

Survey on IOT Based Medical Box for Elderly People

Pampapathi B M¹, Chandana Murthy², Supriya Kumar³, Pooja M⁴, Supriya K⁵

¹ Asst. Professor, India, bm.pampapathi7@gmail.com.

² Student, India, chandanamurthy2226@gmail.com.

³ Student, India, supriya.k007@gmail.com.

⁴ Student, India, poojachandrakanth123@gmail.com

⁵ Student, India, supriiriya@gmail.com



ABSTRACT

While the health care society is slow to embrace IOT (Internet of Things) than other sectors, IOT is intended to keep people safe and secure in the field of medicine, where the primary goal is to minimize health care costs in the coming years. A smart IOT-based healthcare system, which includes a sensor-associated intelligence medicine box and a server for routine health monitoring, has been proposed here. This wireless internet access smart medicine box allows patients to get daily health care and to establish easy contact without physically meeting between doctor and patient. The recommended medicine box allows the patient to take the correct medicine at the right time, along with an email to help the patient take the medicine. A laptop is used as a server where, along with prescription and appointment date, accurate information about the doctor and patient is kept. The doctor and the patient both have IDs and passwords to access the server. In addition, the drug data and patient temperature are kept on the server for the convenience of the doctor. The doctor can if necessary, change the patient's prescription, which will also be notified by email. In addition, in the event of an emergency, the doctor should take immediate action.

Key words : Internet-of-things (IOT), Smart medicine box, Firebase cloud, Android app, Health-IOT

1.INTRODUCTION

Thanks to the techniques of medicine, human life eagerness has been intensified. Even the disorder disordered they claimed to be irremediable is now effectively served by one or more drugs. It could be health injuries to swallow too many of the capsules. If it is not consumed, risk is also present in the same system. So it is best to take proper medicine at the right time. Healthcare at home may play a vital role in lowering expenses on medical care or therapy. Advanced and realistic health-related innovations need to be built and appealed to them directly in the family so that people can get health solutions effortlessly. As medical centers can be more

effective and patients can get healthier drugs, IOT in health care is an ambition [1, 2]. IOT is an analytical component of the digital transition in health care which allows for a change in the process of work and cost control. Wearable IOT devices and Smartphone applications are also used in health education and disease prevention to encourage wellness [3, 4]. Comparative studies and campaigns have been put forward to benefit people. The IOT and RFID-based microcontroller project has been completed to alert patients in time to take their pills [5]. One of the studies on the IHOME system containing several sensors and integrating them with the home health care system was proposed to provide a solution to the problem of medication refusal by informing the user and delivering a particular amount of medicine with the aid of RFID, as well as a smart medicine reminder system which has a changing system and monitor to remind me One of the significant benefits for the elderly population is the growth of medical technology [6, 7, 8].

The diseases are often suffered by elderly people. The protection of medicine is most important for the elderly. Immoderate substance use and rejecting the course of treatment are the most frequently experienced cases of alcoholism[9]. The use of incorrect pills can cause side effects or loss of usefulness. The worst case could be body organs or even mortal pain. Nevertheless the humiliating recollection and comprehension committed make it impossible for the elders to escape such problems. The elders are hard at stopping those issues. To reliably take the medicines, the elders need some prop up for them. We present a method that can help to take medication at the right time to fix these problems. The device should guarantee that each scheduled time instance of the drug can be collected. It is possible to add an additional feature, such as reminding the elders to buzz the alarm. If the patient does not take pills at the right time or the patient mishears the drug, one additional feature such as the machine would send the message to patient family members. This study aims to establish a stable and non-intrusive platform for the wireless monitoring of medical-based human

enterprises using wristband-embedded wearable accelerometers. The framework put forward differentiates various activities based on medication intake with greater precision and less training data. Via an SMS about these events, the caretakers or health care officials are changed. The caretakers will illuminate the periodicity using this device .A wristband is chosen for implanting the sensor because it is comfortable and easy to wear on a daily basis. Medical related processor performed by patients, thereby reducing the need for committed physicians [10, 11, 12] .

2. WORKING

2.1 Android Application

We all Know that Android is an open-source software pyramid that cover the operating system, live wire and built in phone implementation form on a change version of Linux that appliance dealer can further personalized to transform their consequence. In this estimate we use android application like phone, laptops etc. Protector can examine whether the user can take therapeutics or not from an Android application. Android application is utilize a data base firebase real time database.

In this project an android app contains

1. Medicine details
2. Remainder details

A database Firebase has been generated to reserve all kinds of data about doctor and patient, Remedies time information and

body temperature details. A app has been designed which carry doctor and patient login option. All sort of complete data of doctor and patient, Medicine time information and temperature data are displayed on the app. The subsequent frame is the home page of the app for the hospital.

In remainder details it lay remainder to the patients. The pill box will aid patient to remember their medication when it is time to get hold of . For example if a user needs to grab medicine at 7.a.m. in forenoon the pill box will remind him by manufacturing sound and also by addressing an alarm. If he forgets the actual time of receipts medicine and goes to take medication at any time the pill box will not open. While its the correct time to take the healing then the box will send notification until the patient takes therapy. Fire base sends notification about remedy utilization level, medicine accessibility in box and update notification to the user and doctor.

2.1 Medical Box

The sensors that are incorporated with the medical box enable users to monitor their body temperature and pulse at any time.

The user may use the body temperature sensor to monitor his or her body temperature, and may use the pulse temperature to check his pulse. A certain number of small boxes would be included in the medical box. Garden will fill the boxes with medications and enter the medication information into the Android program. When the patient takes the drug that the medical box reminds them to take, the box will warn them to take it again. The medical box will send a status update to the firebase cloud.

2.3 Performance and Scalability

This device performs well, and a single guardian can manage several medical boxes. This can be used by doctors to keep track of their patients.

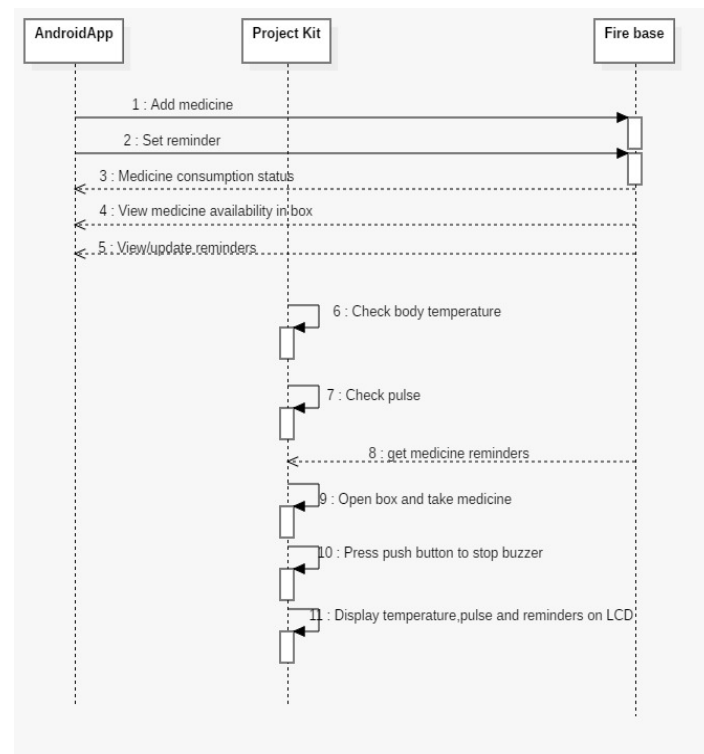


Figure 1: Sequence diagram of medical box for elderly people

2.4 Portability and Compatability

The medical box can operate on a 5V battery, allowing it to be carried by the user when travelling.

2.5 Reliability, Availability and Upkeep

We're working with Firebase Cloud to integrate a medical box. If the network is open, the data is synchronized with the cloud and the process continues. Examine your whole body temperature and pulse are two factors to consider. It is not necessary to use the Internet.

2.6 Usability: This can be used by anyone.

3. ARCHITECTURE DIAGRAM

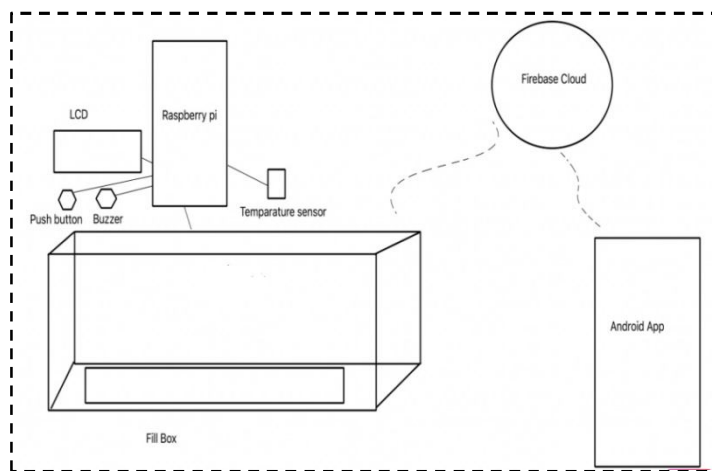


Figure 2: Architecture Diagram of medical box

Hardware Requirements:

- Raspberry pi
- LCD Display
- DS18B20 (Temperature Sensor)
- Buzzer
- Push button
- Android Mobile

Software Requirements:

- Raspbian Operating System
- Python 3
- Thonny IDE
- Android Studio
- Firebase Cloud

Table 1. METHODOLOGY

Sl.no	Methodology	Summary
1.	System Configuration	Arduino UNO and node MCU wifi module are the two main components of this project and connected with each other through serial communication. Arduino mainly controls three compartments of medicine box [20].
	Control Algorithm	To control the smart medicine box, a user needs to input the medicine details and when to take them. There are three compartments so the user can keep three types of medicine according to

		doctor. If the patient doesn't take medicine or misses any notification the light of the compartment will glow and name will be displayed on the screen [14].
3.	Server and Homepage of the website	A server has been created to store to all kinds of information about doctor patient, medication time and body temperature data. The server is controlled by hospital administrator. After logging in to server with ID and password both doctor and patient can access the pages and find information related to medication [14].
4.	Buzzer	Buzzer will be ringing at the proper time the pills have to be taken [13].
5.	LED	We have seven boxes having an LED in each box which blinks to show us the specify box from which the pills needs to be taken at a given time [13].
6.	Pushbutton	We here used three push buttons from first one is used for setting medicine, second one is used for increment and third one is used for next. First button takes menu setting medicine from hour to minute and from minute to the next time [13].
7.	Arduino UNO	It uses 8-bit microcontroller at mega 328p and has 32kb flash memory it is very beneficent to our project it has internet EEPROM which stores real time data in it. Our project is based on the embedded system using arduino it is easy to use hardware firstly we have to add library in Arduino IDE software and after that we made programming [13].
8.	LCD interface	Here we used 16*2 LCD module in our project

		which is connected to Arduino UNO through LCD interface LC or it directly addresses and data bus and few control pins. LCD shows current time and data which RTC sends data to LCD
9.	RTC module	Here we used tiny RTC 12c module which use 12c protocol and it is used in our project. RTC module has internal CMOS cell so it does not needs external power supply to update time and data [13].

including medicine. The clinical essence of this project focuses on a patient's necessary medication. Through this initiative, senior citizens who need daily monitoring of their medication would benefit. This project has combined a server for storing medication time and other information, a temperature sensor for genuine monitoring of patient body temperature sensor for genuine patient temperature monitoring.

REFERENCES

[1] N. Patel, “**Internet of things in healthcare: applications, benefits, and challenges.**”Internet:<https://www.peerbits.com/blog/internet-ofthings-healthcare-applications-benefits-andchallenges.html>

[2] H. Bauer, M. Patel, J. Veira, “**The Internet of Things: sizing up the opportunity.**”Internet: <https://www.mckinsey.com/industries/semiconductors/ourinsights/the-internet-of-things-sizing-up-the-opportunity>, December 2014.

[3] D. V. Dimitrov. (2016, Jul) . “**Medical Internet of Things and Big Data in Healthcare.**” *Health Inform Res.* [Online]. 22(3), pp. 156-163. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4981575/>[Jul. 31, 2016].

[4] L. Zhang. “**Applications of the Internet of Things in the Medical Industry.**” *Internet: https://dzone.com/articles/applications-of-theinternet-of-things-in-the-medi-1*, Jun.24, 2018.

[5] G. Alex, B. Varghese, J. G Jose, A. M. Abraham. (2016), “**A Modern Health Care System Using IOT and Android**”. *International Journal on Computer Science and Engineering (IJCSE)*, vol.8. Issue.4,[Online]. Available URL: <http://www.enggjournals.com/ijcse/doc/IJCSE16-08-04-031.pdf>. [Accessed: 11-Nov-2018]

[6] Z. Pang, “**Technologies and architectures of the Internet-of-Things (IoT) for health and well being.**” Ph.D. dissertation, Dept. Electron. Syst., School Inf. Commun. Technol., Royal Inst. Technology (KTH), Stockholm, Sweden, 2013.

[7] L. Li and W. Benton, “**Hospital technology and nurse staffing management decisions.**” *J. Oper. Manag.*, vol. 24, no. 5, pp. 676–691, 2006.

[8] L. Li and C. Markowski, “**An analysis of hospital capacity management patterns using Miles and Snow topology.**” *Int. J. Manag. Enterp. Dev.*, vol. 3, no. 4, pp. 312–338, 2006.

[9] E. Becker, V. Metsis, R. Arora, J. Vinjumur, Y. Xu, F. Makedon, “**SmartDrawer: RFID-Based Smart Medicine Drawer for Assistive Environments.**” Proceedings of the 2nd International Conference on Pervasive Technologies Related to Assistive Environments, PETRA, 2009, DOI: 10.1145/1579114.1579163

[10] S. Bhati, H. Soni, V. Zala, P. Vyas, Y. Sharma. (2017, April) “**Smart Medicine Reminder Box.**” *International Journal of Science Technology & Engineering.* [Online]. 3 (10). Available :<http://www.ijste.org/articles/IJSTEV3I10093>.

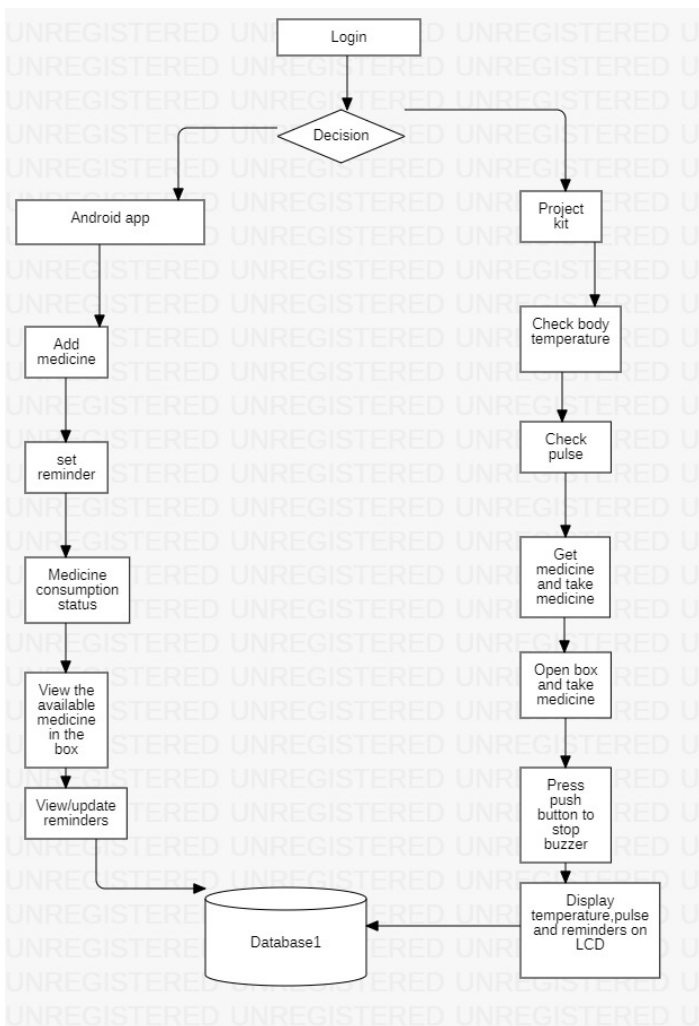


Figure 3: Flow chart of Smart medicine box

4. CONCLUSION

This project suggests a method to help these patients take the appropriate medication at the right time in the right area of the project. We propose a medication reminder system interface,

- [11] N. U. Nyapathi, B. Pendlimarri, Karishma, Kavya,"(2016, May) "**Smart Medicine Box using ARM 7 Microcontroller**", International Research Journal of Engineering and Technology (IRJET). [Online]. 3 (5).Available:
<https://www.irjet.net/archives/V3/i5/IRJETV3I5569.pdf>
- [12] V. Shah, J. Shah, N. Singhal, H. Shah & P. Uapdhyay.(2016) "**Smart Medicine Box**," Imperial Journal of Interdisciplinary Research (IJIR). [Online]. 2 (5). Available:
<https://www.irjet.net/archives/V3/i5/IRJET-V3I5569.pdf>.
- [13]: SMr. Yash Sharma, Sanjay Bhati , Harshid Soni, Vijayrajsinh Zala , Parth Vyas, "**Smart Medicine Reminder Box**" IJSTE - International Journal of Science Technology & Engineering| Issue 10 | April 2017
- [14] O. Al-Mahmud, K. Khan, R. Roy and F. Mashaque Alamgir, "**Internet of Things (IoT) Based Smart Health Care Medical Box for Elderly People**," 2020 International Conference for Emerging Technology (INCET), 2020, pp. 1-6, doi: 10.1109/INCET49848.2020.9153994.
- [15] Circuit Basic. "**I2C Communication Protocol**". [Online]. Available: <http://www.circuitbasics.com/basics-of-the-i2c-communicationprotocol/>. [Accessed:11-Nov 2018].
- [16] Www.einstronic.com. (2017, July 2). "**Node MCU ESP8266**" [Online]. Available URL: <https://einstronic.com/wpcontent/uploads/2017/06/NodeMCU-ESP8266-ESP-12ECatologue.pdf>. [Accessed: 11-Nov-2018].
- [17] NodeMUC8266 Wi-Fi module: "**Node MUC 8266**". [Online]. Available URL: http://www.handsontec.com/pdf_learn/esp8266-V10.pdf [Accessed: 11-Nov-2018].
- [18] Techopedia "**Serial Communication of devices**" [Online]. Available URL: <https://www.techopedia.com/definition/22010/serialcommunication>. [Accessed:11-Nov-2018].
- [19] ManTech Electronics. (2017). "**LCD 2004 Datasheet**" [Online]. Available URL:<http://www.mantech.co.za/datasheets/products/lcd2004-i2c.pdf>. [Accessed:27-Nov-2018].
- [20] If This Then That (IFTTT) home page. "**IFTTT a free web based service**" [Online]. Available: <https://ifttt.com/create>. [Accessed: 27-Nov-2018].
- [21] Dian Firdayati, Indra Ranggadara, Irawan Afrianto, Nia Rahma Kurnianda. "**Designing Architecture Blockchain of Hyperledger Fabric for Purchasing Strategy**" International Journal of Advanced Trends in Computer Science and Engineering.
Available Online at <http://www.warse.org/IJATCSE/static/pdf/file/ijatcse041022021.pdf>
<https://doi.org/10.30534/ijatcse/2021/041022021>