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Altering a Smart Medicine Reminder Kit for Senior Citizens

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Abstract

Our project's main aim is to make a Smart medicine box for those users who regularly take medicines and the prescription of their medicine is very long as it is hard to remember to patients and also for their care giver. Also Old age patients suffer from problems of forget to take pills on proper time which causes certain health issues for patients having Permanent diseases like diabetes, blood pressure, breathing problem, heart problems, cancer diseases etc. We saw these problems in hospitals & people around us who have such kind of diseases and thus based on these two problems we made smart medicine box which solve these problems by Setting up time table of prescribed medicines through push buttons as given in prescription. Present time will be saved in RTC module and notification time will be saved in EEPROM. Therefore at the time of taking medicine system generate Notification sound and display the Bright light in certain pill boxes. So, patient can know the specific number of box from which he has to take out medicines. All pill boxes are pre-loaded in the system which patient needs to take at given time. And our system has quality that it can sense if the patient had taken out pills from the box or not. Another advantage of our system includes of Sensing capability if the patient tries to postpone the time of taking medicine by suddenly opening and closing the medicine boxes to stop the sound. Compare to other devices available in market are capable to generate sound at one time and afterwards it stops. Thus, final result of our system provides fast curing of patient health by using our advantageous system.

Keywords: Smart medicine reminder box Medication, Safety Low cost Health monitoring Microcontroller Real-time scheduling GSM module.

I. INTRODUCTION

Due to the prevalence of many diseases, a huge number of peoples are forced to take medicine regularly. The affection rate also increases daily. Though some diseases may not cause severe suffering, some are fatal. Some diseases can be controlled by taking medicine regularly and on time. The lifespan of human beings is affected by those diseases. We need to take many medicines regularly for survival [1]. In most circumstances, people's memories start to decline as they age. Numerous people require ongoing assistance, whether they are our elderly or particularly abled people. The timing of taking a prescribed dose has a greater influence on elderly patients than on others; for this reason, taking the right medication at the right time is crucial to preventing future complications and curing the illness. According to studies, between 40% and 75% of adults fail to take their prescribed med ications on time each day. As a result, individuals fail to take the right dosage at the right time, occasionally administer

the incorrect dosage, or utilize outdated medication, which may result in additional patient suffering and occasionally put their lives in danger [2].

In order to eliminate the aforementioned risks as well as mitigate the requirement of continuous observation to take the scheduled dose, we are motivated to search for an easy, user-friendly, and effective approach. Some types of medicine kits have already been proposed by some researchers, but most of them are not user-friendly for senior citizens. Some of them are not portable due to their larger size. Nowadays, human errors in many sensitive sectors have been reduced by using modern programmable wireless tech nologies. The use of modern automotive technologies enhances accuracy, so if we merge the concept of programmable modern wireless technology with the medicine reminder kit, then it will be able to provide great features, including reducing size. Different types of medical systems have been previously proposed upon different platforms and concepts, for example: an automated reminder medicine box [3], med-assist [4], medication reminders [5,6], a hybrid automatic reminder [7], and a medication assistive system [8]. One of the main obstacles to the widespread adoption of e-health care technology in practice is that some of the systems lack user-friendly interfaces for both medical professionals and patients. Some systems are wholly app-dependent, which just serves to remind users by delivering brief messages, while others are totally database-related, work using RF technology, and have Bluetooth connectivity.

The new awaited feature in our project is our system is sensible that patient has taken medicine or not and thus the patient can't postpone the time on which he needs to take pills. It is compulsory for the patient to take pills from the box at the right time otherwise our systems continues to make large sound until the medicine is taken out from the box. This notification feature adds life years to the patient and thus this thing is not available in any device which is the necessity for present days.

II. LITERATURE REVIEW

S. Kiruthiga, et al.,[2024] has proposed about the medicines are synthesized to cure, cease, prevent diseases or help in the diagnosis of illnesses. Lots of aged people live unaccompanied; few of them are endure from disorder, making it difficult to take care by oneself. Delay of taking their tablets or even taking it at the incorrect interval may raise health consequences. The design of an IoT based medication system is established and it can be used by patients as well as caretakers in sequence to monitor and ensure that the correct amount of each medicine is being taken at the exact time. This provides audio communication to aware the user when a confirmed medicine is to be taken. Furthermore, a software application is used to send messages and email alerts to the patient and the caretaker [1].

K. Bhavya, , et al.,[2024] has proposed about the past days, there had been many attempts to design "Medicine Box" which helped people in medication reminder, storing their medicine uptake details and provided suitable temperature conditions for storage. In accordance to current technologies, we propose this work, which additionally include some feature to the medicine box, such as health monitoring, emergency alert through SMS is given to their predefined guardian and automated opening and closing of the lid. Using IoT system, vital parameters are recorded, uploaded to cloud and reviewed by clinicians. This helps the clinician to gain knowledge about the patient's growing health conditions. It avoids the complexity of patients carrying their prescription details and their medical records and hence they live independently. Hence, IoT based smart medicine box designed with embedded system to overcome the

holes of elder patient's ambient living. The Wi-Fi connected box transfer the daily activities of the respective patient's health details and their medication details added with benefit of GSM mode alert SMS. An inconvenience of record handling between patient-Doctor had overcome by the cloud system through IoT. The effectiveness of the doctor prescribed treatment become beneficial when the tablets are reminded alarm as per schedule and taken by patients. This compartmented box design comforts the people to take the drugs at right dose at right time. The setup of double division for thrice times a day helps the people to store and consume the drugs easily i.e., user friendly. In our design is made with no complications in usage, so that people need no training to handle the medicine box. The aim of ambient assisted living of a patient is achieved by less complex design and health monitoring sensors along with high security. In our system we have included a panic switch, this helps in the emergency situations [2].

Akshita D, et al.,[2023] has proposed about the importance in developing an IOT device called Medi-box which helps people in taking tablets or medication at right amount and at right period and tablets are dispensed according to user inputs. Medi-box will help the elderly patients who usually have memory issue. This device also provide water to be taken along with the medicines which would make it easier for patients consume their medication easily. Medi-box can be used by patients who travels regularly and has medications to be taken. This device also makes sure about the temperature and humidity that must be maintained for particular medicines. Medi-box can be used in two modes one is online mode using a web age or offline mode using the graphical display on the Medi-box . Medi-box will also make sure that the medicines preserved with proper properties [3].

B. Pradeepa, et al.,[2022] has proposed about the current technology this project endeavour to make a "Smart Medicine Box" for medication with multiple compartments to assist the patient to take medicine at right time through alarm reminder. So, in our compartmented box maintains temperature by means of adaptive cooling method. We propose this system with additionally added features to medicine box such as high security, emergency alert through SMS and automatic opening and closing of lid of the box. The vital parameters are recorded, uploaded to cloud and reviewed by the clinicians using IoT system. This helps the clinicians to gain knowledge about their patient's health condition for further treatment analysis. The feature of uploading the patient details and medical records avoids the difficulties of carrying the prescription and medical records and hence patient can live independently [4].

M. Srinivas et al.,[2022] has proposed about the Health IoT thus helps the hospital authorities to have continuous monitoring on the patients as well as it reminds the patient to have the medicines intime. So, the doctor can have direct view over his patients by this. Thus, the medication procedures can be shifted from hospital centric to home centric. Earlier the medicine box proposed with Ultrasonic sensors, IR sensors and Weight based sensors. These sensors may have less reliability because of ambient light and improper calibration problems. So, in our proposed system Magnetic Reed switches are rugged in operation which is operated by means of stepper motors. The stepper motors are having controlled signal from Arduino microcontroller [5].

III. EXISTING SYSTEMS

In the existing system There are many reasons for not strictly following the regimen i.e., forgetfulness, complexity, lack of proper awareness about the medications, a lack of involvement from family and friends and so on. Many people cannot remember whether they took their medicine on time, especially

those who take multiple drugs. Those who delay their dosage timings run the risk of an overdose when medicating at the next scheduled time. Under and over-dosage of medicine, the absence of medication administration and monitoring mechanisms can lead to many complexities in health. Although errors can occur in any stages of medication process, it often happens during the administration stage. MEDIBOX is designed to alert the patient at the right times along with the right dosage in prescription. Along with reminding a patient about medication it should be ensured that drugs are consumed without degrading their potency. Storage is an important aspect of the total drug control system, so in the design of MEDIBOX an appropriate environment is created to maintain the drug efficacy. The history of medications a person consumed is very important, so the consumption details are uploaded to the cloud for further medical reference. MEDIBOX is also capable enough to alert its user about their next appointment with the doctor.

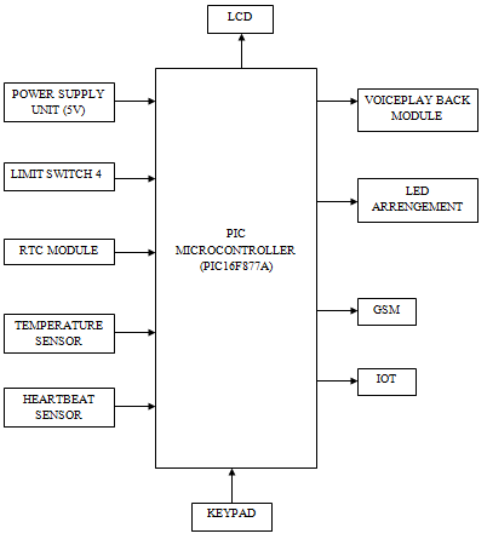
IV. PROPOSED SYSTEM

Internet of Things (IoT) is a system of inter connected computing devices, mechanical and digital machines that possess their unique identifiers and their ability to transfer information over a network without requiring human-to-human or human-to-computer interface. The purpose of using IoT is to extend the level of transmission of data which enables the transfer of information worldwide where Bluetooth has only a short transmission range. The incorporation of a buzzer is efficient to patients thanthe LED lights as sound makes it easier to indicate people than light. The Real Time Clock (RTC) is used in this system to maintain the duration of medicine intake.

The pic microcontroller is an 8-bit micro controller with 32K flash memory, 1K EEPROM and 2K internal SRAM which is used for its high performance and is usually incorporated with the Arduino board. This intelligent medicine box is designed for long term medications for chronic diseases in elderly people. The limit switches are fixed inside the pill box which helps to determine the number of times the pills are taken out from the box. The Global System for Mobile Communication (GSM) is introduced in this system to remind the care-taker if the pill box is emptied by sending an SMS to the mobile of the care-taker.

This smart system will continuously monitor the patient's health with the help of a sensor and also simultaneously monitor the patient's daily dosage of medicine. The medicine boxes will have its own set of timing information compared to the real time clock. If the information matches the buzzer rings and therefore the patient is reminded to take his/her medicine. A health data of the patient will also be maintained and their daily intake of medicines. GSM module is used to send Short Message Service (SMS) to their relatives or guardians and doctors who are given with SIM card. The combination of the inputs of logic gates of switches of three compartments outputs the information about the tablet taken status of a day as "TABLET TAKEN", "TABLET NOT TAKEN".

V. BLOCK DIAGRAM



VI. HARDWARE & SOFTWARE REQUIREMENTS:

- PIC MICRO CONTROLLER
- LCD
- LIMIT SWITCH
- TEMPERATURE SENSOR
- HEARTBEAT SENSOR
- KEYPAD
- VOICE PLAYBACK MODULE
- LED INDICATOR
- GSM
- ESP8266 WIFI MODULE
- RTC MODULE
- EMBEDDED C
- MPLAB SOFTWARE

VII. RESULTS

(a) Welcome message

(b) Real time, date and day

(c) Clear environment

(d) Smoke detected

(e) Room temperature and humidity

(f) Heart beat rate, body temperature and oxygen saturation level

VIII. CONCLUSION

Thus the medicine box would be good in quality and performance and able to be trusted by patients and old age people. The system would be good in quality and performance. The cost would be affordable compared to other products available in the market. User can set the number of times the medicines need to be taken by the patient. The alarm will ring at proper time scheduled. The programming language used is simple and can be modified easily. It can be used in various places such as in hospitals, old age homes, and also for patients who are in homecare with their family since it is user friendly. The product is easy to design and thus requires less maintenance.

IX. FUTUREWORK:

As a future enhancement, the number of ongoing researches provides efficient offline application for storing patient health data. The smart medicine box compartments design in some more precise and compact manner as per the patient's requirement. To overcome the draining power due to peltier module used for cold storage should be reduced in upcoming works to increase the capacity of the battery. Adaptive cooling method will be efficient and beneficiary for drug storage in future. The patient or caretaker can refill the medicine box with help of suitable application or cloud by pill counter setup

using IR sensor. The other health parameters can be sensed and monitored with added more health sensors for accurate patient health details.

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