International Journal on Future Revolution in Computer Science & Communication Engineering
Volume: 5 Issue: 2
ISSN: 2454-4248
13 – 16

Medication Reminders through Alarms using Fingerprint Sensors and IFTTT Application

T. Venkat Narayana Rao
Professor, CSE, SNIST
Sreenidhi Institute of Science and Technology
Yamnampet, Hyderabad, India

Awaru Vaishnavi
Student , CSE, SNIST
Sreenidhi Institute of Science and Technology
Yamnampet, Hyderabad, India

Abstract: In today's world most of the people are suffering from some or the other illness. Everyone is so busy with their lives that they forget taking medicines on time. They had to take the respective medicine time to time but ends up not taking it properly on time which may lead to dementia, means forgetting things of their daily routine (short time memory loss). Most importantly old people who cannot remember to take medicines leads to high illness which is not advisable, sometimes even the caretaker couldn't remember to make the patient to take medicines. So, the suggested model for this issue is a medication box that would insist the patient or caretaker around to take the medicines without failure. It is an alarm based device that helps in reminding patients about their medication. The uses of Internet of Things (IoT) applications make diagnosis easier and convenient for the patients. This device helps in maintaining one-time medication to the patients, and helps increasing the life expectancy.

***Key words**: Internet of Things, Medication, reminders, Arduino and sensor.*

*****

I. Introduction

With the updating lifestyle of every person and their busy schedules, many of them forget many things daily, one such important thing is medicine intake. For the people who are suffering from serious disease must take the medicines properly prescribed by doctor else would lead to bad results. If the patient is at home then some or the other housemate could remind him regarding medicines but this is not possible all the times. For this purpose there is a need for a facility, so that customized medication box could give patients timely alerts to take medicines [1]. The medication box proposed in this paper will make timely alerts to the patient and caretaker to caution through alarms. Whatever the time we mention in our code will be saved and for every occurrence of the time, the alarm rings displaying the medicines. The device is designed as eco friendly and is within the economical range. The entire model is an application of IoT. IoT is the present buzz word which is seen everywhere in almost all applications of our daily routine. This model will definitely have a large scope in present and future days due to its features[1][2]. The medication box would also display the names of medicines to be taken at a preset time with the required dosages.

- Now a days, people are busy with their hectic schedule and they eventually forget the habit of taking medicines on time. So, we need to take care of our own health.
- They may take extra dosage of pills or as if they might have not taken before.
- As of now this is something we are going to remind through through a hardware device[3].

II. The Architecture

Hardware Used:

1. NodeMCU – It is an open source IoT platform to connect the entire hardware to a mobile through wireless application.
2. Arduino Uno board -this microcontroller is used to perform the entire process.
3. Fingerprint sensor / Touch sensor
4. LCD - 2*16 line display is used.
5. RTC – to accurate the time and to display it on screen.
6. Breadboard – to connect and unite the entire hardware, it act a base connection.
7. I2C module – this is used because while connecting I2c and LCD parallelly on breadboard, we need to four output connections to make LCD work.
8. Wires-we need female to male, male to male and female to female wires.
9. Generate Alarm.
10. Cable-To dump the code from pc to arduino uno or nodeMcu Board.

Softwares Used:

1. Arduino Software
2. IFTTT – (If This Then That)

This is a free web based service to create small and simple chains of conditional statements, called applets. This is used to create applet using one's own details like mobile number, hotspot name and password. The applet is triggered by

 ISSN: 2454-4248
13 – 16

changes which occur in web services like Instagram, Gmail, telegram, face book, Pinterest etc.

As it is an hardware device using valid fingerprint to trigger the applet[3]. The IFTTT application should be installed in registered users mobile. By following the steps instructed by the application, the required code is loaded with the caretaker's details. It is required to specify what message to be sent to the user when an event triggers. Whenever, the valid fingerprint is sensed by fingerprint sensor, the applet gets triggered and the message is sent[4][5].

III. The Implementation

In a usual practice there exists a Mediation Box where all the medicines relating to the patient are kept. The sensors are arranged over the Medication box. This system is developed as an application of IOT [4]. The Sensors include nodemMCU, Arduino, fingerprint Sensor, I2c module, Timer and LCD. The required source code is developed using Arduino Software. The message to the registered mobile number is sent using IFTTT[6].

The user can also use Touch sensor in place of fingerprint sensor. Touch sensor scans any fingerprint; it does not look for a valid fingerprint and accepts any fingerprint of any person irrespective of valid ones. The advantage of fingerprint sensor over touch sensor is to recognize only valid and pre-registered fingerprints of the patient only. As compared to touch sensor, fingerprint sensor is more secured and useful. This experiment employs fingerprint sensor. Initially the patient must register his fingerprint with fingerprint sensor. Time panel always displays on the LCD because of the Timer(RTC Module) which is handy module used to keep accurate time for years together. Whatever time, the medicines, the dosage we specify in code are going to be displayed on the LCD at that respective time. An alarm is set up besides the medication box so as to specify the time we desire for. The alarm is the indicator to intake the displayed medicines. The LCD displays the medicine to be taken with the required dosage. The alarm goes on ringing till the fingerprint sensor scans the valid in taker's (patient's) fingerprint. Once the valid fingerprint scans, the alarm stops, and the message "HELLO! THE MEDICINE HAS BEEN TAKEN" is sent to the registered mobile number. In order make use of registered mobile number for messages, the IFTTT application must run in the background of mobile, to offer notifications of the intetnded medicines. The detailed flowchart representation is shown in figure 1.This repeats every time the specified time arrives.

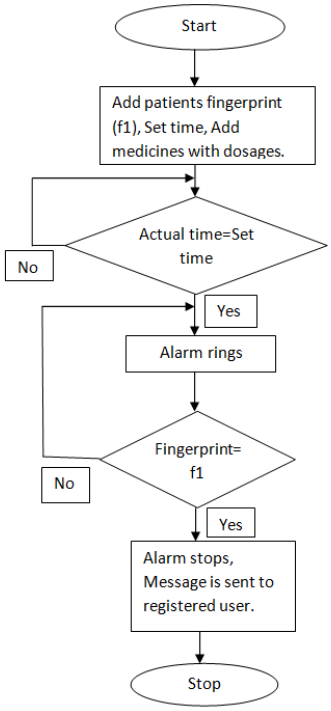

Figure 1 : Flow chart of the Implementation

Algorithmic Implementation

Initially the user need to register through fingerprint sensor which assigns us a FingerId and finger confidence which is used later for identification of valid and invalid fingerprint

Step 1 .Include all the libraries like

#include <Wire.h>
#include <Adafruit_Fingerprint.h>
#include <LiquidCrystal_I2C.h>
#include "RTClib.h"
#include <SoftwareSerial.h>

Step 2. We need to declare all the pin modes using for output in void setup ().

Step 3. In void loop (), we need to write code which reads the date, time, year from year to store and display it all the time.

Step 4. Then write code which takes the specified time, medicines, and dosages from the user and give the signal to the alarm to ring at that specific time.

Step 5. Soon after it recognizes we need to make a if statement to recognize the scanned fingerprint I'd with store I'd. If valid write output to stop alarm, send message to caretaker.

Step 6. In another file , save the file given by the IFTTT application.

In that file, declare that pin as input which is connected to Arduino Uno board.

 ISSN: 2454-4248
13 – 16

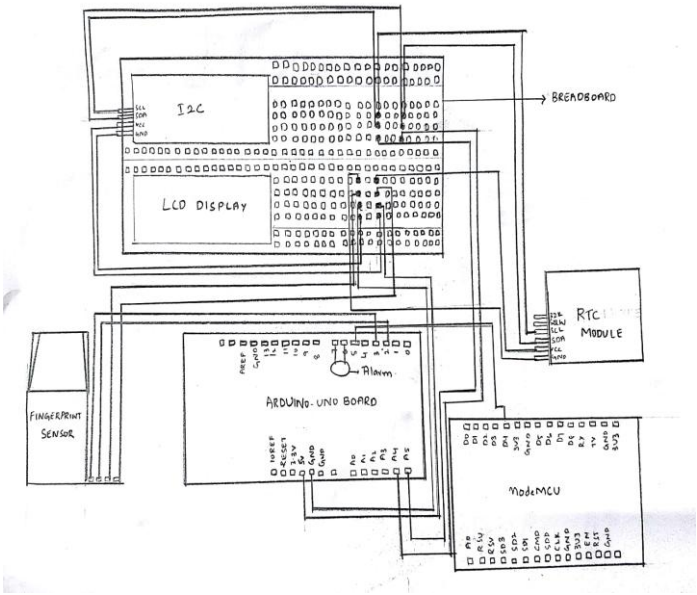

Figure 2: System Design

- LCD and I2C should connect in parallel on breadboard so that only four pins of I2C module can make LCD to work.
- The ground (GND) and 5V (VCC) pins of I2c, Arduino board, fingerprint sensor, RTC module should be connected in parallel order.
- SDA (Synchronized data line) and SCL (Synchronized clock line) of I2C module, RTC module, A4&A5 pins of Arduino Board (A4-SDA, A5-SCL) should connect in parallel order.
- Tx-out, Rx-in of fingerprint sensor should be pinned into any two pins of Arduino board (say A2, A3).
- The output of Arduino board (5) is connected to D4 pin of nodeMCU which acts as input for the nodeMCU for sending message to person's mobile using Wireless transceiver module.
- The alarm is placed in 6th, 7th pin modes in Arduino Board.

IV. Results of the Experiment

There is only one module i.e.., users but that can be handle by both user and caretaker. The updation of medicines can be take care by user or caretaker. But the message should be sent to caretaker so that they will know about the medicines intake of patient/user[7][8].

Screenshot of time displays:

The figure 4.1 exhibits time and date displays on LCD. As this Lcd is 2*16 is displays in 2 rows and the time we have displayed.

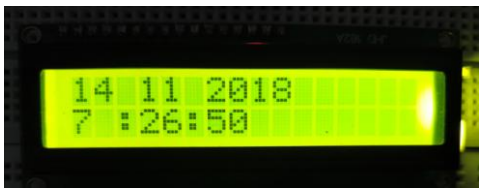

Figure 4.1: Screenshot

Screenshot of displaying medicines:

The figure 4.2 exhibits the medicines actually displays with the respective dosage at specified time.

Figure 4.2: Screenshot

Screenshot of displaying message:

The figure 4.3 shows LCD displaying that the "message taken and Sms has sent" as soon as the fingerprint scans the valid user input.

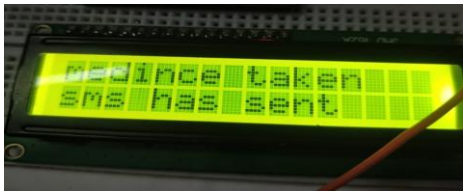

Figure 4.3 SMS Initiations Screen shot

Screenshot of message on caretakers mobile:

The figure 4.4 shows the screenshot of the message comes on registered caretakers mobile.

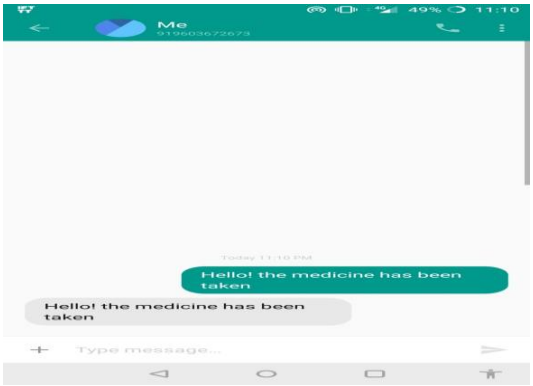

Figure 4.4 SMS Screen Shot

V. Conclusion

The device ensures remembering the medicines without failure and also prevents wrong dosages intake. It minimizes the effort by human by remembering the medicines. It also displays the medicines to be taken with the respective dosages, timings. This work offers a good scope for development of assistive device for the people and helps

 ISSN: 2454-4248
13 – 16

them follow the medicine course properly and offer a good healing experience. The above device was made by considering requirements of patients within economical range. This study can be extended by augmenting few security systems so that only caretaker or patient would be able to modify the medicines and update the entire medicine course with more flexible options.

BIBLIOGRAPHY:

[1] International Journal of Managing Public Sector Information and Communication Technologies (IJMPICT)Vol6, No. 2, June 2015
[2] E. Sabate,´ Adherence to long-term therapies: evidence for action. World Health Organization, 2003.
[3] https://ifttt.com/
[4] International Journal Of Engineering And Computer Science ISSN:2319-7242 Volume 6 Issue 4 April 2017, Page No. 20927-20930
[5] K. Stawarz, A. L. Cox, and A. Blandford, "Don't forget your pill!: Designing effective medication reminder apps that support users' daily routines," in Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 2014, pp. 2269–2278.
[6] M. Vervloet, A. J. Linn, J. C. van Weert, D. H. De Bakker, M. L. Bouvy, and L. Van Dijk, "The effectiveness of interventions using electronic reminders to improve adherence to chronic medication: a systematic review of the literature," Journal of the American Medical Informatics Association, vol. 19, no. 5, pp. 696–704, 2012.
[7] Mayuresh Waykole, Vatsalya Prakash, Himanshu Singh, Nalini N .VIT University, Vellore.ArduMed. (2016). Smart Medicine Reminder for Old People.
[8] Samir V.Zanjala*, Girish. R. Talmaleb. (2015). Medicine Reminder and Monitoring System for Secure Health Using IOT. International Conference on Information Security & Privacy (ICISP2015).