International Journal of Innovative Research in Science and Engineering
Volume 08, Issue 04, 2022
www.ijirse.com
ISSN: 2454-9665

CareTracker: A smart pill dispenser to dispense and monitor medications.

Asit Sonawane[1], Aman Bhoskar[2], Moin Azam[3], Sohail Behlim[4]

Mrs. Pratima Patil Professor[5]

[1,2,3,4,5]*Computer Engineering, Trinity Academy of Engineering, Pune, India*

Abstract

With an increasing number of elderly patients, busy-scheduled patients, and patients with mental disabilities, many patients are missing their medication. According to WebMD, Americans fail to follow their doctor or pharmacist's instructions and dosages about half the time. CareTracker is a compact device that helps patients schedule, track, sort and remind them about their medications. CareTracker could also be connected with Android, IOS and Windows devices to manage and control the device.

I. INTRODUCTION

In India, more than 4 million people have some form of dementia. Worldwide, at least 44 million people are living with dementia, making the disease a global health crisis that must be addressed.

Medication adherence is a growing concern throughout the healthcare industry with doctors, healthcare systems, and other stakeholders (insurance companies) since the elderly or senior patients' medication has a big issue of drugs misuse. Many elderly patients do not have a caretaker who can sort out medications every time. It is very likely for them to forget to take their pills on time Nowadays, family members or assistants to the elderly have more difficulties taking care of dependent persons. This device will help family members to easily take and manage medication of elderly people or patients suffering from diseases like Alzheimer's.

CareTracker aims to help the patients, primarily seniors, take their medications on time in an easy way without the possibility of missing pills and to reduce the risk of over or under dosing accidentally. In addition, CareTracker provides the user with a touch interface available as an application on their smartphone, which will allow them to control dosages, monitor medication history, schedule dosages and much more[1].[2]

The main purpose of this system is to help the patients, primarily seniors, take their medications on time in an easy way without the possibility of missing pills, also reduce the risk of over or under dosing accidentally. The CakeTracker could solve such problems by informing and alerting the patients and their caretakers to take the appropriate dose at the right time. In addition, CakeTracker provides the user with a touch interface available as an application on their smartphone which will allow them to remotely manage and control pill schedules

II. LITURATURE SURVEY/BACKGROUND

Adopting the internet of things technologies in health care system. In this a real time monitoring of patients health through app. Medication assistance devices or system can be found in the market, majority of them are

ISSN: 2454-9665

manual medication assistants which includes pill trays that hosts multiple containers to store medication.[3] Each container is dedicated to hold medication for a single time, many such containers are grouped together forming a tray that serves medication for a period of 28 days. There is no provision of intimating the time of taking the medicine.

Design and Development of a 3D Printed Portable PillBox for continuous medication adherence. In this cost of electronics component and implementation reduce and its more effective.[4]

Application of Firebase in Android App Development-A Study. It was published about Designing the structure of database in Firebase.Just IoT Internet of Things based on the Firebase real-time database. It was published about With Just IoT to collect huge data, a machine learning framework will be integrated to enhance the system intelligence in the near future .Using Firebase Cloud Messaging to Control Mobile Applications. It was published about Firebase Cloud Messaging. Firebase Cloud Messaging (FCM) is a cross-platform messaging solution that lets you reliably send messages at no cost. IoT System for Monitoring a Large-Area Environment Sensors and Control Actuators Using Real-Time Firebase Database.[13] It was published about Real-time firebase database. Data is synced across all clients in real-time, and remains available when your app goes offline.

Functionality of C++ in IOT devices 2) Smart Medicine Dispenser (SMD) (2018) Arduino Code Flowchart[5] Teaching Modern C++ with Flipped Classroom and Enjoyable IoT Hardware (2019) C++ can be easily and effectively centred around IOT for effective learning. C++ has unique pointers, templates, standard library, containers and concurrency.

Several different pillbox were available in the market. The cheapest one was the traditional pillbox, which contained seven boxes for seven different days of a week, costing around 200 rupees. However, user had to load the pills to the boxes every week. Mixing different pills in the same box would increase the risk of making mistakes.[15] We also found another type of pillbox, which had the sound reminder, and was able to remind the user to take medicine at user specified time. However, the users still have to put different kinds of pills in the same box, and reload the boxes every week. Additionally, it could only remind the user to take pills once a day. The average costs of

this type of pillbox were about 1000 INR, Therefore, we think it was necessary to build a cheap and functional smart Medicine Box that could bring more convenience for the user. [6] We then defined the specifications of our device based on the user needs. From the literature cited, the research proposed an idea of Smart Medicine Box [9]-[10] that will adapt the features of time tracking and alarm triggering Additionally, as compared to the existing system, It will remind the user to take medicine not for once per day but thrice per day along with that user does not need to refill the box every week.

Components:

The project entails a simple electronic reminder system comprising of the following components: Real time clock, Arduino Uno, Arduino IDE, IR sensors, Buzzer, GSM Module, LCD Display, Pill Box, connecting wires, jumper wires, and breadboard.

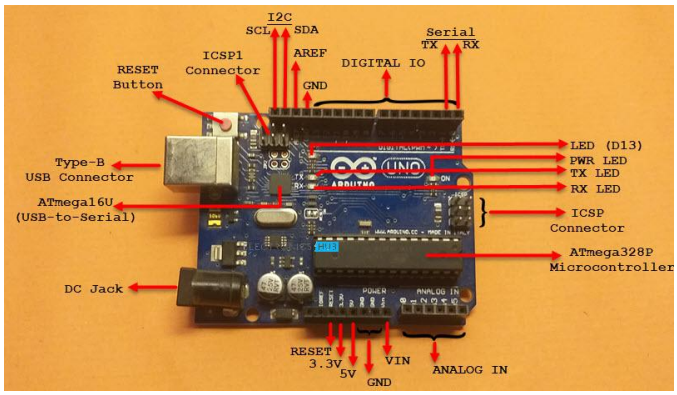
Medicine Box

International Journal of Innovative Research in Science and Engineering
Volume 08, Issue 04, 2022
www.ijirse.com
ISSN: 2454-9665

A rectangle box is divided into three equal sub-boxes where each sub-box contains a LED and buzzer is fitted onto the top of the box.

Arduino

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analogy inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) [7]that runs on your computer, used to write and upload computer code to the physical board.



LCD

Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. In our project 16x4 LCD is used to display the information about pillbox such as the number of medicines in each sub-box to be consumed when the alarm rings.

GSM

GSM (Global System for Mobile Communications, originally Groupe Special Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI).It was created to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones and is now the

ISSN: 2454-9665

default global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories. The SIM800L module supports quad-band GSM/GPRS network, [9]available for GPRS and SMS message data remote transmission.

Real Time Clock Module

Real Time Clock (RTC) module uses the DS1307 to keep track of the current year, month, day as well as the current time. It includes small lithium coin cell battery that will run the RTC and can be accessed via the I2C protocol.

In our project it used to set a specific time as per the patient required i.e. if the user wants to set 8.00 am as its morning medicine taking time then they can do with the help of this module.

III. PROPOSED WORK/SYSTEM

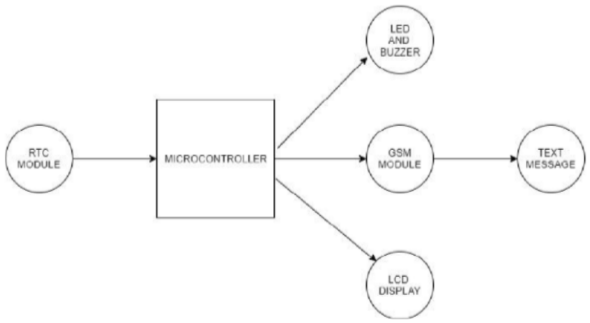
The setup consists of a small box divided into multiple compartments, each having a lid to open and an IR sensor attached to it. The box is connected to a real time clock, a microcontroller device Arduino Uno which processes the activities and accordingly displays the pill details and time of intake on the LCD attached to the box and a GSM module which sends message to the family physician or members in case the pill is not taken. The box consists of several compartments each having a pill for a definite time of the day.

An electronic real time clock, with factory predetermined time interval, is automatically activated in sync with the pill intake timings. The real time clock will start beating and as it reaches the stipulated time of pill-intake, the buzzer will go on and message will be displayed regarding which pill to take and time to take each pill [7]-[8]. The pill dispenser may be preloaded by the patient himself or may be preloaded by someone assisting the patient once a day, thereby minimizing or totally eliminating the possible confusion as to when to take the prescribed medicine and what dosages to take.

A) Now if the person/user takes the pills, i.e. opens the lid, the IR Sensor attached to the lid will detect that the lid is opened and hence will send the output to Arduino which will stop the buzzer. This will be taken into the log registering the person has taken his medicine successfully.[10]

B) In case the person fails to take the medicine or refuses to, the lid will not open and the buzzer will automatically stop after a pre-set time and will be put on snooze. If a person again misses the medicine, the output will be sent to the GSM module attached which in turn will send a message to the person reminding him that he has missed a pill. And if once again the person misses the pill, a message will be sent to family members. The block diagram of the proposed model, process flow, front and side view of the model are as shown in Figures respectively.

International Journal of Innovative Research in Science and Engineering
Volume 08, Issue 04, 2022
www.ijirse.com
ISSN: 2454-9665



Algorithm

The automatedpill dispenser facilitates the user to constantly monitor the health of the patient without the need to be physically present with the patient.The proposed system consists of an IOT enabled medicine box which gives timely intimation for the patients about their medication.[10]It alerts the patients to take medicines at the proper time.The medicine details can be recorded in the System by the caretaker of the patient. The architecture of the Automated Pill Dispenser is described in Fig.

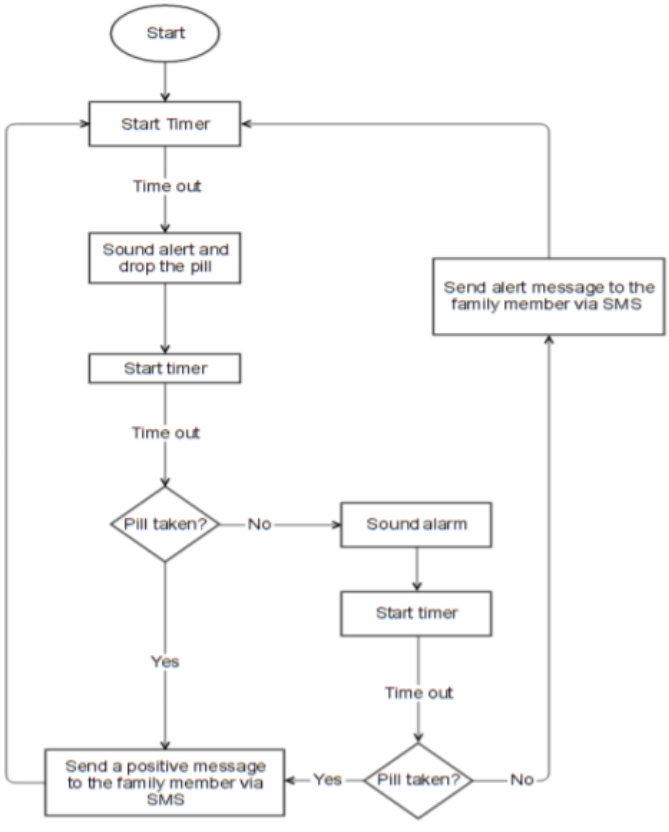


Fig. 2 Flowchart of working of the Automated Pill Dispenser.

IV. RESULT AND DISCUSSIONS

How To Use The System • Turn On The Device • Connect The Phone To The ESP AP

•Use Roboremo to access the smartphone app.

ISSN: 2454-9665

•Change the dosage of each tablet and place it in the opposite spot.

•Wait for a notice every time the medication is taken.

First, we verified that the ESP connection to the remote app worked, as we interact with the app using certain string patterns or codes. The connection between the ESP and the Arduino NANO was also tested using the serial monitor to ensure that there was no delay in transmission or any lost characters. The same testing method was used to test the connection between the ESP and the Arduino NANO, with the results revealing that the delay was only 100 milliseconds.

V. CONCLUSION

This paper focus on the implementation of new technologies designed to overcome the disadvantages of conventional pill dispenser, which includes less reliability, inconvenience. The proposed dispenser has two advantages over existing medication dispensers, they are, To achieve a high degree of remote manageability, and High dependability, cost effective and user friendly management system. Further, system settings, the automated pill dispenser gives the flexibility to remotely manage the errors without causing inconvenience to the user .The automated pill dispenser functions normally and performs the management operations from the medication monitoring server suitably .[11]The automated pill dispenser can be used to improve medication adherence. It is designed to prevent the users from accessing over dosage or under dosage of the prescribed medication. Further, this project can include functionalities like motion sensors and cameras to ensure that user consumes the medication. Finally, the user interface which is the same on all the devices including the machine is intuitive, clear and easy to use, even for elderly patients. The design allows the user to add more containers or more pills per serving

REFERECNES

[1] MacLaughlin, Eric J., et al. "Assessing medication adherence in the elderly." Drugs & aging 22.3 (2005): 231-255.

[2] G. Eason, B. Noble, and I.N. Sneddon Lewis, Kermit E., and Arthur S. Roberts Jr. "Automatic pill dispenser and method of administering medical pills." U.S. Patent No. 4,573,606. 4 Mar. 1986.

[3] Heneghan, Carl J., P. Glasziou, and Rafael Perera. "Reminder packaging for improving adherence to self-administered long-term medications." Cochrane Database Syst Rev 1 (2006)

[4] https://data-flair.training/blogs/features-of-c-plus-plus/

[5] Alok Kulkarni, Sampada SatheHealthcare applications of the internet of things:A review(IJCSIT) Int J Comput Sci Inf Technol, 5 (No 5) (2014), pp. 6229-6232

[6] Billingsley, Luanne, and Ann Carruth. "Use of technology to promote effective medication adherence." The Journal of Continuing Education in Nursing 46.8 (2015): 340-342.

[7] Samir Patel, et al. Mobilizing your medications: an automated medication reminder application for mobile phones and hypertension medication adherence in a high-risk urban population

[8] Patel, Samir, et al. "Mobilizing your medications: an automated medication reminder application for mobile phones and hypertension medication adherence in a high-risk urban population." (2013): 630-639.

ISSN: 2454-9665

[9] Bai, Ying-Wen, and Ting-Hsuan Kuo. "Medication adherence by using a hybrid automatic reminder machine." Consumer Electronics (ICCE), 2016 IEEE International Conference on. IEEE, 2016.

[10] Shaw, Thomas J. "Automatic pill dispensing apparatus." U.S. Patent No. 5,609,268. 11 Mar. 1997.

[11] MacLaughlin, Eric J., et al. "Assessing medication adherence in the elderly." Drugs & aging 22.3 (2005): 231-255. 2005): 231-255.