INTELLIGENT MEDICINE BOX

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Abstract— The fundamental reason for the venture "INTELLIGENT MEDICINE BOX " is to propose the essential thought of programmed medication update, which will help patients take their recommended medication suitably with appropriate dosages. It is a clever plan to help the patient take as much time as is needed and, thus, lessen an opportunity to recuperate from their infection. Specifically, the matured patient takes some unacceptable medication and some unacceptable measurements mistakenly, causing a serious issue. This framework isn't only useful for an individual but can likewise make a significant commitment to medical clinics. In the present occupied, pushed, and booked life, individuals are experiencing loads of illnesses but can't recall their medication and timing of it, and here this framework can be of genuine use. This project utilizes an LCD , ARDUINO module, RTC module. AS per the odder gadgets, this smart medicine box is planned in light of a lower cost. Thus, this convenient and monetarily cheaper framework would be useful to each age group

Keywords—*RTC module, voice module, Arduino UNO, Medicine box*

INTRODUCTION

Health is characterized as a state of complete physical, mental and social well-being and not just the absence of disease. Health is an important part of people's need for a better life. Unfortunately, the global health problem has created a dilemma due to certain factors such as poor health services, large disparities between rural and urban areas, availability of doctors and nurses in the most difficult times[1].
 The increasing use of mobile devices and smart devices such as (Fitbit, Mi-Fit, Realme-Fit, etc.) and the use of IoT or Bluetooth module to monitor health parameters has greatly affected the health sector. Healthcare professionals use these methods more in clinical dialysis of patients. The use of IoT in the healthcare field is increasingly useful[2][10].

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Medicine Box is a technology that uses IoT to provide patients with real-time information about the medications they are taking. In this project, a smart medicine box helps the patient to take his medicine when it is time to take it. And that answers the questions raised. The maino bjective of this project is to help patient to take the medicine on time and remind them to take the medicine of correct dosage at right time. And it also answers for the few of the that are asked through mobile application[3][14].

LITERATURE SURVEY

The essential thought of programmed medication update, which will help patients take their recommended medication suitably with appropriate dosages[4][11]. It is a clever plan to help the patient take as much time as is needed and, thus, lessen an opportunity to recuperate from their infection. Specifically, the matured patient takes some unacceptable medication and some unacceptable measurements mistakenly, causing a serious issue. This framework isn't only useful for an individual but can likewise make a significant commitment to medical clinics. In the present occupied, pushed, and booked life, individuals are experiencing loads of illnesses but can't recall their medication and timing of it, and here this framework can be of genuine use. This framework utilizes an LCD (fluid precious stone showcase), keypad (press button), ARDUINO module, RTC framework, and an alert framework [1]. As per the odder gadgets, this smart medicine box is planned in light of a lower cost. Thus, this convenient and monetarily cheaper framework would be useful to each age group.[16]

In modernizing world the growing technologies and lifestyle aids health sectors. The people are busy-with their hectic day to day schedule which leads to improper intake of medicine. Most of the people do not use prescription for identifying the correct medicine which may lead to improper health condition and some mishaps. In this project, we put forward intelligent medicine box that can conveyance medicines to the patients on time without any other support and also ease with alarm to inmost the long suffering peoples to take the right medicine at exact time[2][17].

An intelligent medicine box which can be used to provide safe medication to the elderly who are living alone. The design is based on STM32F103 micro-controller and other intelligent control components. The basic working principle is analyzed as well as the hardware structure[3]. The proposed medicine box is full-automation, high intelligent and multi-functional which can effectively avoid the health and safety risks caused by the memory declination of the old people.[18]

The main control part of the multifunctional intelligent medicine box is composed ofAT89S52 microcontroller, ISD1700 voice chip, DS1302 clock chip and so on. The human-computer interaction is achieved by the LCD12864 and independent keyboard, and using the piezoelectric thin film sensors to detect the number of medications, in order to add reminders[4][12]. Connecting the mobile phone App with the medicine box through the Wi-Fi module to achieve the monitoring of the elderly medication while APP also provides users with online medical consultation platform and online pharmacy platform functions, it can make the multi-functional medicine box more intelligent, comprehensive, and personalized service for the elderly to take medicine.[20]

An advanced medicine intake monitoring and control system. The proposed system Consists on a smart medicine box that is designed to help patients taking their medications on time. Two Main features are implemented during the design phase of this system: the first one is the safety feature that Will alarm the patient in case of not taking and/or bad

dosage taking for medication, will keep the Medication out of reach of the children and will be used in case of failure of one of the system's Components whereas the second feature is the low cost of the system[5]. This box will be linked to a phone Application that can signal several alarms mainly when the medications are about to finish, the patient Forgets to take his medication or he (she) doesn't take the required dose (or the required number of pills). This system was tested over 30 different medications and when using ten different mobile phones by more Than 25 patients and the results didn't show any faulty alarms.

The Internet of Things (IoT) is the ever-growing network of physical objects. It features an IP address for internet connectivity. IoT technology provides the possibility to connect sensors, actuators, or other devices to the global infrastructure of networked physical objects. The proposed Intelligent medical box system is fit for checking with the patients from all angles, covering customized prescription, vital signs checking, nearby finding in cooperation with remote doctors[6]. It includes and rug box (iMedBox) with improved availability and trade capacity for the incorporation of gadgets and administrations. The data of the patient from bio-path sensor provides signal to the Arm processor and drug box (iMedBox) then the prescription will be displayed in the front-end using Ethernet.

Artificial intelligence (AI) is a modern approach based on computer science that develops Programs and algorithms to make devices intelligent and efficient for performing tasks that usually Require skilled human intelligence[7][15]. AI involves various subsets, including machine learning, Deep learning, conventional neural networks, fuzzy logic, and speech recognition, with unique Capabilities and functionalities that can improve the performances of modern medical sciences. Such Intelligent systems simplify human intervention in clinical diagnosis, medical imaging, and decisionmaking ability. In the same era, the Internet of Medical Things emerges as a next-generation. Bio-analytical tool that combines network-linked biomedical devices with a software applicationF advancing human health. In this review, we discuss the importance of AI in improving the Capabilities of IoMT and point-of-care devices used in advanced healthcare sectors such as Cardiac measurement, cancer diagnosis, and diabetes management. The role of AI in supporting Advanced robotic surgeries developed for advanced biomedical applications is also discussed in This article. This review also encompasses the technological and engineering Challenges and prospects for AIbased cloud-integrated personalized IoMT devices for designing Efficient POC biomedical systems suitable for next-generation intelligent healthcare.

 A desirable system should be capable of taking care of the patients from all aspects, covering personalized Medication, vital signs monitoring, on-site diagnosis and Interaction with remote physicians[8]. The project gives an Experimental idea of patient health condition. The Platform involves 1) an open-platform-based intelligent Medicine box with enhanced connectivity and Interchange ability for the integration of devices and Services,2) intelligent pharmaceutical packaging with communication capability enabled Actuation capability enabled by functional materials, And 3) flexible and wearable bio-medical sensor device enabled by the state-of-the-art inkjet Printing technology and system-on-chip. The proposed Platform seamlessly fuses IoT devices.

A frequent observation that people give more Preference to their work and other material things Than taking care of their health. If smart, working Adults can forget taking proper medications, the Situation can only be worse for our parents and Grandparents. Often they forget to take their Medications or take overdose of it, resulting in Further health deterioration. Our system aims to Reduce this problem by reminding patients about Their medications and showing them the correct Amount of medication to take[9]. It is a

combination of Physical and digital reminder that will be helpful For people of any age, but is specially helpful to old People who forget taking their medications.

Elderly people usually forget to take their drugs because of their age[2][13]. The objective of this project is to Remind people who forget to take medicine on time. This project will help to remind the patient to take his or her Medicine at the time specified. The proposed system is best suited for old persons and those who are busy in there day Today's life, as this device will now not most effective remind them of their drug treatments with a voice command However also shows the call of the medication to be taken at that time. The patient can store the time of the unique Medicine using a keyboard. Raspberry pi is the microcontroller used for this project[10]. In conjunction with a voice Command, the programmed time for medicine is displayed on the LCD to alert the patient about the best medicine.

EXISTING SYSTEM

The existing system of the Intelligent Medicine box has Recorder Tap and Device is used for the Voice Module and Speaker to Remember the forgotten things. User have to enter the dosage of the tablet manually every time. It cannot be added automatically. The existing system consists only of message notification. Only a few pills can be stored and it is difficult to add some other pills.

The existing system provides remainder to the patient but it is not automatic and it is not wireless and it does not provide any voice message alert ,it only send notification to the mobile. And this system doesn't answer any questions that are asked ,it just reminds the patient to take the medicine. The existing system consists only of LCD, Timer, Servo motor and LED. The problems are to Maintaining the regularity of the prescribed dosage is difficult to remember in the busy schedule .People need a way to remember to take their medicine without any confusions. To overcome all these problems the Intelligent Medicine box is proposed. The main objective of the Intelligent Medicine box is to help patients take the medicine on time.

The existing System includes an Android application installed on patient smartphones. Through this application, patients were able to view their prescriptions and receive, notifications about receiving medications. There are medicine boxes equipped with different compartments. The LED on each part of the indicates the correct compartment. Every time the patient opens an invalid partition, the cuts a warning using the Arduino. The WI-FI shield is attached to the Arduino board and this Arduino microcontroller collects the data and sends it through the WI-FI module.

PROPOSED SYSTEM

In proposed system, the Intelligent Medicine box reminds the patient to take the medicine on time. In this project, a smart medicine box helps the patient to take his medicine when it is time to take it. And that answers the questions raised. The main objective of this project is to help patient to take the medicine on time and remind them to take the medicine of correct dosage at right time. And it also answer for the few of the that are asked through mobile application.   The medicine box also has audio and display functions, which can provide Services to the elderly with little education.

In proposed system blue tooth application installed in the mobile phone. Through this application, patients can able to ask few questions and it will answer to those questions. There are medicine box with different compartments. The medicine can be stored in the

medicine box. The medicine box reminds the patient to take the medicine on time through voice message. The medicine box opens the Box only when it is time to take the medicine.

The hardware components used in our projects are Arduino UNO, RTC Module, APR Voice module, Bluetooth module HC-05, Motor driver and Servo Motor. These are components used in the Intelligent Medicine box.
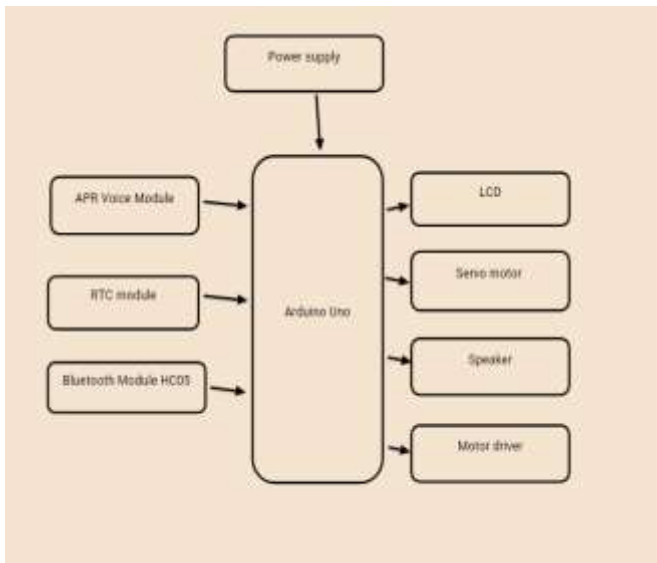

Fig 1.Block Diagram

HARDWARE USED

BLUETOOTH MODULE HC05 – The Rx and TX pin of the bluetooth module is connected to the Rx and TX pin of the Arduino UNO. Bluetooth serial modules allow all serial enabled devices to communicate with each other using Bluetooth. It is connected with the mobile phone through Mobile phone the instructions are given.RTC MODULE – The SDA and SCL pin of the RTC module is connected to the A4 and A5 pin of the Arduino UNO. The RTC module is a time-consuming electronic device. The battery in this RTC module keeps the date and time updated even when there is no external power. So we can get the exact date and time when we need it. The RTC module reminds the patient to take the medicine on time.APR Voice module – The PE and REC Pin of the APR voice module is connected to the 2 and 3 of the Arduino UNO digital pin. The APR Voice module is used in our project . The voices are recorded and it is played at the time to take the medicine. SERVO MOTOR -The servo motor is connected to the Arduino UNO. The servo motor is used to open the Medicine Box. When it is time to take the medicine the servo motor is used to open the Medicine Box. SPEAKER – Speaker is connected to the APR voice module. Speaker is used in this Project to hear the voice message. MOTOR DRIVER – The motor driver is used in our project to connect the motor. The motor is used to open the Medicine Box.LCD DISPLAY- In our project ,the LCD display is used to display the medicine name.

SOFTWARE USED

TC module remains a patient to take a medicine on time, when the time is up motor is started and the voice alert is given using APR module to take the medicine, name of the medicine can be viewed in LCD display. The box will open once the remainder is turned off.The voices are recorded in the APR voice module. The voice alert is given to the patient when it is time to take the medicine.

EMBEDDED C

During infancy years of microprocessor-based systems, programs were developed using assemblers Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.
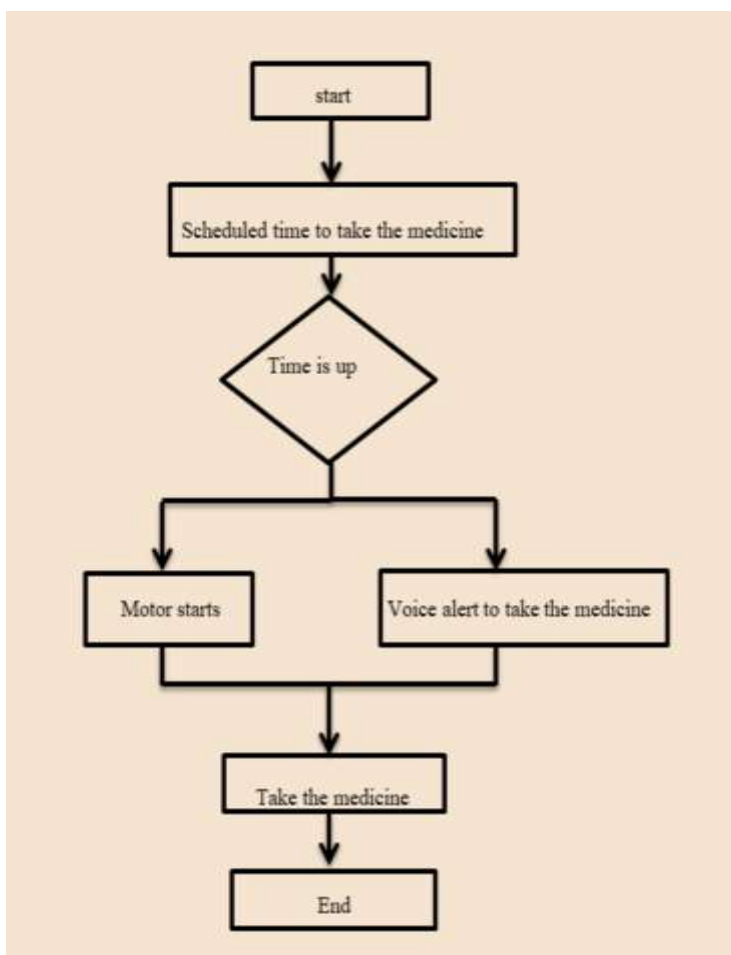

Fig 2.Flow Chart

In 2008, the C Standards Committee extended the C language to address these issues by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as, fixed-point arithmetic, named address spaces,

and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of standard C, e.g., main () function, variable definition, data type declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.   and fused into the EPROMs.

The flow diagram of the Intelligent Medicine box. RTC module remains a patient to take a medicine on time, when the time is up motor is started and the voice alert is given using APR module to take the medicine, name of the medicine can be viewed in LCD display. The box will open once the remainder is turned off. The voices are recorded in the APR voice module. The voice alert is given to the patient when it is time to take the medicine.

RESULT

The Intelligent medicine box is operated using mobile phone. It reminds the patient to take the medicine on time. Bluetooth application is downloaded in the patient phone and it can be controlled by patients itself. The doctor prescribed medicine is stored in the Medicine box and the time is stored using RTC module and it reminds the patients to take the medicine using Voice module . The voice is recorded in the APR Voice module. when it is time to take the medicine   the voice note is given using speaker. The Emergency medicine is also stored in the Medicine Box.It also answers the question that are raised by the patient. And the medicine name is displayed in LCD Display.
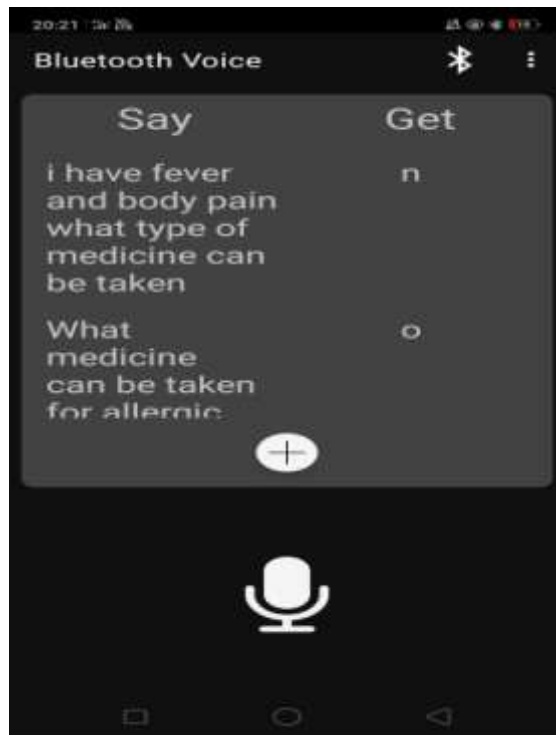

Fig 3.Bluetooth Application

Figure 4 . shows the Bluetooth application used in the project. This Bluetooth Application is downloaded in the Patients phone and it can be controlled by the patient.

Fig 4.medicine box

It is the medicine box which is operated using mobile phone. The medicine box operated successfully and used for memory loss patients.

CONCLUSION

A Intelligent medicine box is operated using mobile phone.
This project doesn't need special training for handling medicine box. It is a user-friendly device even elder patients can operate easily that the instructions are displayed in LCD display. It remains patients by alarm to take medicine in prescribed schedule which will be programmed earlier. On taking drugs at right dose at right time, patient grasps the benefits of treatment. Medicines present in it are split into different compartments
 Medicine box are opened and closed by servo motor by means of electrical signal arrived from Arduino microcontroller. The power supply is provided to distribute power to other modules in the device. The device is programmed with Arduino which is plugged with alarm. Hence the medicine box operated successfully as an assist device for memory loss patients.

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