

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 6, June 2018

Pill-O-Box - An Intelligent Medicine Reminder

Dr. Anitha S¹, Hemanth Kumar G², Ranjith L³, Varini Chinnabhandar⁴

Professor, Department of Biomedical Engineering, ACS College of Engineering, Bangalore, India¹

Asst. Professor, Department of Biomedical Engineering, ACS College of Engineering, Bangalore, India²

U G. Student, Department of Biomedical Engineering, ACS College of Engineering, Bangalore, India

U G. Student, Department of Biomedical Engineering, ACS College of Engineering, Bangalore, India⁴

ABSTRACT: Medicines are the primitive solution for the prevention and cure of most diseases. Many risky diseases can be cured and prevented with the use of proper medication. Alzheimer's, Parkinson's and even old age are certain contributing factors to the inability of proper, timely medication consumption. Therefore, it is mandatory to take medicines at the prescribed time. If a patient doesn't take his/her medication on time, there can be adverse effects. To assist in this regard, the proposed Med-Alert system provides intimation about the right medication to be consumed at the prescribed time through audio-visual alerts. For the audio alert, a pre-recorded voice message is used while an LED is used as the reminder for visual alert. Besides an alert, the system also checks whether the patient is taking the right medicine or not. This system also helps a patient to order the required medicines by clicking a predefined button, which will send an email to the pharmacy mentioning the required medicine via IoT. It is designed to also measure heart beat and sweat of the patient and warn the patient to take emergency medications if there are any changes in the primary body parameters.

KEYWORDS: Medicine, alert, box, medicine alarm system.

I. INTRODUCTION

In recent days the count of people with Alzheimer's disease is growing rapidly. An estimated 5.4 million Americans of all ages have Alzheimer's disease in 2016. Of the 5.4 million Americans with Alzheimer's, an estimated 5.2 million people are of age 65 and older, and approximately 200,000 individuals are under age 65 (younger-onset Alzheimer's). One in nine people age 65 and older has Alzheimer's disease. Every 33 seconds one in United States would develop this disease. The coming years, these numbers will escalate, to reach age 65 as the baby boom generation has begun and beyond, the age range of greatest risk of Alzheimer's. By 2050, people with age group of 65 and above would triple in number with this disease and so on, barring the development of medical breakthroughs for a very necessary cause to prevent or cure the disease. The count may reach to more than a 16 million if untreated. People of age group 80 are more prone to deaths as compared to age group of 30. With a rate twice as maximum, sixth-leading cause of death in the United States is Alzheimer's disease is officially listed. For people age 65 and older it is the fifth-leading cause of death. With the increase in the population of the United States ages, this disease is more common cause of death.

In this paper a Med-Alert system is designed and developed which will remind the patient to take medicine on prescribed time. The Med-Alert system is equipped with a voice recorder and a speaker to alert the patient with voice announcement. The system will also use a LED visual system to remind the patient. The Med-Alert system is also designed to check for the medicine that the patient takes. This system will check whether the medicine taken by the patient is right medicine or not. In order to this we are providing a RF ID tag for the patient and for medicines.

In this paper a medicine booking system is designed which will help the patient to order medicine. The Med-Alert system is fitted with a medicine booking button which can be used by the patient to order the medicine when it is about

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 6, June 2018

to finish. When the button is pressed the system will automatically send an email with the list required medicine to the pharmacy via IoT. The Med-Alert device is also fitted with a heartbeat and sweat sensor, which will monitor the heartbeat and sweat of the patient and warn the patient to take emergency medicine if there is any change in heartbeat and sweat.

II. STATISTICS

Sixty-five percent of the country takes a prescription drug these days. 32 million Americans use three or more medicines daily. 75% of adults are non-adherent in one or more ways. In a recent poll of U.S., in individuals 65 years and above who used medications, research found that 51% take at least five different prescription drugs regularly, and one in four take between 10 and 19 pills each day. 57% of those polled admit that they forget to take their medications. Among those using five or more medications, 63% say they forget doses, compared to 51% among those who take fewer medicines. Failure to take drugs on time in the dosages prescribed, is as dangerous and costly as many illnesses. Solutions to improve adherence must be multi factorial. To assess general aspects of medication adherence using cardiovascular disease as an example, a MEDLINE-based literature search (January 1, 1990, through March 31, 2010) was conducted using the following search terms: cardiovascular disease, health literacy and medication adherence. Measurement of medication adherence is challenging because adherence is an individual patient behavior. The following are some of the approaches that have been used: (1) subjective measurements obtained by asking patients, family members, caregivers, and physicians about the patient's medication use; (2) objective measurements obtained by counting pills, examining pharmacy refill records or using electronic medication event monitoring systems. Patients are generally considered adherent to their medication if their medication adherence percentage, defined as the number of pills absent in a given time period ("X") divided by the number of pills prescribed by the physician in that same time period, is greater than 80%. One limitation to calculating adherence using this method is that it assumes that the numbers of pills absent were actually taken by the patients. In addition, this method may not be representative of long-term adherence patterns. Mortality is caused by poor adherence to medical treatment. According to the WHO, improving adherence for conditions of hypertension, hyperlipidemia, and diabetes would yield very substantial health and economic benefits. Given the enormous complexities involved in medication adherence, research on improving adherence has been challenging and generally focused on single disease states.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 6, June 2018

III. METHODOLOGY

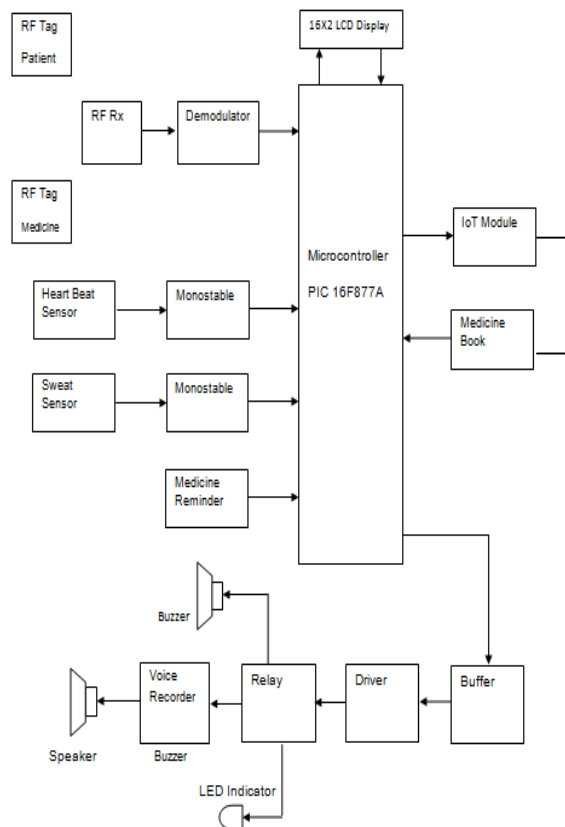


Fig 1. Block Diagram

The Med-Alert system is a PIC 16F877A microcontroller. The microcontroller controls all the operations of the system. In the medicine reminder feature, when the medicine reminder button is activated, the system will remind the patient to take the medicine on prescribed time with a voice and visual alert. When the time to take medicine, the microcontroller will activate the voice recorder with the help of driver and relay to give voice announcement. At the same time one LED will be turned ON and a message will be displayed on the LCD display to give a visual warning to the patient.

In this project we are providing an RF tag for the patient and the medicine. When a patient is consuming medicine, the RF receiver in the main unit will receive the signal from the patient tag and medicine tag. Then it will give the signal to the microcontroller. The microcontroller will check whether both the signals are matching. If both the signals are matching, then microcontroller will display it is correct medicine. If both the signals are not matching, then the microcontroller will warn the patient with a warning sound by activating a buzzer with the help of driver and relay. At the same time a warning message will be displayed on LCD display and red LED will be turned ON.

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 6, June 2018

This project is also designed with a medicine order system which will help the patient to order for the medicine when it's about to finish. The Med-Alert system is also fitted with a heartbeat and sweat sensor. These sensors will detect and measure the heart beat and sweat of the patient and sends the signal to the microcontroller via monostable.

IV. HARDWARE, SOFTWARE & CIRCUITRY

The following hardware components have been used in our system:

- Microcontroller – PIC16F877A'
- Switching Module
- IoT Module
- Heart Rate Sensor
- Sweat Sensor
- Monostable Multi-vibrator
- GPS Locator
- RF Reciever& Transmitter

The software used in our system for programming the setup of transmitting receiving and detection is embedded C and MPLAB X IDE.

The following circuits form the integral part of our system:

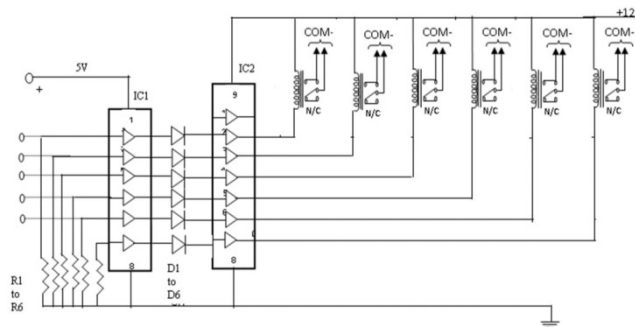


Fig 2. Buffer, Driver & Switching State

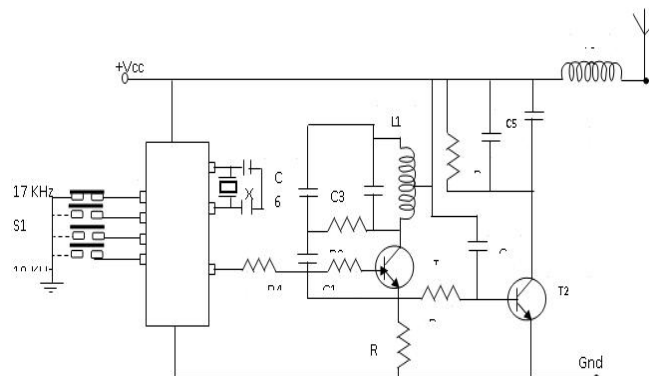


Fig 3. RF Transmitter

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 7, Issue 6, June 2018

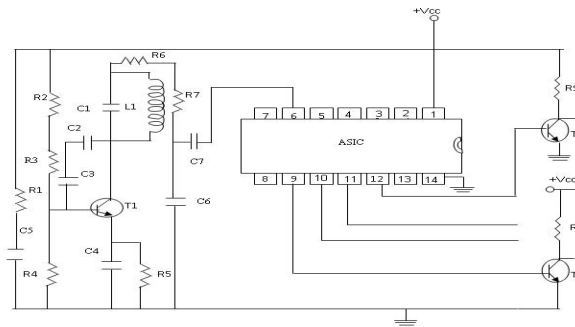


Fig 4. RF Receiver

V. RESULTS

The system sends the messages to the patient instructing time for medicine consumption. When the patient forgets to take the medicine, the patient device sends the message to the patient's caretaker informing them that the patient has not taken the medicine. It also notifies consumption of the wrong medication.

Apart from medicine related information, the system also displays information pertaining to the person's heart rate and sweat. Any abnormality or condition different from suitable conditions is immediately indicated through LED's.

VI. CONCLUSION

The system designed and developed is a Med-Alert system which will remind the patient to take medicine on prescribed time. The Med-Alert system is equipped with buzzer to give warning sound. The system will also use a LED visual system to remind the patient. The Med-Alert system is also designed to check for the medicine that the patient takes. This system will check whether the medicine taken by the patients is right medicine or not. In order to do this, we are providing a RF ID tag for the patient and for medicines. The patient device is fitted with a sweat and heartbeat sensor, which will monitor the sweat and heartbeat of the patient and send location information to the family member in case if there is any change in heart beat or sweat(perspiration). A GPS locator is fitted in the patient device to send the location of the patient to family member.

REFERENCES

- [1]DrAnitha S, "Somnolence Alerting System", International Journal of Pure and Applied Sciences, Vol No.7 2018, 479-483
- [2]K. Doughty, "TEMPEST - An intelligent pill reminder and delivery system for telecare applications", Proceedings of the 20th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Vol. 20, No 3, 1998.
- [3] Mei-Ying Wang ; P.H. Tsai ; J.W.S. Liu ; John K. Zao " Wedjat: A Mobile Phone Based Medicine In-take Reminder and Monitor".Bioinformatics and Bioengineering, 2009.BIBE '09. Ninth IEEE International Conference
- [4] Dana DeMeo , "Medication Adherence Using a Smart Pill Bottle" 2014 IEEE
- [5] Ying- Wen Bai and Ting- HsuanKuo, "Medication Adherence by Using a Hybrid Automatic Reminder Machine" 2016 IEEE
- [6] Jayanth S, Poorvi MB, "MED-ALERT : An IoT device" 26-27 Aug. 2016, Inventive Computation Technologies (ICICT), International Conference