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SMART MEDICINE REMINDER AND VENDING MACHINE

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ABSTRACT: In this project a Smart Medicine Reminder and Vending Machine has been developed. Many old people have the tendency of missing the medicines or taking the medicines at wrong time. Often, they require someone to give them the medicines. Hence it is required to design a Medication Reminder Device that can help old people and many other patients to take medication on schedule. In situations like the CoVid-19 pandemic there is a physical contact between the patient and the caretakers, doctors. So, the devicedeveloped is capable of delivering medicine at prescribed time in which care-taker of the patient can store medicine in small boxes which will drop out according the time entered. Arduino IDE software platform and Arduino Mega along with RTC, servo motors, LCD, MP3 player, LED, Rotary Encoder with push button, IR sensor as hardware are used to build this project

Keywords: Medicine boxes, Rack, Real Time Clock, LED, Rotary Encoder, MP3 Player, LED, Arduino Microcontroller

INTRODUCTION

An embedded system is instrumental in solving any problems related to humans, thus Health Care departments are constantly working on methods to improve the quality of health services provided. Good Health is important for a good life and it is quite necessary to give priority to health-related issues which can be solved by digitization using a variety of devices. Currently there isn't a fully functional embedded system in the market that provides the options to fill the medicine and the reminder (dose) times. Medicines are one of the greatest achievements in human history.

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But they work only if they're taken properly on time. There is no cure for CoViD-19 yet, although patients are given some medicines by nurses and doctors to medicine to patients, thus we have developed a machine that can take in the time set by the doctor or caretaker once, at the start-up of the machine. This will ensure distancing from patients and nurses won't have to risk their lives to go and give medicine to the infected patient. Hence reducing human efforts required in giving the medicines. Once the medicine is on the given rack from where the patient can take it, he/she is alerted via a speaker on the system to take the medicine. The data of when the medicine is taken is stored in an SD card for further reference by doctors to monitor the effect on symptoms by the given doze.

LITERATURE SURVEY IMA (Indian Medical Association) published a list of doctors who died due to the corona virus. As of the data on September 16, 2020 as many as 2,238 doctors were infected with the disease and of them were 382 lost their lives excluding the health workers who died due to the virus. Hence systems ease the pain, increase immunity, and reduce symptoms. But this puts our Healthcare warriors at risk when they give the

Medicine Doses of an Entire week, store them and supply them to the patient at the which are efficient of reducing the risk for the health workers and doctors were developed. But these systems are either complicated or costly. The microcontroller used in the circuit is of 8051 family. RTC used maintains a correct time as it is supported with the assistance of a crystal. The 8051 Based Medicine Reminder is simple to use, affordable, but it has high complexity and low flexibility. Some systems also used the IOT cloud and RFID. IOT cloud is effective for storing sensors data, the benefit of digitally storing is the retrieving of data is easy and faster manner in case of emergency for secure health. For the user personal identity and Encryption/Decryption purposes the RFID is good but the overall cost of the system and amount required to maintain it is quite highReal time video processing is also used in some systems by which a caretaker can see the video of the patient concerned by being away from patient. But this

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increases the cost of the system, as well as the complexity of the system and the cost required to maintain the system is also considerably high. Since a system needs to be cost effective along with being efficient, some of the above things can be eliminated so that the product can be used by everyone

EXISTING SYSTEM

- Kalantarian et al. [12], [13] proposed a smartwatch-based system in which built-in 3-axial accelerometers and gyroscopes were adopted to recognize several motions for medication adherence detection. Ma et al. [14] also developed a smartwatch-based adherence monitoring system, which used machine learning and distributed computing techniques. Moreover, data were collected from built-in inertial sensors to monitor the sequence of actions occurring during a person's medication intake.
- Aldeer et al. [15] designed a noninvasive medication adherence monitoring system based on integrated collaborative sensing technology in a wireless sensor network (WSN) environment. Several sensors were mounted on the pill bottle to monitor medication adherence behavior regarding pill intake. Other related issues have also been addressed [16]–[31] in attempts to provide immediate medication records, cloudbased online medicine management systems, and personalized telemedicine services. Given several instances,
- Chen et al. [16] proposed a comprehensive medicine management system that integrated medical information from various sources. The proposed system could automatically detect inappropriate drugs. Moreover, every participant could fully track the patients' most recent medicine use online in real time.
- Kim [17] developed a medication compliance monitoring system for checking medication compliance in clinical trials. The proposed system was composed of a clinical trial database management platform and a PDA with a barcode scanner for each clinical trial participant. Related healthcare ecosystems have also been addressed, discussed and proposed [19]–[31]

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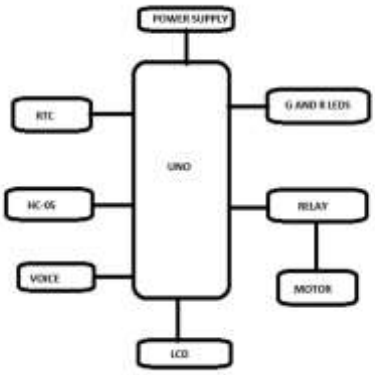
to enable new personalized, predictive, preemptive, pervasive, and precise e-health services.

- Jiménez-Fernández et al. [32] discussed possible issues of adaptation usability and sensor device interoperability for chronic disease management systems. They noted that a large percentage of chronic patients are also elderly patients. Their experimental results showed that sensor-network-based systems could play an important role in monitoring patients. Hence, the usability of such a sensor-network-based system must be adapted to meet the patients' needs.

PROPOSED SYSTEM

To address the problems posed by patients with chronic diseases taking multiple medications for those diseases, we propose an intelligent medicine recognition system based on deep learning technology. This system can automatically identify pills and assist patients with chronic diseases in understanding the dosage of their medications and other related information, thus mitigating the problem of patients taking the wrong medications. Currently, smart medicine pillboxes are often used to organize drugs and help patients take medicine and combine a variety of drugs, but they ignore the potential adverse effects of placing different drugs together. To address this problem, we use deep-learning-based image recognition technology to achieve immediate multiple drug placement and instant recognition and to provide voice explanations of medication information

BLOCK DIAGRAM



The Block Diagram of proposed model is as above and its explanation is as given below:

1. When the machine is first booted, the user is asked to set the dose times for all the doses of each day. If two racks are used, up to 28 Doses can be stored in a single refill. Each day, 4 doses can be delivered according to the time set.

2. The LCD displays upcoming doses.

3. The rotary encoder is used to set the time for each dose.

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4. Servo motors are used to deliver the medicine to rack and clear the rack if the patient misses the dose.

5. The IR sensor is used to detect the time at which the dose is dropped and taken by the patient and the data is stored in SD card.

6. Once the dose is delivered, the speaker plays a tone (a custom audio clip which is dubbing of person reminding to take the dose, followed by a ringtone) to alert the patient to take the dose.

7. LED also blinks repeatedly to provide visual output

FLOW CHART

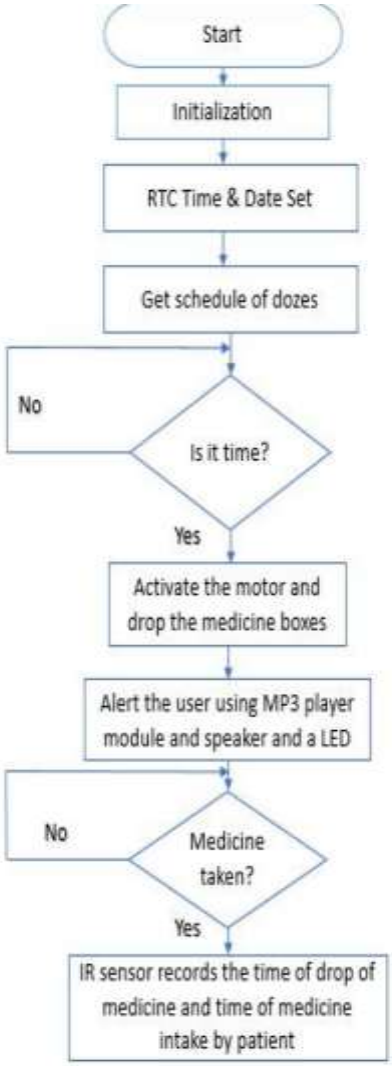

Figure: Flowchart

1. Start

2. Initialize UART, RTC and LCD

3. Set count = 4 and set the current time in RTC

4. Set the four pill times and display “PILL TIME” in LCD.

5. If 1st pill time is set decrement the count and run servo motor.

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6. Run the servo motor and drop the medicines in the rack.

7. An Alert tune is played through the MP3 player module and speaker.

8. A led lights up in order to indicate the presence of medicine present in the rack.

9. Check whether the medicine is taken or not, if no then return to Step: 7.

10. If the medicine is taken from the rack, use an IR sensor to record the time at which the medicines were dropped in the rack and when taken by an individual from the rack.

11. If 2nd pill time is set decrement the count and run servo motor and execute Steps: 6 to 10, else call Step: 5

12. If 3rd pill time is set decrement the count and run servo motor and execute Steps: 6 to 10, else call Step: 5

13. If 4th pill time is set decrement the count and run servo motor and execute Steps: 6 to 10, else call Step: 5

14. End

CONCLUSION With this system, the chances of missing medicine are reduced. The doctors can easily monitor and thus interpret the results of tests of the patient according to the record of patient. This product can be easily replicated and placed in Covid-19 Quarantine centers next to patient beds to give them their medication on time. Using this product will ensure safety to healthcare workers who provide medicines, by keeping them at distance from the infected person. This easy-to-use device where no prior training is required can be a convenient option for households where family members have work-hour compulsions or are compelled to keep a nurse for the member with medical complications.

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