Design of Embedded IoT based Medicine Feeder Box

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Abstract

This paper introduced the development of the ESP Module-based pill reminder, which will enable patients to obtain a prescription at the right time and time. Assisted automation is another technology that can bring great benefits to humans. Today, however, only 2 out of 50 people use assistive automation due to its high cost, lack of information on the subject, and availability. By 2050, one in 20 households will need a support product and most adults will need 2 or more of her products. I also found that people pay more attention to their work than their health. This procedure aims to alleviate the problem by reminding you to take your medication anywhere within the designated time and to contact the appropriate contacts. It is a combination of a patient's physical and digital memory, which is important for communities of all ages, but especially effective for physicians with disabilities who forget to take their medications. The main goal is to keep the system useful and cost effective. The presented system uses ESP Module, AC motor, PIR sensor, Buzzer with alarm used to bring victims closer to receive the required doses according to the doctor's note at the right hour. This practical and economic program will treat older patients, especially illiterate patients. This smart pill box can alleviate the burden on elderly family members by reminding them to take their medication on time, especially with infections like Covid-19

Design of Embedded IoT based Medicine Feeder Box

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***Abstract*— This paper introduced the development of the ESP Module-based pill reminder, which will enable patients to obtain a prescription at the right time and time. Assisted automation is another technology that can bring great benefits to humans. Today, however, only 2 out of 50 people use assistive automation due to its high cost, lack of information on the subject, and availability. By 2050, her 1 in 20 households will need a support product and most adults will need 2 or more of her products. I also found that people pay more attention to their work than their health. This procedure aims to alleviate the problem by reminding you to take your medication anywhere within the designated time and to contact the appropriate contacts. It is a combination of a patient's physical and digital memory, which is important for communities of all ages, but especially effective for physicians with disabilities who forget to take their medications. The main goal is to keep the system useful and cost effective. The presented system uses ESP Module, AC motor, PIR sensor, Buzzer with alarm used to bring victims closer to receive the required doses according to the doctor's note at the right hour. This practical and economic program will treat older patients, especially illiterate patients. This smart pill box can alleviate the burden on elderly family members by reminding them to take their medication on time, especially with infections like Covid-19.**

***Keywords*— ESP module, Pill box, Real Time clock, PIR sensor, Medicine reminder.**

I. INTRODUCTION

Advances in medicine have increased the average human life expectancy. Diseases that can be considered self-controlled are currently successfully treated with one or more drugs. Often the patient has to take the medicine more than once a day and forgets to take it. Most medicines need to be taken at a certain time or hours of the day. Prediction is a difficult solution in this area, as patients often forget to take their doses. The problem becomes even more serious for older patients or patients who do not have enough skills or knowledge of medicine. In Hospital or in home, patient has to take a right dosage at right time. People who are used to take care of elderly people in home are forgot due to some problem. Home health care can end up being import and the role of lowering the cost of treatment or treatment. This technology requires improved and effective health-related improvements and is directly applied in the home so that people have easy access to health services. From now on it is necessary patient taking the appropriate medication at the right price as well time. Upgrading of electronic equipment can work well Solution to the above problems in this period of technology. There was a lot of research work on the remaining smart medicine box. So, we proposed to design smart pill box using Blynk software and ESP module. Blynk software is designed for the internet of things. It can control hardware remotely it can display sensor data. IoT in healthcare is hopeful because medical facilities are highly effective and patients receive better care. This technology offers unparalleled benefits that can improve patient health as real-time monitoring can save lives in medical emergencies. Various wearable IoT devices continue to play a role in healthcare. IoT is a key part of healthcare's digital transformation, making a difference in workplace processes and cost control.

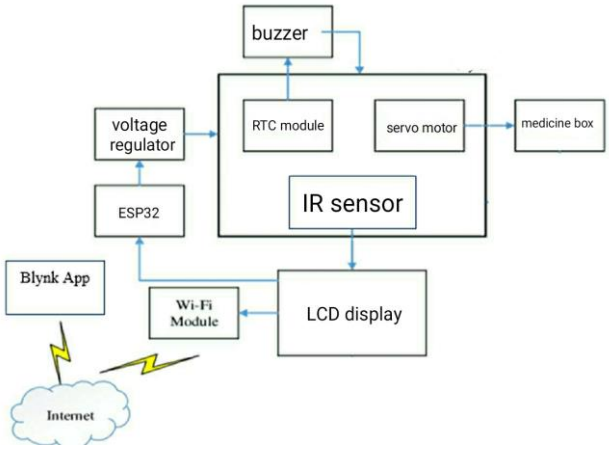

Fig 1 Block Diagram of Entire System

A project has been developed that will provide patient warning stake their medication at the right time. Further research into a home-based multidisciplinary program and integrating it into a proposed home health care system that will provide a drug solution to the compliance problem by reminding the user to retrieve a certain amount of drug with the help of the ESP module and smart medicine. a reminder designed with system warning and a reminder about medication.

II. PROBLEM STATEMENT

The collection and sharing of critical network data associated with networks using a secure service layer defines IoT. Simply put, the Internet of Things can be defined as a wireless network of interconnected machines, exchanging information and messages, communicating and generating new information for recording and analysis for future use. Online submission of materials facilitated collection of real-time data and patient record information. One of the most common reasons patients do not do this is not taking their medicines in the allotted time. People over the age of 50 are at risk of developing diseases such as high blood pressure, diabetes and Alzheimer's disease. Exceeding

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the dose for such patients is very dangerous. Therefore, it is important that patients receive their prescriptions on time.

This program eliminates confusion about which medicines to take and when for those who forget to take their medicines or need to take many medicines. Therefore, this project will help provide information about the condition of patients, whether people are on medication or not. Today, most families in our society are nuclear families. Adults like independence, but children worry about it. This machine is one way to help them take their medicines successfully.

III. GLOBAL SCENARIO

People have started using health care apps and their popularity has been rising, but there are still a lot of problems that need to be addressed by them. Several drug reminder programs are built on different concepts and forums. It works on mobile and provides an intuitive interface to manage doctor schedules and warnings to remind patients when to take their medication according to the prescribed schedule. Several systems use RFID (radio-frequency identification) or motion recognition technology to ensure that patients actually take their medication.

This paper created an app with the name Medicine Reminder pro. An android app that can provide up to 15 reminders. The user can order these reminders with repetitive or repetitive patterns. The hour intervals between alarms can also be selected, with a minimum duration of 1 hour. At the appointed time, the app will send a notification with LED indicator, alarm and vibration.

The main goal of this study is to develop a smart first aid kit that tells the elderly or hospitalized patients to take the right medication at a set time. The device has 21 airtight compartments for storing medications. Operators can manually set the medication time or upload a text file showing each department's medication time to the SD card. The device has a real-time clock that can read the time. When the set time and time match, the speaker emits a sound to share information about the amount of medicine, and at this time, the LED in the specific compartment where the medicine is stored blinks. The device also tells the patient if they should take their medication before or after a meal. This device can ensure the safety of the drug, the proper dosage of the drug and the prevention of drug use by the elderly. The proposed paper has created a smart online medical device (IoT) for adults. Safe and healthy people have the overriding goal of reducing health care costs for years to come. An intelligent IoT-based health system was developed here, including a neural-connected intelligent first aid kit and a regular health monitoring server. The provided first aid kit helps patients take the right medication at the right time and also provides an email to help patients take their medication.

IV. DESIGN & IMPLEMENTATION

In this project, a smart medicine cabinet helps remind patients about their medicines when it's time to take them. For example, if a patient needs medicine at 6:00 am, the box will make a sound to remind them to send an alarm. When he forgets the real thing, it's time for him to take his medicine. A servo car opens and closes the medicine cabinet, so whenever the medicine cabinet won't open, take your medicine. When it's time to pick up the tree, the box will make a sound until the user picks up the tree or opens the cabinet. Even if the user is not at home, the medicine cabinet uses her Wi-Fi module to send notifications to the user's changed email her address.

Fever and medical data acquisitions are stored on a server that is accessible to patients and physicians, allowing physicians to review medications in a timely manner and change them if necessary. It also helps doctors keep their patients up to date.

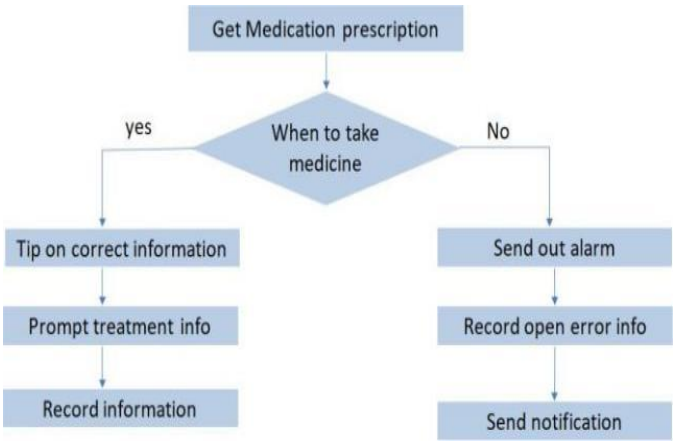

Fig 2 Flowchart of Medication

The flow chart shown in figure 2 explains the mechanism of the IoT medicine feeder; the first step of taking a medicine is consulting a doctor and getting a prescription of medicine to be taken. Once you get a prescription you can set events through the blink app about the timings of the medicines. The feeder has medicine in a box provided. When the software gives command to the module it rotates the servo motor and an alarm alerts the patient for taking their medicine. If the patient takes the medicine the IR sensor detects the hand movement and gives input to the module which then an email is sent to the user. If the medicine is not taken the sensor sends input to module and a message is sent to the user via email and app notification followed by a alerting system consisting of a buzzer and an alarm system, it also displays a message on the LCD display.

A. System Configuration

- Software Required

Blynk Software: The blynk software has events recorded as per time of medicine. It's given command to the ESP module. A buzzer alerts you about taking medicine. We you take the medicine, the PIR sensor detect the motion and sends message to the blynk software. If medicine is taken the email is sent via blynk software to your email id. If the medicine is not taken the buzzer rings again after 5 minutes. This is shown in figure 3, where configuration of Blynk app is done along with figure 4 where ESP node is connected with Blynk app.

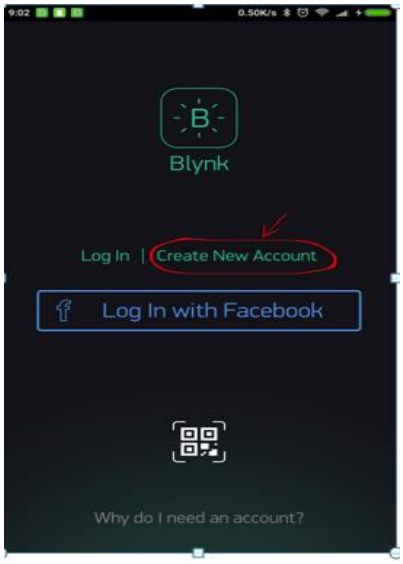

Fig 3 Blynk app

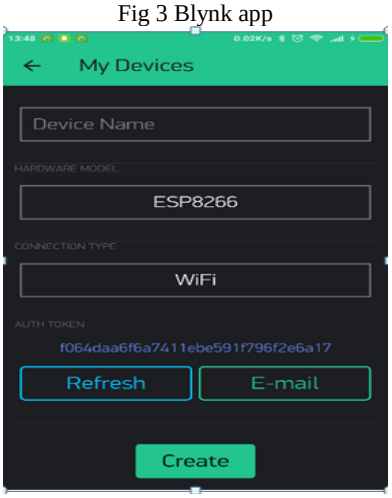

Fig 4 How to connect to blynk app.

- Hardware Required

The hardware devices that are used in the project are as follows

- RTC module
- ESP 32
- Servo Motor
- LCD display
- IR Sensor
- Dotted PCB
- DC jack
- I2C Module
- Capacitor
- Adaptor
- Buzzer

V. WORKING

The IOT medicine feeder is designed to help people who cannot take medicine by themselves or have to be reminded every time. The feeder is an automatic machine which provides medicine on a given time as per users time inputs.
The medicine feeder can be virtually operated through Blynk software. The software is designed to give reminders and operate the ESP module. The circuit of entire system is done using Proteus software which is shown in figure 5.

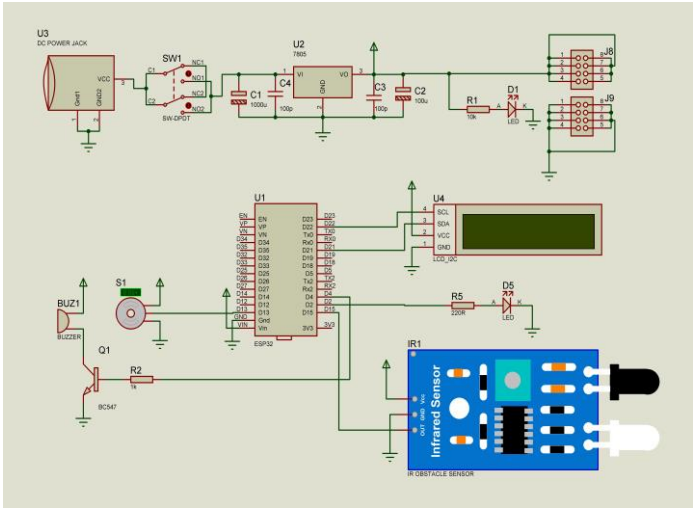

Fig 5 Circuit Diagram done in Proteus Software

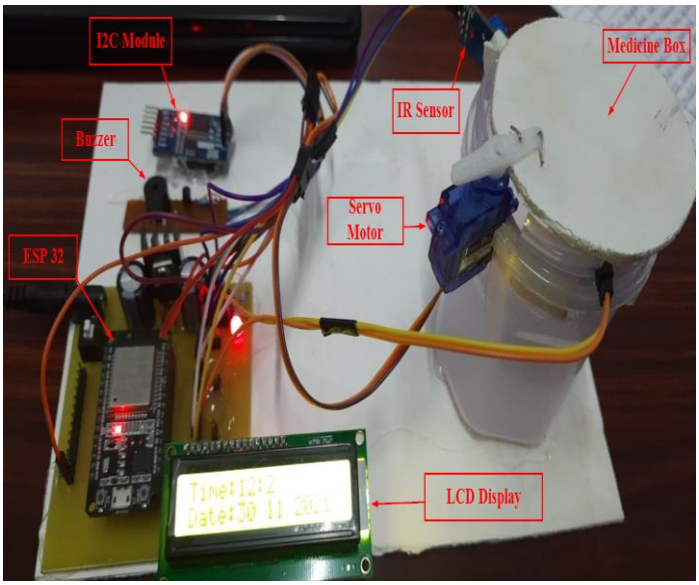

Fig 6 Actual Implementation of System

The blynk software has events where one can feed the time and medicine name to be given, and set the alarm. The feeder will be set as per MORNING-AFTERNOON-NIGHT schedule of medicine and hence the machine has three motors for three slots.
The blynk software gives command to the ESP module and module gives command to the motor.
The motor works as a gate to the feeder, when the module gets a command, the motor is connected with a gate which opens and make way for the medicine fall down on the tray and at the same time a buzzer alerts the patient to take medicine. The feeder continuously alerts the patient until the medicine is picked up from the tray.
The PIR Sensor detects movement and hence send data whether the medicine is been taken or not.
If the medicine is not taken it alerts the patient again to take medicine.

Once the patient has taken the medicine the notification is sent to the user through an email and notification through the blynk app.
In case of some medicines which are not as per any schedule and can be taken any time, the user can physically give command from the blynk software and the feeder will provide the medicine, the alert system can also be controlled at times of need as shown in figure 6.

VI. RESULTS

Case1: As shown in figure 7, the time and date display before the model run. LCD display is controlled by RTC module. One pin of LCD display is connected to I2C module to convert serial into parallel. LCD display works according to Indian time.

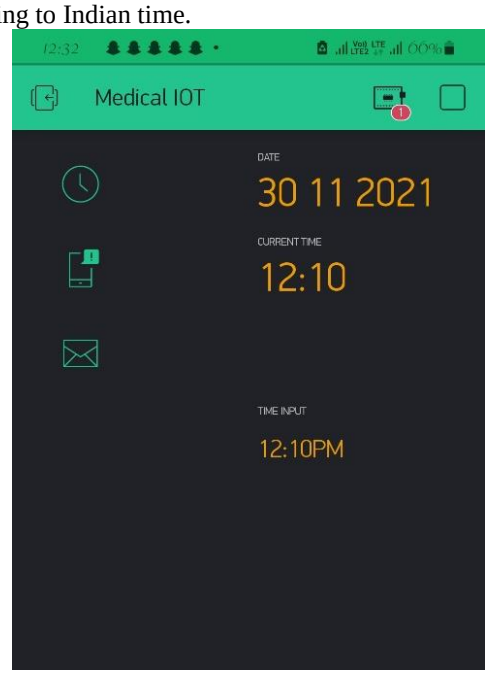

Figure 7: Blynk App Screenshot

Case 2: Firstly, we have to set the time in the blynk software at what time patient to take the medicine as shown in figure 8.

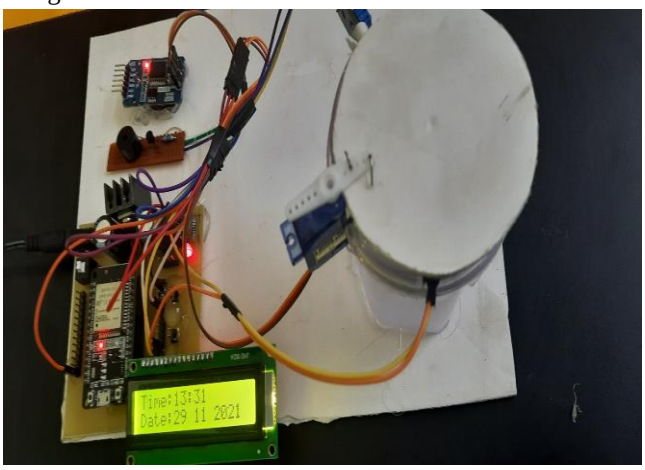

Figure 8: Medicine Box

Case 3: As shown in the figure, the box is currently closed when it's time to take the medicine and it opens with the help of a servo motor. Notification are shown in figure 9.

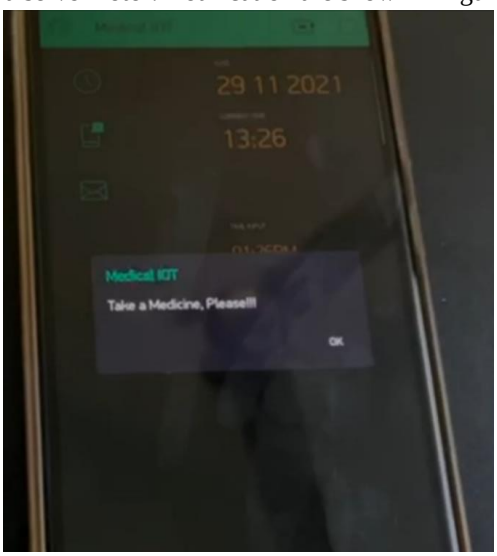

Figure 9: Notification

Case 4: As shown in figure 10, the message is displayed on the app after the buzzer rings. This indicated time to take pills.

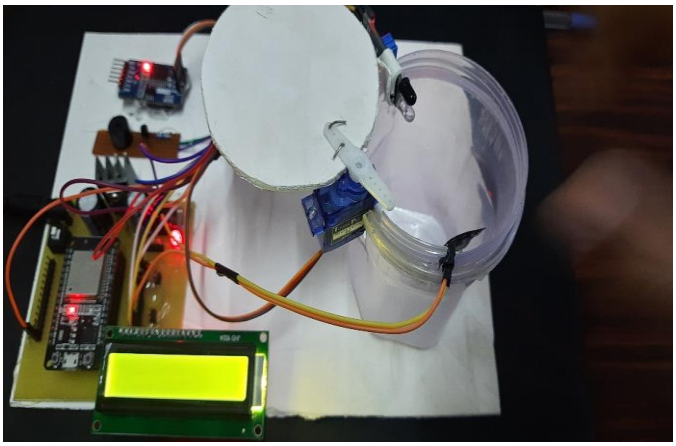

Figure 10: Time to take medicine

Case 5: As shown in figure when the Buzzer rings the box will open with the help of servo motor and then patient have to take the medicine.

VII. CONCLUSION

Many systems are used to accomplish the same task. However, these programs are difficult to use, they are not mobile and they are expensive and complicated. The proposed system overcomes all the above problems and is more accurate and easier to use. Suitable for all ages. Helps find the most common medications, reducing manual and human effort. Its simple bike and affordable design will benefit young and old alike, making it a solution for teen parents as well. In homes and hospitals with medical supervision, it has an application and can be sold as an inexpensive solution. Its main goal is to provide a healthy, non-controversial lifestyle for regular pill users and to make it available to the general public at an affordable price.

The overhead incurred to patients by hospitals and pharmacies can be reduced with the proposed architecture. The methodology has been found to be error-free from the perspective of transcription and dispensing. Having all dispensers connected via cloud makes future expansion to include multiple pharmacies easier. By managing private clouds for each OHC group, security can be provided.

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