MEDICATION ADHERENCE SYSTEM

Dimpal Kitukale[1], Jyoti Darra[2], Pranjali Mehakare[3]

[1]Student, Electronics Engineering Department Shri Ramdeobaba College of Engineering and Management Nagpur, India

[2,3]Student, Electronics Engineering Department Shri Ramdeobaba College of Engineering and Management Nagpur, India

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Abstract - *It's said that poor adherence to prescribe medication can reduce the benefits of medicine and treatment effectiveness. Usefulness of health care services is seriously effected by medicine adherence. It is crucial that the pill is taken by the person on time, otherwise taking an incorrect one or not taking one in the slightest degree may expose the patient to some dangerous situations, starting from health issues up to death. To solve this problem, we proposed the medication adherence system for reminding the patient to take medicine on proper time. Our pill box is programmable which reminds the timing of medication by proper visible indication. It not only reminds but also keeps the daily record of patient medication history. Record of this medication history is send to doctor and patients close one through mail using IOT. Whenever count of pills reduces to zero, this system refill the medicine by automatically placing the order in the medical store using IOT. This system helps in increasing the safety of the people and also prevents the wrong dosages. It reduces the effort required in remembering medicine schedule and this will help the people to get the schedule of the medicine on time.*

Key Words: medication adherence, IOT, Pill box

1. INTRODUCTION

There are many types of pill boxes available so far in the market such as traditional pill box and the main aim of such pill box was only for loading pills without any of the pills falling out of the container. But only loading pills on time does not solve the purpose of designing Smart Pill Box. As we know population is growing rapidly so it has become essential to create awareness about health issues. When we designed pill box more important is to focus, how good quality the product has designed which requires less effort to access.

Currently, worldwide aging and regularity of persistent diseases is a broad concern. Forgetfulness while taking medicine is one of the main reasons of unintentional medication non-adherence. Our Electronic pill box act as a reminder for the user and also allow family members of a patient to check whether they have taken a medicine on time or not. This helps the patient to take their pills on time without help of any nurse or caretaker. If in case patient forgets to take his medicine, an alert message will be send via mobile phone. After a weak a report will be generated to show the status of daily dosage taken by the patient and send to family member and doctor.

2. RELATED WORK

Several types of pill dispensers produced by different companies are available within the market that comprises of built-in alarm that will notify the users without having online database to avoid wasting the users and pills, or having remote access functionality.

2.1 Smart Medicine Dispenser (SMD)

The Android application which stores the data on the cloud and performs synchronization upon login is the primary way to interact the system with the patient.

To dispense the pills, the phone connected to the Arduino will start sending commands.

SMD provides the patient with a touch interface available as an application on their mobile which will allow them to manage and control medicine schedules.

2.2 Automatic Pill Reminder for Easy Supervision

IR SENSOR is used to check the closing and opening of the box. The box is attached with an RTC module and Arduino Uno which process the activities and accordingly display the details of the pill and time intake on the LCD.

GSM module is used to send the SMS to the doctor or caretaker and a buzzer is used to alert the patient.

2.3 Pill dispenser with alarm via smart phone notification

A pill dispenser was designed in such a way that it consist of a combination of infrared sensors and Arduino microcontroller with alarm system to help the patients take their pills at the correct time .the alarm function was added to the system as a popup notification via the Instapush application on the smart phone. This system differs from the existing built-in alarm pill dispenser, as the notification can be received by not only the patient, but also by the family members that have installed the Instapush application in their smart phone.

3. MOTIVATION

• Proper medication adherence determines the success rate of treatment.

• A survey conducted by Nation Community pharmacists Association (NCPA) shows that only 24% of patients strictly adhere to the medical prescription, which proves that more than 75% of the patients fail to take their medicines on time due to various reasons.

• Forgetfulness while taking medicine is one of the main reasons of unintentional medication non-adherence. Technologies that help patient remember to take their medicine on time often do not take into account the context of people's everyday lives.

• Existing evidence that shows the effectiveness of remembering strategies that supported contextual cues is largely depend upon research with older adults and Alzheimer's patient, and thus it is not clear whether it are often generalized to other populations or accustomed inform the look of wider adherence technologies that support medication self-management.

• Understanding how younger generation populations currently remember medications can give information of the design of future technologies that take advantage of previous contextual cues to support remembering.

4. METHODOLOGY
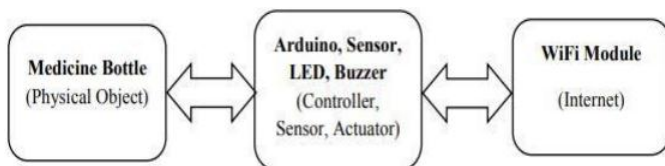
Medicine assistance system functions to remind users of when they're forgetting their prescriptions. It involves the pill cap connected to the internet that sends signals to a tool that resembles a nightlight. According to the timing of the medicines, the led connected to the system will blink and also buzzer will ring , which gets louder as time goes by. If the medication continues to be not taken, this device generates an automatic telephony to the user to remind them to require a pill and ask them why they've forgotten it to this point. It also offers the aptitude to e-mail your adherence rate to a selected friend or loved one, if you're someone who is spurred by social support.

SENSOR:

A sensor is use to detect events or changes in its surrounding environment and accordingly send the knowledge to other electronics devices, such as a computer processor. A sensor is always used with other electronics.

PROCESSOR:

The ESP8266 could be a cost efficient Wi-Fi microchip that is produced by manufacturer Espressif Systems in Shanghai, China. ESP8266 has on-board processing and storage capabilities that can be integrated with the sensors and other application devices with the assistance of GPIOs available with minimal development up-front and minimal loading during runtime.

OUTPUT: Buzzer, LED

A buzzer is an audio signaling device. A light-emitting diode (LED) emits light when current flows through it when a Deadline is missed, the system will blink and sound an alarm, which gets louder as time goes by.

4. WORKING OF SYSTEM

In order to cut back the responsibility of members of family of medicines within the pill box, we assume that the medicine the patients must take at particular times has been packed into the pill box. In this system we have to line the pill time for required medicine by using input system. We have to line the time in open IOT platform Blynk. System checks the pill time from internet using IOT service. When the system matches the time from the web it alert the patient by giving visual indication and at the same time notification on the phone. If the patient take medicine on time then it marked as 'done' for the day and if just in case patient fails to take the medicine then the software marked it as 'missed'. In this way, system monitors the medication of patient. This system thus create weekly report of patient medication whether he/she has taken the pill or not. This weekly report can be send to the patient's relative or doctor if required. When the pills from the bottle finishes, this system gives the notification to the user that whether they want to refill the bottle or not. If user click on yes button then, this system directly place the order for prescribed pills in the medical store by email service using IOT.

As for the hardware part, the finished circuit will be placed within the bottle cap. The micro switch are going to be attached to the bottle cap in such a fashion that, it will be on when connecting the cap to the bottle and off when removing the cap from the bottle. When the switch is pressed it will power up the ESP module. ESP module will then be connected to the wifi and send data to the cloud. Then the ESP module will go into the sleep mode for an infinite time. When someone opens the bottle cap to take the medication ESP module will be disconnected from the power source. After taking medication, when the patient close the bottle cap the switch will be close again and ESP module will be turned on again. ESP module will send some data to the cloud and again goes to the sleep mode for an infinite time. So, we can conclude that every time someone opens and close the pill bottle, ESP module restarts, sends data to the

cloud and goes to the permanent sleep. This kind of hardware helps to develop smart pill box using IOT.

5. ADVANTAGES OF PROPOSED SYSTEM AS COMPARED TO TRADITIONAL SYSTEM

1. It can be life savior at times as it reminds patient to take medicine.

2. It can be used as modern smart medical equipment.

3. Helps blind and partial deaf person to take medicine without any assistance.

4. It is very helpful for the patients who are suffering from diseases like Dementia and Alzheimer.

5. It is good for chronic disease management.

6. Online report generation of medicine of the patient using Blynk software.

7. Real-time health statistics monitoring of medicines

6. CONCLUSION

Elderly people constitute 8.5% of the population and plays very important role in the society. Therefore it is necessary to create new devices using the emerging technology like IOT in order to improve medication safety and to avoid confusion in taking tablet among the elderly, this paper proposed a smart adherence system with remind and confirm functions. The smart pill box can help to reduce responsibility of family members towards the correct and timely consumption of medicines. This pillbox alert the user to take medicine on time as per schedule. The open IOT platform Blynk helps to generate online report of the medication of patient. It is cost efficient and can be easily accessible for patients of all sectors.

ACKNOWLEDGMENT

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