

# Internet of Things (IOT) Based Smart Health Care Medicinal Box

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**Abstract-** Though the health care society is slow in adopting IoT (Internet of Things) than other fields, IoT in the field of medicine is destined to keep the people safe and healthy where the main purpose is to decrease the cost of health care in the coming years. A smart IoT based healthcare system has been proposed here, which contains an intelligence medicine box associated with sensors and server for regular health monitoring. This smart medicine box with wireless internet connectivity helps the patients to get regular health care and create easy communication between doctor and patient without meeting physically. The proposed medicine box helps the patient to take the right medicine at the right time along with an email which will help the patient to take the medicine. A laptop is used as a server where detailed information about doctor and patient are stored along with prescription and appointment date. Both doctor and patient have IDs' and password for accessing the server. Also, the data of medication and temperature of patient are stored on the server for doctor's ease. The Doctor can change the patient's prescription if necessary, which will also be notified via email. Moreover, the doctor can take immediate steps in case of an emergency.

**Keywords-** *Internet-of-Things (IOT), smart medicine box, server, remote observation, Health- IoT*

## I. INTRODUCTION

Human life expectancy has been enhanced due to the advances in medicine. Even, the diseases that were thought to be incurable can now be treated effectively by one or more drugs. For most of the cases patients have to take drugs for one or more time a day and they forget to take the drug. With most medicines, does have to be taken at a regular interval or for a certain times of the day. In this field the patients sometimes forget to take it and as a result the expected remedy becomes hard. The problem becomes acute for the patient of elderly people or patients with inadequate skills or knowledge to follow a medicine or cognitively impaired patients. This segment of the people needs to take a lot of medicines daily and for them taking medicines on time is an important thing. In-home healthcare can keep an important role to reduce the expenditure on medical care or treatment. It is needed to develop advanced and practical health related technologies and apply them directly in the house so that people can get health services easily. IoT in healthcare is a hope because

medical centers can be more functional and patients can get better treatment. Different IoT wearable devices are keeping role in the field of medical. mIoT is a critical piece of the digital transformation of healthcare and it enables a change in work process and cost management. Wearable fitness, health education and in disease management. Not only this, by the help of IoT medical equipment and drug monitoring has become easy and selling of counterfeit medicine has also been reduced more than 10%. As in China alone, at least 200,000 people die each year due to wrong medication. Patient information management has become easy as even patient's family medical history can be kept and reference can assist the doctors to develop treatment programs. Many countries have taken the initiative to upgrade their infrastructure though optimizing medical resources and increasing the use of home healthcare.

Different researches and projects had been proposed to help people. Microcontroller based, IoT and RFID based project has been done which will give alerts to patients to take their medicine in right time. One of the research on iHome system which consists different sensors and combining them a home healthcare system has been proposed which will offer a solution for the medication noncompliance problem by reminding the user and dispensing a certain amount of medicine by the help of RFID [9, 10]. Also a smart medicine reminder system has been designed which has alerting system and display to remind about the medicine.

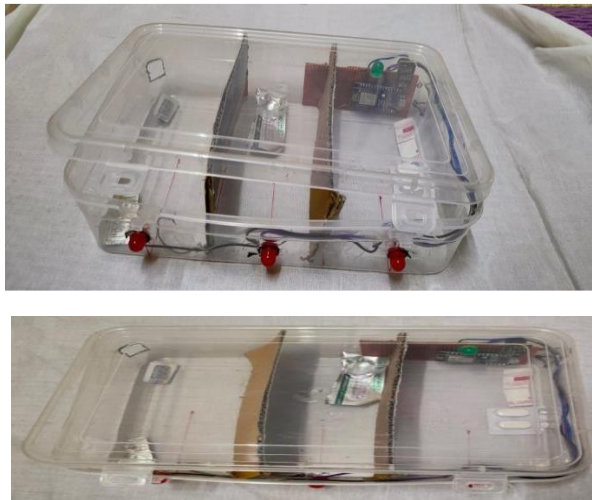
## II. ARCHITECTURE OF THE PROJECT

In this project, the intelligent medicine box will help a patient to remind him/her about his/her medication when it is time to take. For example, if a patient needs to take medicine at 6 a.m. In the morning the box will remind him by making sound and also by sending an alarm. While it's the right time to take the medicine then the box will make sound and will give notification until the user takes medicine or open the drawer. Also, if the user is outside of the home, then the medicine box will use the Wi-Fi module to send notification to the user's fixed email address or direct to the phone.

### *System Configuration*

Node MCU Wi-Fi module is the main components of this project and connected with each other through serial communication.

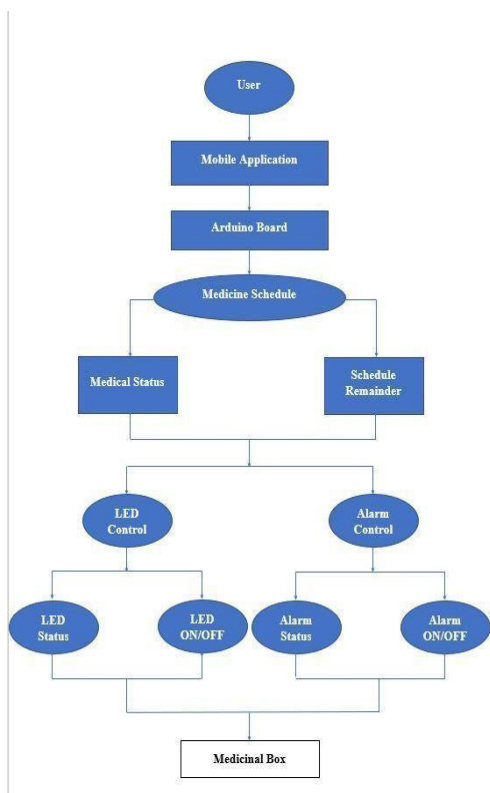
Node MCU is used for controlling alarm and LED, sending email to patients mobile and storing medication time data, temperature data to the server.



**Fig : Smart Medicinal Box**

**III. Control Algorithm**

**Fig. 3. Flow chart of medication process.**



To control the smart medicine box, a user needs to input the medical details and when to take them. As there are three compartments so the user can keep 3 types of medicine according to doctor supervision. In our system, the control algorithm is shown in figure. A real time clock is generated using the RTC module. The medication time or alarm tone is set in the code

compiled for this project. If the generated real time clock matches the medication time, then, an alarm will be created, the Buzzer will ring and an email will be sent to patients mobile as notification, the LED light of that compartment will glow, and the medicine name will be displayed on the screen. If the patient doesn't take medicine or misses any notification, then the light of the compartment will glow and name will be displayed on the screen. After taking the medicine from the compartment the LED will off.

LED bulb will glow which indicates the sensor will read data for 60 seconds. The Wi-Fi module extracts the maximum value from the reading and showed it on the LCD monitor. After 60 seconds the extracted maximum data will be sent to the server to help the doctor to monitor the patient remotely.

As the medicine box matches the time of the user's the box reminds him/her about the medicine at the right time given to the patient

With the help of the mobile application we can save the data of the patient the app and the medicine remainder can be given using the system clock reminder and can send the notification to the use at the time of the medicine as per its prescription given by doctor.

**IV. Mobile Application**

**Fig : Login page**

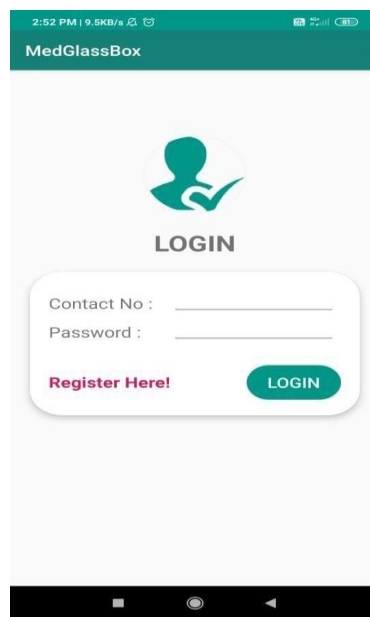


Fig : Registration Page

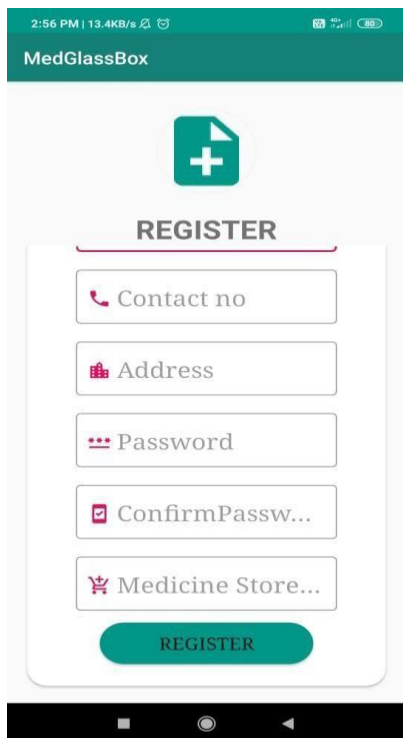


Fig : Medicine Remainder (as per user)

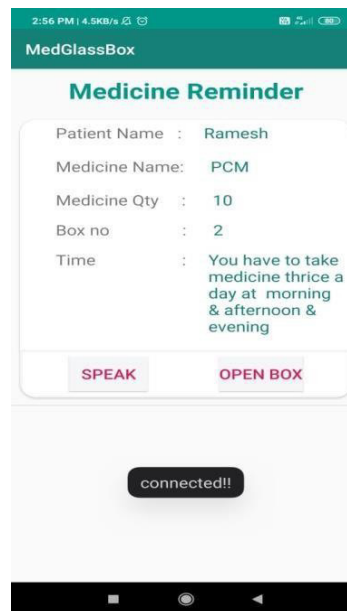
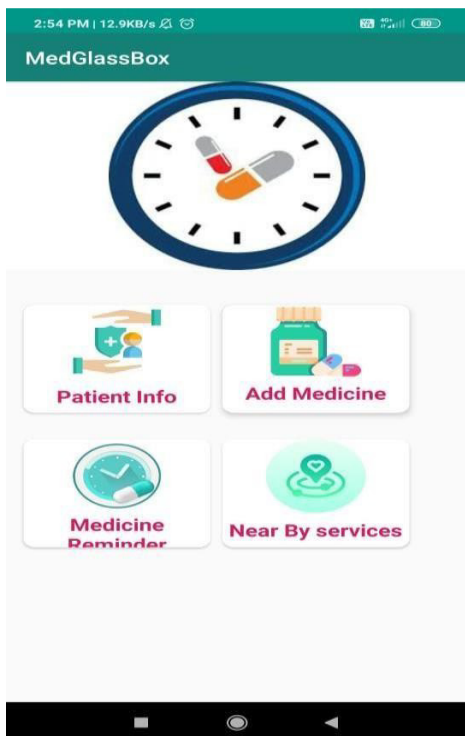


Fig : Dashboard



**V. Conclusion**

In recent days healthcare system is changing all over the world. IOT based application of smart healthcare system has created a new dimension of medication and healthcare in hospitals. The objective of his project is focusing on proper medication of a patient. Older people who need regular monitoring of their medication will be benefited through this project. Server for storing medication time and other information, mail transferring protocol, temperature sensor for proper monitoring of patient body temperature has been integrated in this project.

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