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"Automatic Pill Reminder & Dispenser"

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Abstract— In today's life, human beings face difficulty to keep in mind the medicines they required to take. This project proposes a model of automatic medicine reminder and apothecary system. This system can relieve unevenness in taking recommended dosage of pills on time prescribed by the doctor and switch from ways primarily reliant with the memory of the human being insignificant regulation, hence people can be freed doing wrong things due to human error like taking pill at different time with incorrect dosage. Various medicine boxes exist in the market. This system sends message to care taker person using G.S.M module. An Alarm will be ringing until we take the medication from the reminded time. Medicine name, medicine dosage, time to take medicine will be read out by the speaker as well sent as a message to the care taker. LED light will be glowing to intimate which particular medicine to take in an order. By using push buttons, we control the intake of medicines. The proposed medicine box would help people who are under medication mainly for old persons to take the medicine on time without forgetting. A person's life can be saved by this system. Human effort can also be decreased by this health alert and medicine reminder.

Keywords: Arduino Uno , Arduino Mega, G.S.M module, Stepper Motor, C language

I. INTRODUCTION

Now a days, monitoring healthcare by 24x7 and apothecary services needs a large cost and manpower. This, added with the intrinsic absentmindedness of human being can result in severe flaws, frequently leading to carelessness, dangerous situations and depression. Often we cannot understand the damage we impose on our body by not taking medicines on time, putting off intake or leaving in halfway on the whole, or wrongly taking the wrong quantity. Some of the key areas have been aided by automation and technology to eliminate human fault.

A preferred level of efficiency can be attained by taking medicines on time. This is as yet not seen as a zone which could be facilitated via computerization and present day innovation. The proposed medication update and gadget incorporate a few compartments for holding distinctive sorts of drugs, for example, tablets, containers and so on.

The ideal opportunity for the following pill is shown in a LCD screen and messages are created when the time comes to, alongside LED flickering implying which compartment to open. At the point when a compartment is opened by the patient, this is identified by a sensor and light is reset, alert gets napped. Regular medication containers could be updated into a programmed multi-pill update and gadget for simplicity of activity and ease of use. The proposed model of medicine box – an automated medicine reminder is designed with the help of a micro controller. This micro controller is used to keep track of when a patient should take his/her pills.

All patients face difficulty to adhere to the prescribed medication plan. This is particularly tough for elder people. Medication adherence needs a healthy connection between the patient and the medicine prescriber. The useful medical prescription should have i.e. the management plan, future advantages unfavourable effect and expenses. Elder persons are not adhering to medications commonly. The primary reasons differ among patients [1]. Automatically dispensing the pills is used where the patients will get the pills out of the storage compartment, twelve storage compartments are kept vertically with pre-loaded medicine. It has pills to be taken for 24 hours automatically the pills will the dispensed and the patient will have the pills once it is dispensed

II. EXISTING METHOD

There are several existing models for automatic medicine reminders. Here are a few examples:

Medisafe: This is a popular app for medication management that allows users to create customized medication reminders. The app can also track medication adherence and provide medication-related education.

Mango Health: This is another app for medication management that offers personalized medication reminders, drug interaction warnings, and a medication history log.

MedAdvisor: This app offers medication reminders, medication information, and prescription management tools. It also allows users to order repeat prescriptions directly from their pharmacy.

MyTherapy: This app provides reminders for medication, appointments, and measurements. It also offers a medication tracker, symptom and mood diary, and health report generator.
Round Health: This app allows users to create customized medication reminders and track medication adherence. It also offers pill identification and medication information.
These apps use different algorithms and technologies to provide automatic medication reminders. Some use machine learning algorithms to predict when a user is likely to forget to take their medication, while others use simple scheduling algorithms to send reminders at fixed intervals.
Medisafe is a medication management app that provides automatic medication reminders to users. The app is available for free on both iOS and Android devices. Medisafe allows users to create a personal medication list, set up custom medication reminders, track their medication adherence, and receive personalized medication-related education.
Medisafe's features include a medication refill reminder, a pill identifier tool, and a medication tracker that allows users to log their medication intake and view their progress over time. The app also provides drug interaction warnings and allows users to share their medication information with their healthcare provider.
One of the unique features of Medisafe is its support for multiple users. This allows caregivers to manage medication schedules for their loved ones, ensuring that they are taking their medication as prescribed.
Overall, Medisafe is a comprehensive medication management app that can be useful for anyone who wants to improve their medication adherence and keep track of their medication regimen.
MedAdvisor is a medication management app that provides automatic medication reminders, medication information, and prescription management tools. The app is available for free on both iOS and Android devices.
MedAdvisor allows users to manage their medications by creating a medication profile that includes information about their prescriptions, dosage instructions, and refill dates. The app then provides customized medication reminders to ensure that users take their medications on time. It also allows users to order repeat prescriptions directly from their pharmacy.
In addition to medication reminders and prescription management, MedAdvisor also provides medication information such as possible side effects and interactions with other medications. Users can also track their medication history and receive alerts if they miss a dose.

Disadvantages:

1)Dependence on technology:
If a person relies too heavily on automatic medicine reminders, they may become less able to manage their medication independently. This could be especially problematic if the technology fails or if the person is in a situation where they do not have access to the reminder device.
2)Cost:
Some automatic medicine reminder systems require the purchase of specialized devices or software, which can be expensive.
3)Privacy concerns:
Some people may be uncomfortable with the idea of sharing information about their medication use with a third-party app or device.
4)Over-reliance on reminders:
If a person becomes too dependent on medication reminders, they may not develop good habits and strategies for managing their medication independently.
Alert fatigue: If a person receives too many medication reminders, they may become desensitized to them and start ignoring them altogether.

III. PROPOSED METHOD

Step 1: Assumptions

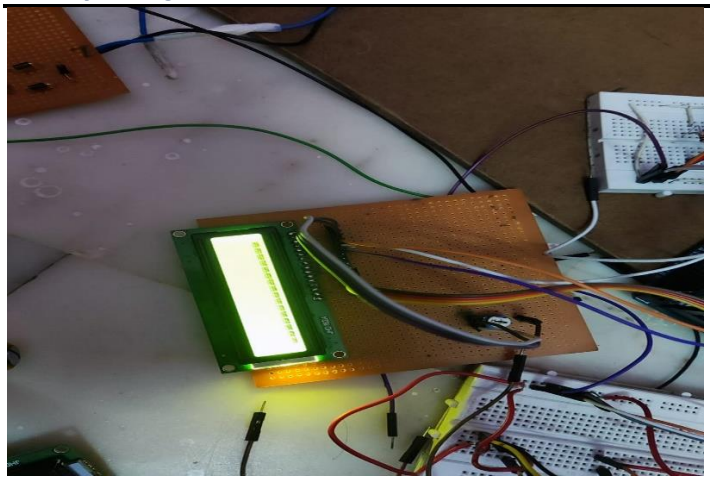
I would like my device to be as easy to use as possible, and ideally, the kids shouldn't have to do anything except taking pills. It will not have any buttons because it will be controlled via wifi thanks to the BLYNK app. I designed a dispenser that has 14 slots, which means the pills will last for a week, assuming two people will take one pill in the evening. The 18650 battery will be responsible for powering the electronics, and I will charge it via USB type C.

Step 2: PCB Preparing

Based on these assumptions, I created the layout diagram, determined the shape of the board, and placed all the components in it, and Eagle created the wires himself. Then I ordered a PCB from PCB Way and was informed that they would come to me in a week. At that time, I decided to sort the parts I had so far so that I would know what I was missing for this project. Unexpectedly, 4 days after placing the order, the courier with my PCB was waiting at the door.

Step 3: Microchip

In my project, I used 3 components from Microchip which play a very important role. The first is a DC / DC boost switching regulator that will power devices that require 5V. The second is a 3.3v stabilizer that lowers the voltage for ESP. The third component is the RTC module, thanks to which the dispenser can dispense pills at a set time.



Step 4: A Minor Mistake

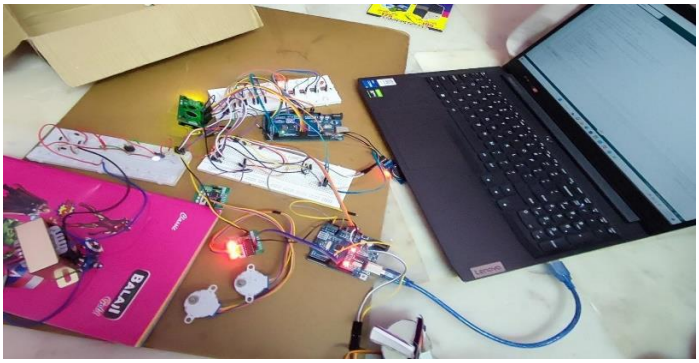
After unpacking the shipment, I immediately spotted an error with the battery holder, namely, instead of the 18650 battery holder, I put an AA battery holder. However, I decided to use an ordinary 3.7V battery. I also had to cut a piece of PCB to be able to put the USB socket in its place.

Step 5: Soldering

So it's time to soldering. This time I soldered the board using a soldering iron. I put the flux and tin on one of the pads, put the resistor in its place, soldered it first to the first pad, and then to the second pad, and repeated this action with the rest of the elements. As the first, I soldered the charging module, and after making sure it was working properly, I proceeded to solder the ESP12.

Step 6: Programming

To upload a program to ESP, press the button on the board, connect the power, and finally put the programmer in its place. I uploaded the code supporting the BLYNK application, thanks to which I checked whether the communication between them is as it should. Then I soldered the components responsible for increasing the voltage from 3.7V to 5V, which is required to power the servo and the stepper motor. This is how the finished tile looks like.

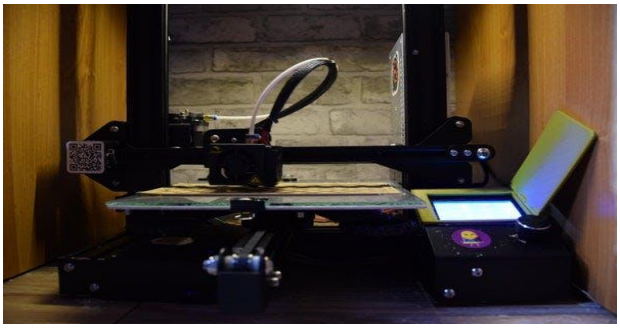


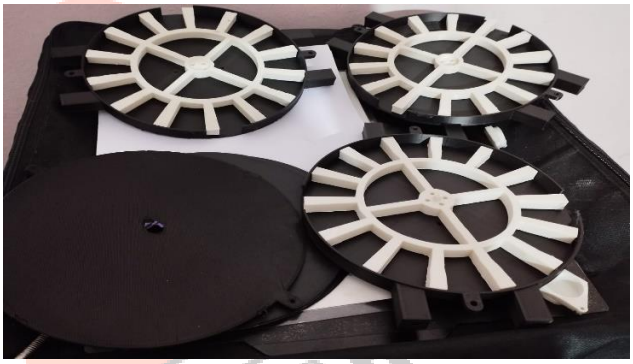
Step 8:RTC Module

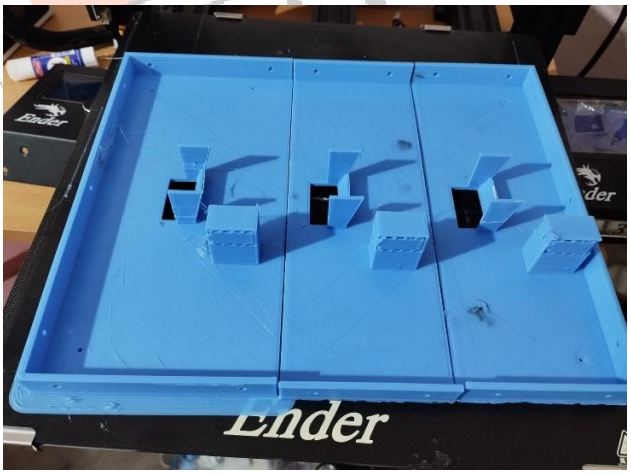
There is a place to solder the RTC module on the PCB as I had a plan to connect the ESP to the Arduino cloud, however, I was not able to do that so I decided to use the BLYNK application which supports controlling ESP outputs depending on the real-time. For this reason, I didn't have to use this module on my board, however, you can do so if you want to use it offline.

Step 9: 3D Printing

The most time-consuming part of this project turned out to be 3d printing because I had huge problems with ABS printing on my 3d printer - the prints were detaching from the table, making them finally deformed. I tried various solutions - glue, glass table, temperature changes, but the best result was when I placed the printer under the desk and covered it with a blanket to keep it warm.

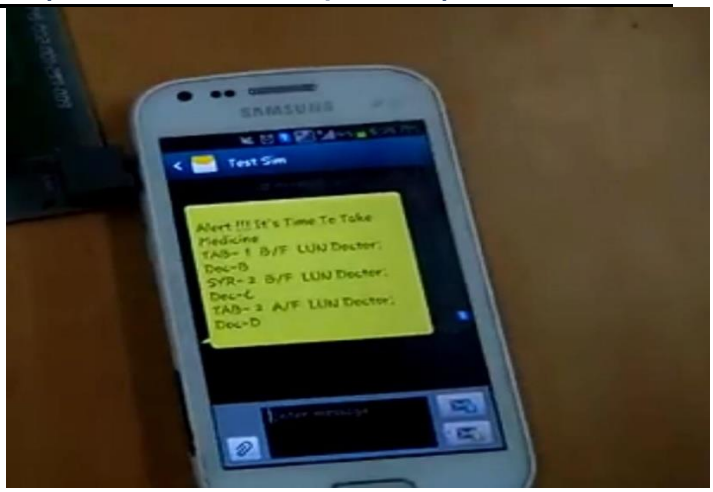






Step 10: Assembling

Step 11: Final Product



The final step was to write the code and configure the application. Now I can upload the program. It works in such a way that at a certain time it gives a tablet that we must first place in the dispenser. When filling, we need to close the hole with the servo that will be lowered during the first dispensing of the drug.

Output Layers:

- Visual notifications: Many automatic pill reminders use visual notifications such as pop-up messages on a smartphone or tablet screen, or flashing lights on a specialized device. These notifications typically include information about the medication to be taken and the time it is due.
- Audible alarms: Some automatic pill reminders use audible alarms such as beeps, chimes, or tones to alert users that it is time to take their medication.
- Voice reminders: Some models offer voice reminders, where a pre-recorded or synthesized voice speaks the medication name, dose and time it is due.
- Vibrations: Some automatic pill reminders use vibrations, which can be useful for people who are hard of hearing or who work in noisy environments.
- Mobile app notifications: Many automatic pill reminder apps also send notifications to the user's mobile device, providing information about the medication to be taken and the time it is due.

IV. ADVANTAGES AND APPLICATIONS

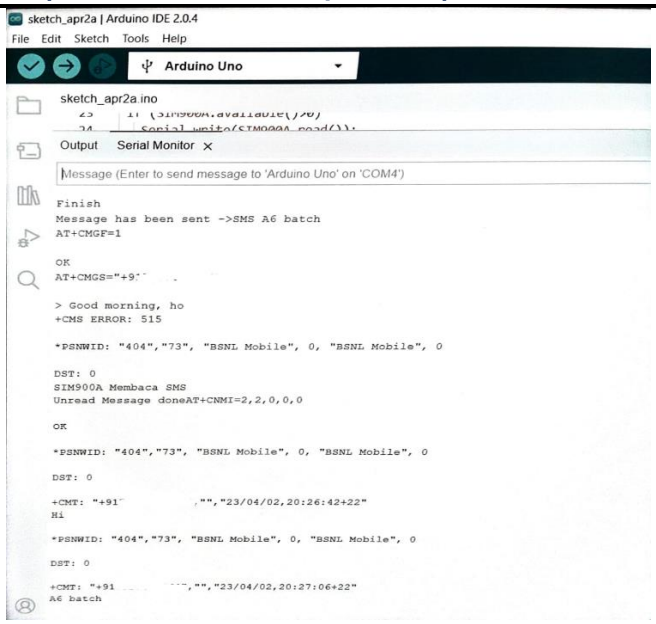
Advantages:

1. Improved medication adherence: Automatic medicine reminders help individuals take their medication as prescribed, which can improve medication adherence and treatment outcomes.
2. Reduced medication errors: Automatic medicine reminders can help reduce the risk of medication errors, such as taking the wrong medication or taking a dose at the wrong time.
3. Personalized reminders: Many automatic medicine reminders allow users to customize their reminders based on their specific medication regimen, ensuring that they receive reminders that are tailored to their needs.

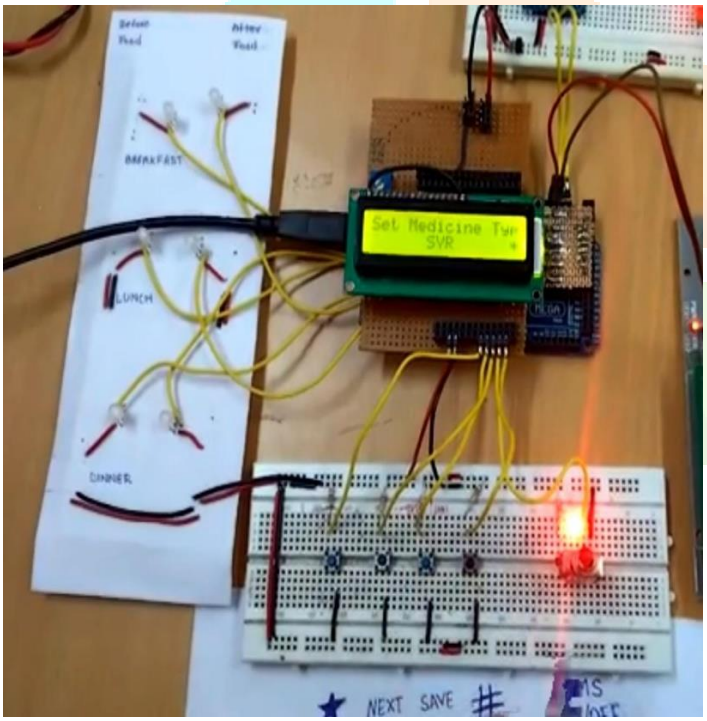
4. Data tracking: Some automatic medicine reminders track medication adherence and provide users with information about their medication usage, which can be useful for tracking progress and identifying areas for improvement.

Applications:

1. Chronic disease management: Automatic medicine reminders can be particularly useful for individuals with chronic conditions that require daily medication.
2. Caregiving: Automatic medicine reminders can be used by caregivers to help manage the medication schedules of their loved ones.
3. Mental health: Automatic medicine reminders can be used to manage medications used to treat mental health conditions such as depression, anxiety, and bipolar disorder.
4. Senior care: Automatic medicine reminders can be used to help seniors manage their medications and stay independent.



V. RESULTS



V. FUTURE SCOPE OF STUDY

1. Integration with wearable devices: With the growing popularity of wearable devices such as smartwatches and fitness trackers, there is potential for automatic medicine reminders to be integrated with these devices, providing even more convenient and personalized reminders.
2. Artificial intelligence (AI) and machine learning (ML): AI and ML have the potential to further personalize automatic medicine reminders based on individual medication regimens, lifestyles, and other factors. This could lead to more effective and efficient reminders that are tailored to each individual's needs.
3. Improved connectivity with healthcare providers: There is potential for automatic medicine reminders to be more closely integrated with healthcare providers' electronic medical records (EMRs) and other digital health tools, allowing for better communication and coordination between patients and their healthcare teams.
4. Gamification: Some researchers are exploring the use of gamification in automatic medicine reminders, turning medication adherence into a game or competition. This could be particularly useful for engaging younger patients or those who struggle with medication adherence.
5. Development of personalized medicine: As the field of personalized medicine continues to grow, automatic medicine reminders could be used to help patients manage complex medication regimens that are tailored to their individual genetic profiles.

VI. CONCLUSION

By this model we can save humans life by reminding correct medicine to correct time by using l. E .D, voice commands, G.S.M module. This model make medications simple and easy

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