

DESIGN OF A SMART MEDICINE BOX USING ARDUINO

Submitted in partial fulfillment of the requirements for the award of Bachelor of
Technology degree in Biomedical Engineering

By
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**DEPARTMENT OF BIOMEDICAL ENGINEERING
SCHOOL OF BIO AND CHEMICAL**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this Interdisciplinary Project Report is the bonafide work of **Sheryl_Robinson (39240037)** who carried out the interdisciplinary project entitled **DESIGN OF A SMART MEDICINE BOX USING ARDUINO** under our supervision from Jan to April 2022

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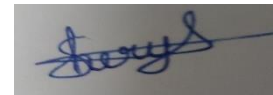
DECLARATION

I **Sheryl Robinson** hereby declare that the Interdisciplinary Project Report entitled **Design of a Smart Med Box Using Arduino** done by me under the guidance of **Dr. J. Bethanne Janney, Department of Biomedical Engineering** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering / Technology degree in Biomedical Engineering.

DATE: 28.04.22

PLACE: Chennai

SIGNATURE OF THE CANDIDATE



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ABSTRACT

In the current generation it is quite common to see people both young and old who are on medication due to some illness, for cosmetic purpose or who are required to take supplements due to some defects. But it's quite common for one to forget to take medication due to their hectic schedule and this is especially true in the case of the elderly who tend to forget things due to old age. So for this a smart medicine box can be used. The smart medicine box proposed will have a knob through which either the patient or the guardian can set the time and then at the corresponding time an alarm would sound by means of a buzzer, the drawers will also open with the push of a button and an SMS will be sent which is convenient in situation where the guardian happens to be in an area where there internet fails to work or they happen to switch it off during their work. By pressing the button the box opens sideways so patients can take their medication and after a minute it goes back in. This box is small, compact, and cheap and is suited for outdoor purposes as in the case of an app wifi would be needed to update the time whereas here it is not the case.

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LIST OF ABBREVIATIONS

S.NO	ABBREVIATION	FULL FORM
1	CPU	Central processing unit
2	DC	Direct Current
3	EEPROM	Electrically Erasable Programmable Read-Only Memory
4	GSM	Global System for Mobile communication
5	IDE	Integrated Development Environment
6	IOT	Internet of Things
7	IR	Infrared Red
8	LCD	Liquid Crystal Display
9	LDR	Light Dependent Resistor
10	LED	Light emitting diode
11	MCU	Microcontroller
12	MQTT	Message Queuing Telemetry Transport
13	PIR	Passive Infrared
14	RAM	Random Access Memory
15	RFID	Radio Frequency Identification
16	RTC	Real Time Clock
17	SMS	Short Message Service
18	UART	Universal Asynchronous Reception and Transmission

1. INTRODUCTION:

Nowadays as technology advances in the healthcare field, more number of diseases are being diagnosed and treated. The treatment ranges from surgery, medication and these medication are prescribed even after surgery to maintain body's immune response etc. People take a medication for a wide variety of reason, it may be due to some vitamin deficiency, chronic illness, old age, genetic disorder etc. The old as well as the young are getting affected by diseases. After consulting health professional they obtain the medication to relieve their symptoms that might be causing them nausea, pain, headache and many more. Depending on the degree of the infection the patient would be advised to take the medication many times a day and for a prolonged period of time. But either due to the day to day life or due to some other factor the patient sometimes fail to take their medication which in turn worsens their situation and affects their quality of living .For instance in the case of young child they wouldn't remember to take their medication as they tend to get distracted easily as such it's up to the child's parents to give the medication and in some cases even they do tend to forget due to their work, stress etc. The smart med box can thus be used by the parents to set the time and alarm so as to remind their child to take their medication on time even when they aren't around. The same can be said even for the adults, teenagers who have to study, work to earn a living, this device can help them as it serves as a reminder to take their medication. It is possible for them to set an alarm using their phone to take their medication but there is still a chance to ignore that reminder as they just simply have to slide it off it does serve its purpose to remind the person but there is no guarantee they would do it at that time maybe they would take it at a later time as they are busy at the moment and as a result they tend to forget to take. As this medicine box is portable they can carry it around with them and as the alarm buzzes they have to switch it off with the button placed on the device and since the medication is also present they would just take it then and there as there work would be done and in the case they don't a message will be sent to the guardian in such cases. This box is especially useful for the elderly who tend to forget things as they age. The problem is either due to their old age or due to diseases like Alzheimer which mostly tends to appear in people aged 50 above. Not only Alzheimers the elderly might be suffering from other

diseases an example would be Parkinson disease. Failure to take even a single dosage might cause unbearable pain and discomfort to the elderly. And most of the time the elderly might be living on their own, with their children, or with a caretakers. This medicine box can relieve the burden of the elderly, their family and caretakers as it serves to be reminder for the patient to take their medication

1.1 TRENDS IN MEDICINE BOX:

A medicine box is generally designed to aid patients taking a surplus amount of medication for a prolonged period of time and aids them in taking the medication at the specified time without fail and certain devices have a function of lighting the compartment that the patient has to take the medication from at the time specified, this function prevents them in choosing the wrong compartment. In addition now IOT (Internet of Things) has been incorporated to the medicine box to make it an even more of an assist to the patients/caretakers. With the use of IOT medicine box now have the function of monitoring whether the medication has been taken or not by the patient and in response to that a message is sent to app that has been installed on the phones. They can set the time by means of the app and receive alerts regarding pills consumption. Now there are researches going on about using weight sensor technology [Roy Abi Zeid Daou et al] and by means of this the medicine box sends a message to the caretakers phone to inform them when the pills are about to run out. Now even papers are there where they have incorporated a lock system for security purpose as this prevents the children from playing around with these medications [Harshitha V et al].

1.2 PROPOSED METHOD:

The smart medicine box here has a buzzer that acts as an alarm and will buzz for a minute at the time that has been inputted by the user. The time will be set by means of rotating the knob and on subsequent clicking of the knob will move on to the next option. LEDs are present to give visual indication of which compartment the medication is present so it's easy for the patient to know. A button will be used for controlling the drawers and based on the input of the button, messages will be sent to the guardian regarding if the medication has been taken or not for instance if the medication hasn't been taken within a minute of the specified time, a message will

indicate the failure of taking the medication as the drawers with medication haven't been opened .

2 LITERATURE REVIEW.

Savithaa. N et al (2021) had designed a smart medicine box which had an android application which is installed on the patient's smart phone. Through this application patients could view their prescriptions and get notifications regarding medicine intake. Medicine box is provided with different compartments. An LED on top of each section signify the right box. At any moment patient opens a mistaken section, a warning will occur with the help of Arduino. A WI-FI shield is attached to the Arduino board and this microcontroller picks up the data and sends it through WI-FI module. These compartments are opened or closed by servo motor by means of electrical signal arrived from Arduino microcontroller. The device is programmed with Arduino which is plugged with alarm and LED display. Smart medicine box attached with vital parameter measuring sensors is implemented with IoT technology. Doesn't recover special training for handling. It is a user-friendly device even elder patients can operate easily. The instructions are displayed in LCD display

Divya Sai. K et al (2021) had designed a medicine box where the schedule data/configuration data is sent to the pill box through IoT. The smart pill box contains Arduino MCU, LED display, LEDs, buzzer, buttons, Pulse Sensor and Temperature Sensor. The LED are used to display the commands in pill box by MCU. The Wi-Fi module is configured with IoT. The configuration data is send to the smart pillbox when the configuration is in ON mode. The concerned LED glow with buzzer at schedule time. It is cost efficient and user friendly as user can set time table of medicine by himself. Highly reliable and the product can be used for long time. It is easy to use and manufacture It also provides accurate result

Anandhapadmanaban .S et al (2020) used Peltier module which is imported into one of the compartments made for cold storage and other compartments left without Peltier for room temperature storage. According to medical adherence, box is splitted to store drugs to be taken thrice times in a day. The patient's vital signs namely body temperature and heart beat rate are sensed and sent via sensor probe. An additional switch is built to alert the preset guardian through GSM module when it is triggered by strangers or guardians at emergency situation. Cloud storage

assists doctors to analyze the patient's health graph and gain knowledge about the recovery or degradation of their patient's health. By these knowledge doctors easily prepare their treatment plan earlier for his/her patient

Nur Zulaikhah Nadzri et al (2020) designed the device in such a way that the user will set the time according to the medicine scheduled by the doctor by using the Blynk apps. Then, if the time is correct it will notify by 2 notification, LED and buzzer is on. Magnetic switch is used to detect the action of opening and closing the iBox cover. LDR to detect the action of taking the medicine If the user takes the medicine, the data will be stored in the cloud and this is triggered by the reed switch

Harshitha V et al (2020) created an IoT device is designed to remind patients about their medication time. By using the GSM, the caretakers can be notified through smart phones. Sensors like IR sensor, camera, and RFID tags are used to count the number of pills inside a tray and whether medicines has been taken properly These are interfaced with Arduino UNO micro-controller. The RFID stickers fastened on each tablet sheet will be scanned by using the RFID, camera and IR sensor. The sensors will be giving the count of pills inside the box periodically for every 5 to 6 hours. The timings for the intake of medicines by the patient will be set using RTC. By using RFID tags the pills which are taken can be identified, whether the patient has taken correct medicine or not at a prescribed time. The data will be updated into the web browser using the Wi-Fi module. After completely taking the medicines over days/months the device will be fixing an appointment with the doctor automatically by sending a message using the GSM module and also convey the same to the medical shops to deliver the required medicines to patients address or to the hospitals. Focuses on alerting the users, care-takers about the medicine intake time of the patients. When the pill box becomes empty it sends a purchasing notification to the medical shop about the medicines that has to be purchased. The device also fixes an appointment with the doctor when the usage of medicines is completed.

Viral Doshi et al (2019) made a device which consisted of a small box divided into 21 sections for storing pills for a week of up to 3 patients. The box was connected to an RTC module, an Arduino AT mega 2560. The RFID tag will be given to each patient. When it is brought close to the reader, the medication will be dispensed. RTC is used to compare the time the dosage is to be given with the current time. It will check whether the RFID tag is read by RFID reader. If the condition is true. The

box will open about 60 sec and then the section will be closed, also it will store data as DOSAGE TAKEN. It will then go back to monitor the current time. If the condition is false and 30 sec after the notification was sent are completed the LED and BUZZER will be turned off. It shall then check for the current time is equal to set time + 5 minutes, if the condition is true, the patient will receive the second reminder. The LED and BUZZER will be turned on again for 30 sec. If the RFID tag is not detected the data would be stored as dosage missed. WIFI-module is used in sending the results which will be stored in the database.

Akshaya. C et al (2019) made a medicine kit that has individual compartments that can be filled with medicines and designed in a way to fill medicines when the compartments are empty. When it is time for medication the medicine box drops the pills and sounds an alarm with notification until we take the pills .The setup is interfaced with servo motor and a GSM module to provide notification. A speaker module is connected to the ATMEGA 328. Then the LED on the pillbox glows and an alarm is also generated indicating which pill should be taken. The microcontroller is interfaced with two output modules. The LCD module for display operations and Buzzer for alarm function. Additional. The GSM module is connected via the UART. The GSM module is interfaced to the controller for sending messages to the patient as an alert system. The numbers to be accessed by the GSM is read from the microcontroller's memory.

Nausheen Fatima et al (2019) designed a device which had visual indicator which would light up along with the speaker. Also had a buzzer which will give a loud auditory indication that the medicine needs to be taken. A mobile app will give details about whether the patient has taken medicine or not for that time. It also has Heart beat sensor and temperature sensor. The Real time clock inside the LPC2148 will update the registers. The registers are then loaded to the RAM of the LCD and hence displayed on the Screen. When the box is opened, a delay timer is set for 1 minutes. The buzzer and LED will remain ON until the patient has taken the pill. As soon as the patient takes the pill the door will close after a delay of few seconds. The result is updated on the mobile application with the color of bar changing to green. Similar operation is performed, and if the patient has not taken his pill, the buzzer will sound and LED will blink and mobile application is updated with Red color of the bar indicating that the patient has not taken his pill.

Deepak Bhatt et al (2018) made an automated medicine box, operated by the ESP8266 microcontroller. This controller has an in-built Wi-Fi module which can connect to a smart phone. The microcontroller is programmed such that whenever it is powered ON, it will connect to the smart phone through Wi-Fi. The microcontroller will attempt MQTT connection with smartphone's android application. Once the MQTT connection is established, the user can update the schedule of medicines. The medicine timings will be stored even if the microcontroller is powered OFF. Microcontroller checks for the respective medicine type once the medicine type is determined, the microcontroller will eject the respective medicine's tray. After the timer of 1 minute, the medicine tray will get back automatically. This process keeps repeating to serve the purpose of smart medicine box. The proposed system helps to remind the patients to take the correct medicines at the correct time. This system just requires the patients to update the prescribed time through an android application of their smart phone and subsequently the smart medicine box will automatically dispense the correct medicine.

Roy Abi Zeid Daou et al (2018) designed one in which the weight of the pill is monitored using a safety weight sensor system. The Processor does the calculations to check if the patient has taken the medication on time or not. For this a safety-related 1002 architecture is targeted (one out of two) channels are connected in such a way that one of them is sufficient for triggering the safety function. a safety-related weight sensor system is used.

Not failed- the processing units will unlock the medicine box, send alarm, and determine the number of used pills.

On failure-, the system will trigger the safe function which is defined in sending a message to the patient and to the ones using the phone application.

The suggested system is able to measure the weight of the pills, monitor the medicine intake, and remind the patient to take their medication during the allotted time. It's a device that only unlocks through the application, it is safe to keep it anywhere as it is out of the reach of children.

Diaa SalamaAbdul et al (2018) their device was able to logs the pill name, number of pills and hours at which each pill is actually taken versus the time it should have been taken. Emitting warnings to the owner's relatives or nurses if needed. The pills

box contains nine separate sub-boxes so can have 9 distinct pills. Has 3 parts The pill refilling mechanism, the pill dispensing mechanism and the electronic module. Also has a pill tray where each one of the pills will exit the pillbox. Pill is dispensed once the patient presses the button When it has to be discharged the pipe will be aligned with the hatch opening (outlet) the pipe then rotates, aligning the empty compartment of the pill storage with the hatch opening, preventing any other compartments to be aligned over the hatch. It productively controls the season of senior citizens to take medication. It additionally diminishes the proportion that patient misses and defers taking medication

Ekbali Rosli et al (2018) created a robotic device that can assist patient to take medicine alone by implementing an IOT apps system for controlling the Smart Medicine Box. There are four sensors. The purpose of PIR sensor is to detect hand movement near the device, while IR sensor is to detect the line follower on the floor. The LM 35 acts as the detection of the temperature inside the box and the ultrasonic acts as the detection of the obstacle in front of the device. The servo motor will be used in the box to drop the medicine, DC motor will move from one place to another when receiving the command from the microcontroller. This monitors the consumption of medicine intake for intrinsic patients. It is practical in the morning and evening but also can be used at night. This device is controlled by using Bluetooth system, so the nurse does not need go to the personal ward to give the medicine. Monitors the consumption of medicine intake for intrinsic patients. It is practical in the morning and evening but also can be used at night. This device is controlled by using Bluetooth system, so the nurse does not need go to the personal ward to give the medicine

Sanjay Bhati et al (2017) made a device where setting up time table of prescribed medicines through push buttons as given in prescription. Present time will be saved in RTC module and notification time will be saved in EEPROM. Therefore at the time of taking medicine system generate Notification sound and display the Bright light in certain pill boxes. So, patient can know the specific number of box from which he has to take out medicines. All pill boxes are pre-loaded in the system which patient needs to take at given time. Can sense if the patient had taken out pills from the box or not. If the user open and closes the box immediately, system once again starts generating loud sound and forces the user to take pills again

3. AIM AND SCOPE OF THE EXPERIMENT

3.1 AIM

The aim of the experiment is to create an inexpensive, simple, and portable medicine box that can be used by patient and user to carry in case of going on trips and for day to day use

3.2 SCOPE

As number of people are being diagnosed with disease irrespective of their age factor. There is also a growing need for them to take their medication as advised by the doctors.

As these medication tend to alleviate their symptoms, failure of taking the medication can cause the symptoms to aggravate. Though the patient has been warned about the consequence of not taking the medication they do tend to forget to take it which might be due to stress, work or disease busy life and tend to forget it

So here is where the smart medicine box can be put to use. These can be used to store the medication and set the alarm for when the medication is to be taken and as such serves as a reminder for the patient to take their medication on time as the buzzer will sound for a minute or two depending on the brand that has made the smart medicine box.

There are presently smart medicine box that can are in the market but they are tedious to use as in some device you would have to continuously push the button to set the time, Tedious to understand and difficult to use.

The present investigations can be used as a prototype for other research going on in this device as it's a simple, cheap and easy to use device. GSM module has been used to provide information to the guardian and patient whether the medication has been consumed. This is done by using a button which controls the drawer.

4. MATERIALS AND METHODS

4.1 HARDWARE COMPONENTS

Arduino UNO

The Arduino UNO is an ATmega328-based microcontroller board. There are 14 digital pins and 6 analogue pins on this board. a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button is present . It is an open source electronics platform which is easy-to-use for beginners. It consists of both a physical programmable circuit board and a piece of software, or IDE which is Integrated Development Environment that runs on the computer this is used to write and upload computer code to the physical board.

RTC module:

A real-time clock (RTC) is an integrated circuit that maintains track of the present time. This information can be read by a CPU, usually through a serial port, to let software conduct time-dependent activities. RTCs are designed to consume very little power because they typically run even when the main system is turned off. This allows them to compare current time to an absolute time reference, which is normally set directly by the CPU.



Fig 4.1.1: DS3231 RTC module

12C LCD interface:

The LCD (Liquid Crystal Display) is a type of display that uses the liquid crystals for its operation. A 16*2 LCD is used in order to display the menu and the time that is selected so the user can know what time they have selected for the medication .A 12c interface is used along with it to reduce the pin connection to arduino



Fig 4.1.2: 12C LCD interface display

Rotatory encoder:

The angular position of a rotating shaft is determined by a rotary encoder, which is a position sensor. It can be used with an Arduino to obtain this capability via modules. Here it is used to select the mode and time based on the rotation of the knob

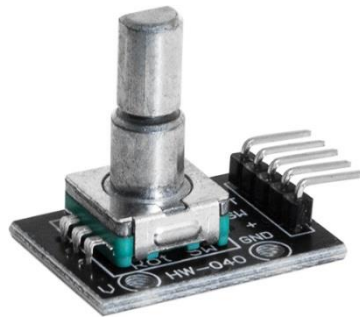


Fig 4.1.3: Rotatory Encoder

Buzzer:

A piezo buzzer is another name for an arduino buzzer. It is a tiny speaker that can be interfaced directly to an Arduino. The frequency of the buzzer can be set thus creating different tones . The piezoelectric action is reversed in the buzzer, which creates sound. Notifies the patient that it is time to take their prescription.

LED:

LED serves as the visual indicator for this project, the full form of it being light emitting device. These are semiconductor device which emits light when current flows through it. Here three different colors green, yellow and red are used to

indicate compartment 1 2 3 respectively Indicates from which compartment patient has to take the medication.

Button:

Pushbuttons or switches connect two points in a circuit when you press them. Here 2 buttons red and white. The red button is used for switching off the buzzer and LED and the white button is used for opening the drawer which thus sends a message to the drawer.

Power supply and breadboard power supply:

Here a 9v volt battery is used to drive the SIM800L GSM module as the module as strict requirements for voltage and and current which is not possible to be delivered by the arduino. In this project a breadboard power supply powered by AA battery are used to drive the micro servo motor



Fig 4.1.4: Breadboard power supply

SIM800L GSM module:

SIM800L GSM/GPRS module is a miniature GSM modem. This module can be used to do almost anything a normal phone is capable of doing it can send SMS, Make or receive phone calls, connecting to internet through GPRS etc.



Fig 4.1.5: SIM800L GSM MODULE

Servomotor:

Micro Servo Motor SG90 is a tiny and lightweight server motor with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. It is used for opening and closing of the drawer.



Fig 4.1.6: Micro Servo motor

4.2 SOFTWARE COMPONENTS:

Arduino IDE:

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

4.3 METHODOLOGY:

4.3.1 Proposed Methodolgy

Here the arduino UNO has been chosen to be the microcontroller. The RTC module provides the time for this project. The LCD allows us to scroll through and choose the time for a compartment by means of a knob. The led serves as the visual indicator for the patient to know from which compartment the medication is to be taken, the buzzer acts as the audio indicator. The box opens with means of the servo motor, this is triggered by means of a button on performing this action a SMS will be sent.

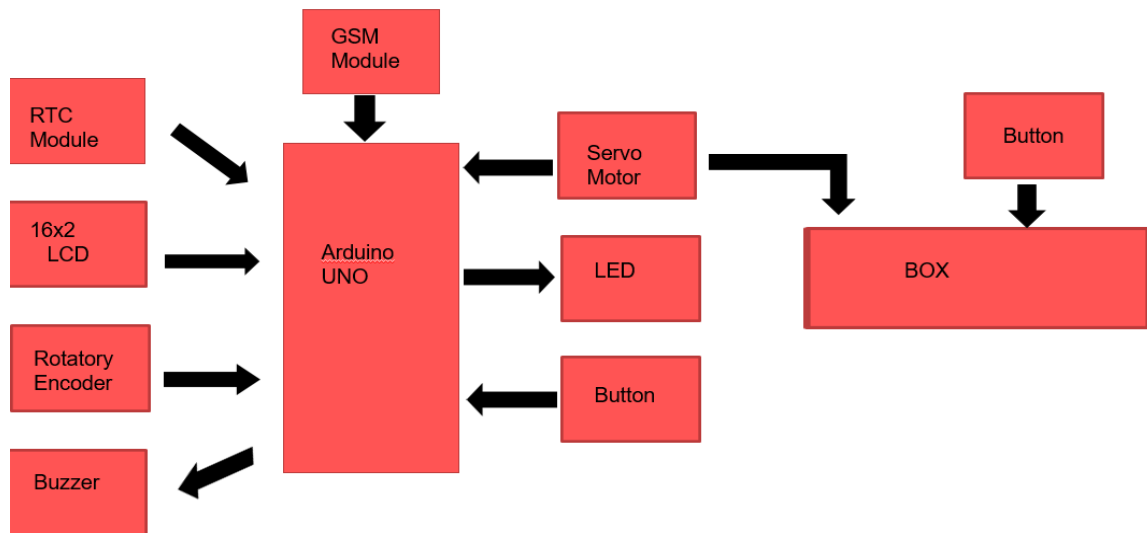


Fig 4.3.1.1 Proposed system

4.3.2 Block diagram explanation

The 16x2 LCD serves as the interface through which the user can select the compartment for which they want to set the time, they can select the time for 3 compartments titled med 1, med 2 and med 3. This is done by the help of the rotatory encoder which acts as the knob by turning the knob clockwise and anticlockwise we can scroll through the list of options provided. The time that has been selected by the user will then be displayed on the LCD for a min or two and then will move to the default screen which displays the current date and time

The time that has been selected will be stored in the eeprom of the arduino and at that time set, the buzzer and the led which serves as the audio and visual indicator respectively is activated. There are 3 LED present to indicate the 3 compartments and only the LED corresponding to the compartment will glow so the patient can know that it's time and which compartment they have to reach out for their medication. The LED and the buzzer can be switched off with the help of a button and if that's not the case they automatically stop after a min

Another button is present which controls the micro servo motor that serves the purpose of opening the box and for sending the SMS to the guardian based on the button input a SMS will be sent. For instance if the button is not pressed the box remains in the same place as such a conclusion can be drawn, that the patient has

failed to take their medication at the specified time and so an SMS will be sent to indicate this. On the other hand if they press the button the servo pushes the box forward and so the patient has taken said medication and hence a corresponding SMS will be sent to convey this information to the guardian/caretaker

5. RESULTS

The prototype of the medicine box is shown in figure 5.1. It consists of the LED's the two buttons for controlling the buzzer and servo motor, The sim800l which allows communication between arduino and the guardian/caretaker or patients phone. The servo motor is powered separately with an external battery supply which drives the container back and forth at the time specified.

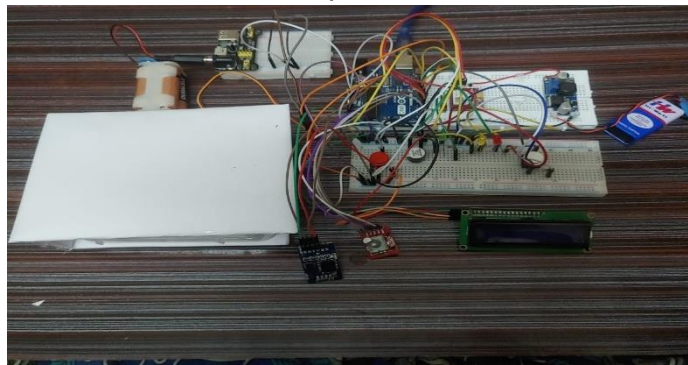


Fig 5.1: Prototype setup

When the arduino is powered on. It shows the starting screen as shown in figure 5.2.



Fig 5.2: The welcome screen when Arduino is powered on

It then moves to the main menu selection and on turning the knob the user can scroll through the options present,



Fig 5.3: The menu system displaying alarm on the LCD

On choosing alarm we can then select the compartment for which we want to select the time. We can choose the time for three compartment namely Med1, Med2 , Med3. In figure 5.4 we have selected the time for the Med3



Fig 5.4: Med 3 has been selected for setting the time

After choosing the compartment we will be prompted to choose the hours and time for the medication to be taken



Fig 5.5: Setting the time for the hours



Fig 5.6: Setting the time for the minutes

The selected time will be displayed on the LCD for the user to see as shown in figure 5.7 So user can see the time that they have selected.



Fig 5.7: Time selected by user displayed on the screen

After 100 seconds the LCD will then move on to show the present time and date

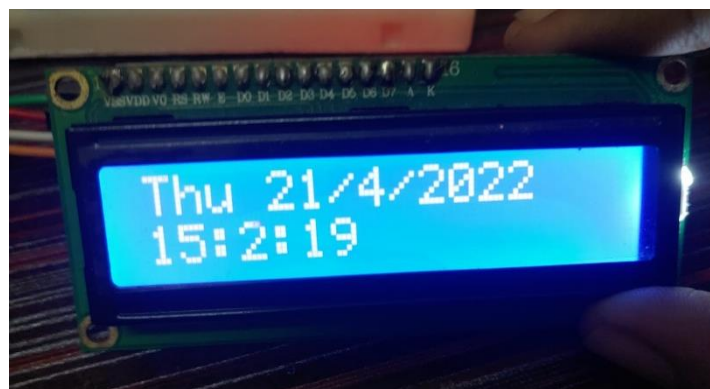


Fig 5.8: Default screen is displayed after time selection

Both LED and buzzer sounds at the time specified by the user. On pushing the button (Red) the buzzer and LED turns off as shown in the figure 5.9.

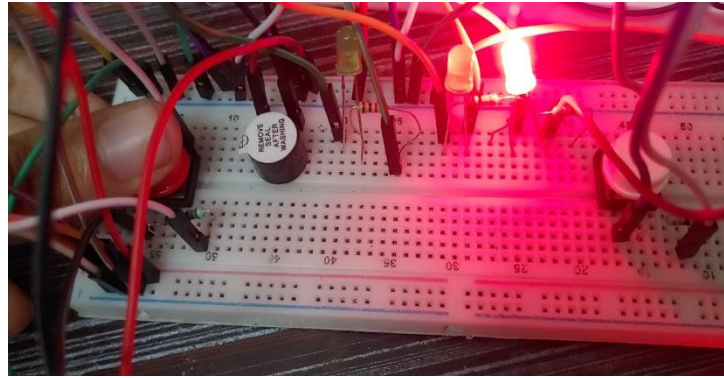


Fig 5.9: Buzzer and LED turned on at the selected time

The LCD also displays a message to indicate which medication has to be



Fig 5.10: Message displayed at the time set

Then the second button (white) is pressed to push the container with the medication forward and also a message is sent in this situation to indicate that the medication has been taken as the box is now open.



Fig 5.11: Box opens sideways when button is pressed

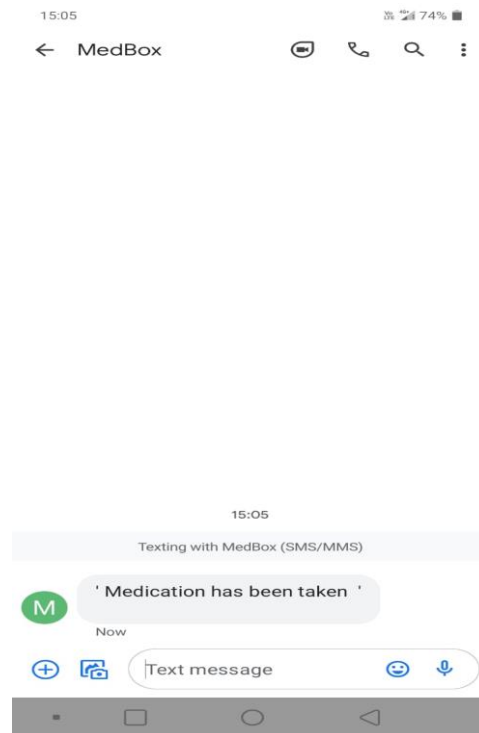


Fig 5.12: Displays the message that will be sent (on success)

Failure of pressing this button also results in a message to be sent to indicate the failure of taking said medication.

This was done by setting the time to 15:15 and even though the button for the switching off the buzzer and LED was pressed and they both were turned off. However this time the white button for opening the box wasn't pressed at all as a result after a minute had elapsed from the time that was set, a message was sent to the phone to indicate this.

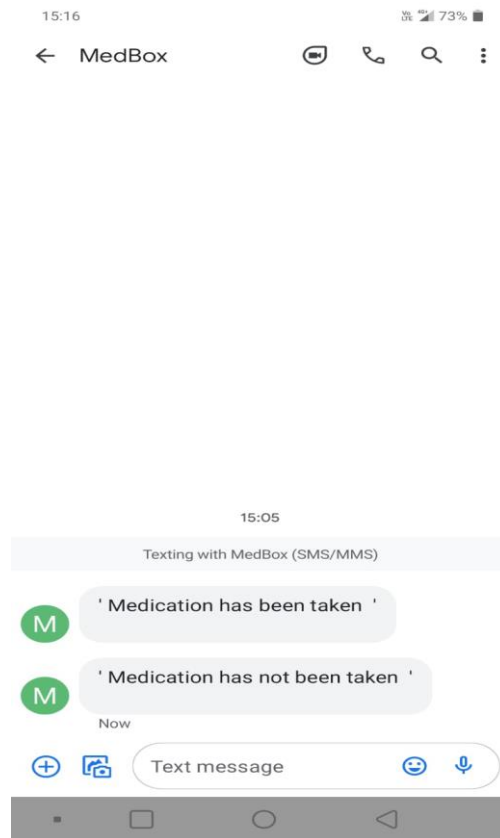


Fig 5.13: Displays the message that will be sent (on failure)

6. Summary and Conclusion

Now it's common to see people young and old take medication maybe be for health purpose etc. The medication may be required to be taken many times per day and people do tend to forget as they have many other things going on with their lives. The project was done with the aim of trying to find a good measure for this problem. This project can potentially help caretakers, guardians and patient as it reduces their burden of having to constantly remember the fact that they or the patient under the guidance have to take their medication and a specific time. The project is inexpensive, easy and portable for use. More work can be done like adding more options to the menu system, sensors for tracking pills weight, adding more compartment, and security.

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