

within a certain amount of time, the doctor receives the message as a reminder .

## LITERATURE REVIEW

The Smart Medicine Box is a contemporary gadget that has the ability to reduce irregularity or medication errors. A comparison of the several pill dispensers and medicine boxes that are currently on the market is done. We talk about how they have improved over time and changed. The pill reminder bottle was created by Joseph Lai and patented in 2004.

## METHODOLOGY

The following are the main hardware parts of the medicine box:

1. The Uno Arduino
2. GSM SIM900A
3. RTC DS1307
4. Piezo Buzzer
5. Display of Liquid Crystal
6. LED

## ARDUINO

Arduino is an open-source platform that consists of a software program and a physical programmable circuit board. Additionally, codes are uploaded and written to the IC (Integrated Circuit) via it. This device makes use of an Arduino Platform-based AVR AT Mega 328 microcontroller. It describes a hardware architecture that includes a software framework that allows the operation of other applications.

## IM900A GSM

The SIM900, a quad-band GSM/GPRS solution, is used in the customer application. This Arduino GSM and GPRS module is inexpensive and straightforward. The reason why GSM is in use is that it can communicate at 900MHz. The majority of mobile networks in India support the 900MHz frequency.

## DS1307 REAL TIME CLOCK

The DS1307 Real Time Clock is a type of clock module known as an RTC. A low power clock with battery backup is the DS1307 RTC. Even in the event that the power is turned off or the Arduino is reprogrammed, it aids in maintaining accurate timekeeping.

## PIEZO BUZZER

**Piezo Buzzer:** This device uses an oscillating electronic circuit to operate a piezoelectric element. Certain crystals produce sparks when squeezed. The mechanism also occurs in the opposite direction, sparking a quartz crystal that flexes. This is how piezo buzzers produce sound.

## (16X2) CHARACTER LCD DISPLAY

There are several uses for liquid crystal display (LCD) screens in the electronics industry. The 16x2 LCD's 16 indicates that it can show 16 characters on a line, and the 2 denotes

the presence of two such lines with 16 characters each.

**LED**

A light-emitting diode, or LED, is a type of semiconductor light source. It is typically employed as an indication in a variety of devices, and its use for general lighting purposes in daily life is growing constantly.

**SOFTWARE DESIGN**

Figure 3.1 shows how the medicine box operates overall. This image shows the general perspective of how software is using programming to complete the work in our project.

This device is programmed using the C programming language in Arduino software. The sequence of codes is used to initialize different parts, such as switches, buzzers, LCDs, RTCs, and GSMs. Following the initialization of each of the five flags for a specific switch, the flags are raised and assigned their designated functions. Each .This device is programmed using the. Following the initialization of each of the five flags for a specific switch, the flags are raised and assigned their designated functions. Finally, the GSM module, LCD, and buzzer operations are defined, together with the alarm time out and GSM-specific message

**HARDWARE ASSEMBLY**

The smart medical box's circuit diagram is depicted in the picture. To construct it, an Arduino Uno is used. microcontroller board with

ATmega328P architecture. It has both analog and digital outputs. The Arduino digital outputs 4, 5, 6, and 7 are connected to the LCD board. The GSM module is linked to the Arduino's digital outputs 2 and 3. The analogue outputs A0, A1, and A2 are coupled to 220 ohm resistors in series with three LEDs, D1, D2, and D3, respectively. The digital output pins 12, 11, 10, 1, and 0 are connected to switches S2, S3, S4, S5, and S6 in that order.

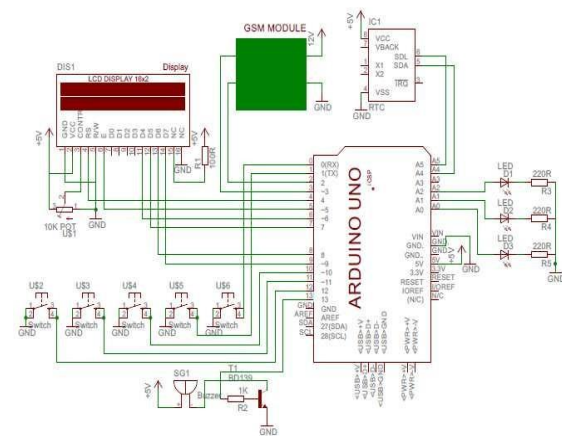


Fig 2. Circuit Diagram

**WORKING**

The phases of the device's operation are as follows:

- 1) The initial phase of implementation
- 2) Stage of comparison
- 3) The reminder phase

During the setup phase, the user inputs several times for the alarm system. Once the time has been entered, the OK button is hit. The device goes into comparison mode after

establishing several alarm timings. The gadget compares the entered time with real time during the comparison stage. The device goes into the reminder stage when the two times coincide..

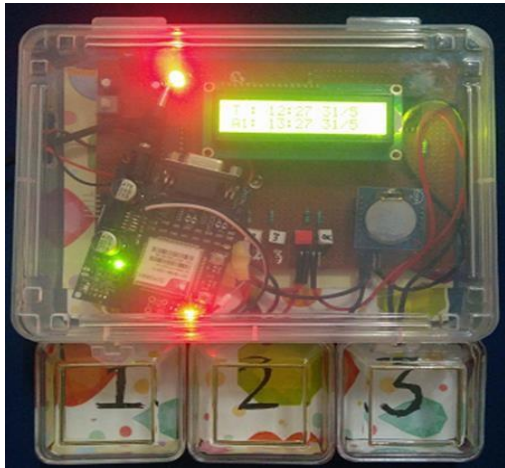


Fig 3. Final outlook of deviceThe provided case study explains the stages of the device's practical operation.

**A Case Study**

We will first set the alarm timings after turning on the device. This suggests that the gadget is now in the initialization phase. The device's various timings are displayed below

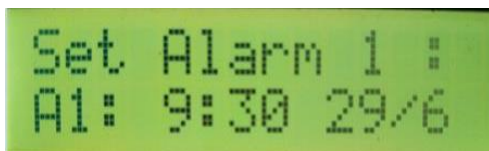


Fig 4. Setting alarm 1 time

The device enters the reminder stage as soon as the entered time and real time coincide. Following this, until the OK button is hit, the buzzer will continue to sound and the LED will

continue to blink. If not, a message will be sent to the specified mobile number.

None of these levels limit the use of the panic button. It is self-sufficient. The panic button is the fourth button. Regardless of the device's stage, the panic button will always transmit an alert message as soon as it is pressed. The snapshot of the messages is displayed in the provided figure. The device was turned on at 16:44, according to the second message, the panic button was touched at 02:15, and the last message states that the message was sent at 16:51 and that medication 2 had not yet been administered.

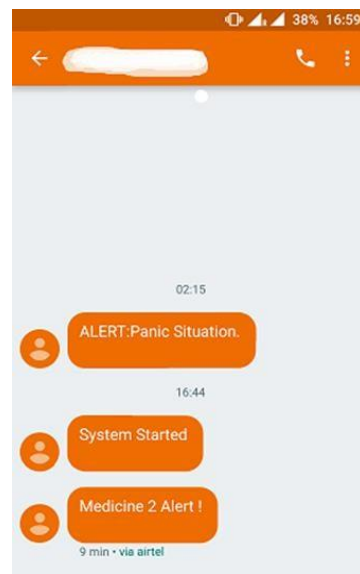


Fig 8. Screenshot of messages

**CONCLUSION**

The purpose of the device is to help individuals across various age groups take their medications on

schedule. The The GSM module, LED, LCD, RTC, and microcontroller are all included in the medication box. It may have three boxes in the early going. There are three distinct sub boxes that correspond to these three alarms. The medication box can notify the user by using a buzzer, an LCD, an LED that blinks, or a GSM module to transmit an alarm message. To date, a large number of pill dispensers and medication boxes have been created. They have almost all of the features that this "GSM based Medicine Box" offers. However, this medicine box stands out from other gadgets on the market because to its extra panic button feature. This option is offered to the user in the event that they require assistance and are unable to handle the problem. A few features could be added to this gadget in the future to better suit user needs. This can be achieved by adding features like making a user manual, selecting a larger LCD display, adding a loud buzzer, increasing the number of sub-boxes, and displaying the date and time. This concept can be altered to allow blind individuals to use the device for medical treatment by using sensors as well. We may add more capabilities to the system by modifying the Arduino programming so that it is compatible with mobile phone applications. The system may function more effectively if the reminder.

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