Research Article

Automatic pill box for elderly and visually challenged people

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Abstract

In day to day life, we come across IOT technology in many fields but in a medical/health care IOT is a slowly adopting one. It keeps the people safe and healthy where the main purpose is to decrease the cost of health care treatment in the future. Generally, most of the health issues are due to the ir-remembrance of medicine consumption at the right time. This paper aims to help the patients to get the regular dosage through the smart medicine box for regular health care checkup. This system helps for both elderly and visually impaired people based on voice recognition system, Secondly an alarm/buzzer system is provided for their remembrance along with a GMAIL/SMS notification in case of their loss of remembrance. This will provide the patients to take medicines in a proper scheduled time to keep them healthy and easy to adapt.

Keywords: Internet of Things; Health care; Medicine box; Voice recognition.

Introduction

Life span expectancy of human has been increased due to the advancement in medicine. IOT a new technology in health care to hope because medical centers can be functional and patients can get better treatment. This can improve the health of patient in real life monitoring that saves life in the case of medical emergency. In day-to-day life, most of the people need to take medicines in more amount because of increment of diseases by every day. In this work/system we focus attention on the automatic medical box, for elderly and visually challenged people to take their medicine at the proper time with the right dosage. For more of the casas patients have to take medicines properly with a advice of doctor, Our system is very helpful/useful for their remembrance to take their medicine. In this even if a person forgets to take their medicine or goes outside, then an GMAIL along with the SMS will sent to the respective caretaker through their mobile phone. Most importantly a voice recognition system is implemented, moreover for their independency. A use of voice recognition to intimate the patient at correct time through the IOT technology and Google Voice Kit is used for well-known relevant language for their wish, Data's are stored in the server with the help of ESP8266.

Node MCU is an open source IOT platform. The term "Node MCU" be default refers to the firmware rather than the dev kits. Then if any necessary to change the prescription the doctor can change it and then a new notification is sent to the respective person to that the medication had been changed by the doctor. In recent days healthcare system is changing all over the world. IOT based system on this paper gives an attention to the medication of a patient with monitoring and observing the data. Then thedevice is used for old people and also placed in hospital for their medication but there is no alerting system [1-5].

The SMB contains separate compartments that can be programmed for exact time and rest to refill some pills. It can be used for different categories of patients. The design methodology for smart medicine and physical health system is based on ontology. This system must be both effective and efficient [6,7].

Architecture of the project

In this project, the smart medicine box will help the patients to take their medicine at a right time. The box consists of the compartments as per the days. It have the alarm system through the of buzzer. If a patient need to take the medicine at pre-meal, then the intelligent medicine box will

remind them by making a alarm sound. The compartment will open at a particular time, if they missed the time then it will not open, it will be locked by the principle of servomotor. The patient missed the consumption of medicine then it will send a GMAIL/SMS notification to the patient's guardian through the help of WI-FI module. Then the system contain a temperature sensor to measure the temperature of the patients, it helps to monitor their health condition. But it is only a part of information about their body condition; it doesn't give a whole response of the patient's body. The server which is used to store the data and also create a login page to the doctor and the patient for their consideration. This will aid the people both elderly and visually impaired people to maintain their health with goodness. Our proposed system mainly has the voice recognition with the help of Google voice kit through their preferred language. It mainly helps to the blind people to have their own privacy and independency to make them feel. At a time buzzer ring, it will provide voice to the patient through communication insists to take medicine.

Proposed system with block diagram description

In this paper, we introduce a system based on voice recognition that provides a relevant language voice for their medication time to get intimation. Block diagram of the proposed system is shown in fig. 1. Arduino UNO is the heart of the system, which connects every device oh the whole. Arduino UNO and Node MCU ESP8266 WI-FI Module are the two main components of this project and connected with through serial communication. Node MCU is used for controlling temperature sensor, sending GMAIL to the respective contact and storing medication time data, temperature data to the server. A servomotor is used to control and operate the compartment which present in the medicine box. A real time clock is generated using RTC module. If the generated real time clock matches the medication time, then an alarm will be created, LED will glow on particular compartment.

Temperature sensor DS18b20 is a digital temperature sensor for measuring patient's body temperature. The patient must place this sensor on the body like a thermometer. The patient must press the push button for 1 minute a buzzer will

ring, temperature shown in LCD display. LCD display also used for at the time of medication, medicine name will display on the screen. Then our proposed system consist of Raspberry pi 3, HC-05 Bluetooth module, Google Voice kit, MP3-TF-16P player used for voice recognition with relevant language. Implementation of Hardware and Software By presenting the architecture of the system, this part will contain the hardware and software implementation. For the first segment we discuss about the hardware components of the medicine box. Then, the second segment gives the algorithm part of the software application.
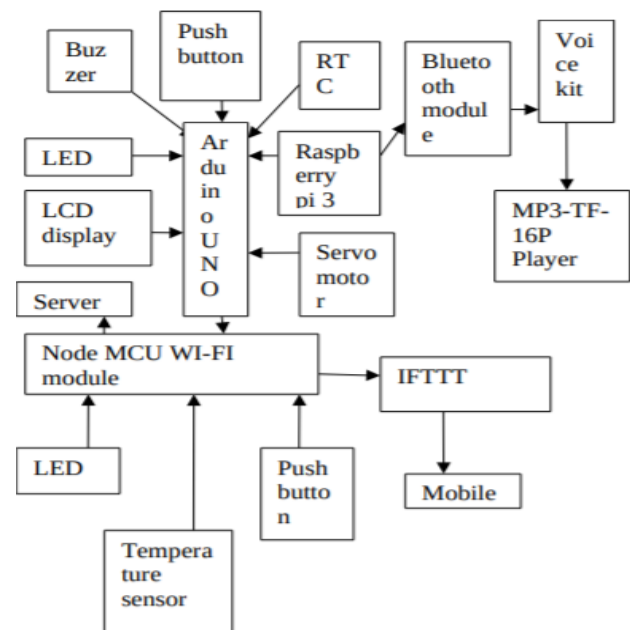

Fig. 1. Block diagram

Hardware implementation

While this system is designed for the smart medicine box to the patients for their medication process. It is mainly aim to the main people and elderly people because of their loss of remembrance. Once a disease is caught into the patient the illness will be cure with the help of medicine. But, the people who do not take the medication proper or consume more than the prescribed dosage this causes huge disturbances to their lives, sometimes it will leads to fatality of the patient. Implementing IOT in the field of medical service it gives to the world. In our system, the two main components are Arduino UNO and Node MCU WI-FI module connected by serial. Arduino is mainly used for control the function and compartments in the box. The Node MCU WI-FI module is used to store data to the server and also control the digital temperature

sensor. Then it sends a notification through GMAIL/SMS. A servomotor is used control the compartment of the box by applying some software application. The RTC module is placed for the time, if a medication time is matched with the clock, then a buzzer will ring and the LED will glow on the particular compartment and the LCD display shows the name of the medicine. Once the patient takes the medicine in the compartment LED will off and it will be locked. Then a PC/Lap acts as a server by installing software. Measuring the patient's body temperature by placing the sensor in his/her body and a push button is pressed by 60 seconds. Our proposed system includes Raspberry pi 3, HC-05 Bluetooth module, Google Voice Kit, MP3-TF-16P Player used for voice recognition with relevant language. Raspberry pi 3 has the operating function of voice recognition. In Bluetooth module "HC-05" in a Data mode with the serial communication in the <100 m. It act as both the master and slave mode. Google Voice Kit is a do-it-yourself intelligent speaker project. It will respond when you speak and also intimate to the action. Then the MP3 player module provides the voice alarm with the help of Google Voice Kit by using our preferable language.

Software implementation

In this part, the software of the medicine box will be explained/discussed as follows, The program has been written in the Arduino software. For the voice recognition, Python software is used. It was used for implementation in Raspberry pi 3. The instructions written 'import' 'def' and if-else statement. It applies to the servomotor to LCD, LED parts. In servomotor, the compartment on particular time only opened by the basics of the program. The voice will extract through Google voice kit as the program inbuilt. If the LED blinks then the SD card have the program converts the voltage to voice recognition as the algorithm.

Results

In the end, the whole system is implemented in a box. In this system a modern healthcare IOT based smart medicine box along with the reminding and monitoring the patient. It has the android application to the data display through the smart phone (Fig. 2). The proposed system gives the voice intimation to the patient through voice kit along with their favorable language. This makes them feel independently to their

range of lifestyle. Then they can take the correct consumption of medicine as per the doctor's advice.

Fig. 2. Output of the system

Conclusion

Technology assisted systems can provide a quantitative, individualized, rehabilitation platform. This paper presented a economic medicine box that can assist and monitor patients concerning the accurate intake of their medication. Mainly, it is feasibility for patient, to feel the independently at their life activities. The proposed feature gives a voice based system for blind people and also useful for Alzheimer's patient. We hope this project will helps for patients like elderly people and blind people and also Alzheimer's person.

Conflict of interest

Authors declared no conflict of interest.

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