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An IoT based smart medicine box

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ABSTRACT

This paper proposes the design of Arduino ATmega based pill reminder which will help the patients to take their medicines in the correct quantity and at the prescribed time. Assistive technology is one such technology which can help an individual tremendously. But today only 2 out of 50 people are using assistive technology due to high cost, lack of knowledge on the subject and availability. By 2050, every 10 out of 20 households will need one assistive product with many elderly needing 2 or more. It is also seen that people give more attention to work than health. This system aims to reduce this problem by reminding them to take the medicine on time within the prescribed time. It is a combination of physical and digital reminder for a patient that will be helpful for people of any age, but especially helpful for geriatrics who forget taking their medicines. The main aim is to keep the system easy to handle and make it cost-efficient. This system uses Arduino, LCD display and Real Time Clock (RTC) module, RFID system and an alarm system used to intimate the patients to take proper dosage according to the prescription at right time. This portable and economical system would help aged patients, especially to the illiterate patients. Our, smart pill box can reduce elderly family member's responsibility towards by reminding them to take the medicine on time.

Keywords— *Arduino, LCD display and Real Time Clock (RTC) module, RFID system, IoT database*

1. INTRODUCTION

Capturing and sharing of vital data of the network connected devices through a secure service layer is what defines IOT. In simple terms, Internet of things can be defined as the wireless network of devices which are connected to each other to share information and data in order to communicate and produce new information so as to record and analyze it for future use. Collection of real-time data and recording database of patients has become easy due to the use of Internet of Things.

One of the most common reasons for the failure of a method to cure a patient is because of not taking the medicine at the prescribed time. People aged 50 or above are prone to diseases such as high blood pressure, diabetes, Alzheimer's and Parkinson's to name a few. Missing a dose for such a patient can prove to be very harmful. Hence it is vital for the patients to take the medicines on time. It has been observed that people in general neglect their health and give preference to other things than taking their medicines.

This project will be helpful for people who forget to take their medicines or even to those who have to take a lot of medicines and get confused about which medicine to take at what time. So this project will help people provide information about the patient's status whether he has taken the medicine or not. In this era, it is difficult for the family members to be present all the time for the aged. Today, most of the families in our society are a nuclear family. Elderly prefer staying independent, but it is a worry for their children. Sometimes despite their best efforts, the aged fail to take the medicine on time. This device is one approach to help them take the medicines effectively.

2. EXISTING SYSTEMS

Various systems are available in the market. Some of which we studied are:

In [1], a Pill Box based on an MCS-51 micro-controller was proposed; that pill box can send out medicine using a stepper motor at a scheduled time, but there was no provision to record the time when the patient actually took the medicine.

In [2], an Intelligent Pill Box (IPB) was proposed. The IPB is based on the medicine bag system, and the IPB sends a medicine bag out of the box at the appropriate time. If the patient does not take the medicine bag away, the IPB would notify the caregivers via Skype. The IPB system improves the interactivity between patient and caregivers, but it works well only if an internet connection is available.

In [3], an electronic pillbox called MedTracker was proposed; in the MedTracker, the time at which each lid was opened or closed is recorded, and transmitted to PC via a Bluetooth link. However, the MedTracker does not provide any remind or confirm functions.

3. PROPOSED SYSTEM

The proposed architecture is IOT based smart medicine dispenser. Each patient will be provided with a unique RFID tag which will have its unique 12 digit code. Corresponding to the RFID tag code, the patient name, the total dosage was taken and the total dosage missed if any, in one month will be updated in the database. This database will be created using IOT. This database will be real-time and updated as soon as the medication is taken or missed. The RFID reader will be placed inside the medicine dispenser.

3.1 Block diagram description

The device will consist of a small box divided into 21 sections for storing pills for a week of up to 3 patients. The box will be connected to an RTC module, a microcontroller device Arduino AT mega 2560 which is used as the main microcontroller will monitor and distribute work as and when a request is made by the peripheral devices. The RFID tag is given to each patient. When it is brought close to the reader, the medication will be dispensed. RTC is used to compare the time the dosage is to be given with the current time. The clock will provide seconds, minutes and hour's information. The real-time clock will start beating and as it reaches the stipulated time of intake, the buzzer will alert the patient, caretaker along with a message displayed on LCD. LCD is also used to display prerequisite text written in the program such as patient name, date and time. WIFI-module is used in sending the results which will be stored in the database. The RFID tag and reader provide the basic security feature to the system which will dispenser the dosage only when a valid tag at a given time is read.

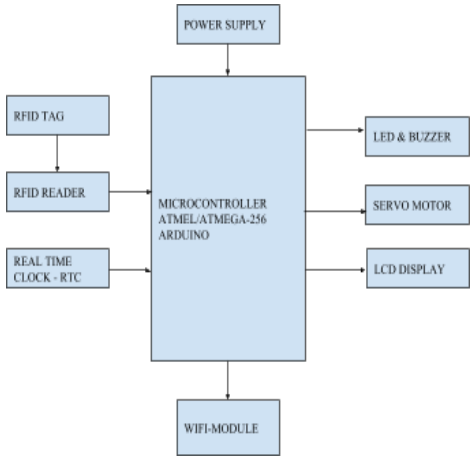

Fig. 1: Block diagram

3.2 Flow chart description

The below-shown flowchart [Figure 2 and 3] is explained as follows:

As soon as the medicine box is turned on, the algorithm will ask for the time at which the patient needs to be given his/her medicine. The time is set using a webpage/app into the microcontroller. Using the RTC the microcontroller will monitor the current time. It will check for the condition that the current time is equal to set if the condition is true.

The medicine box will send a notification and at the same time, the front display LED and BUZZER will be turned on for 30 sec. It will now check whether the RFID TAG is read by RFID READER if the condition is true.

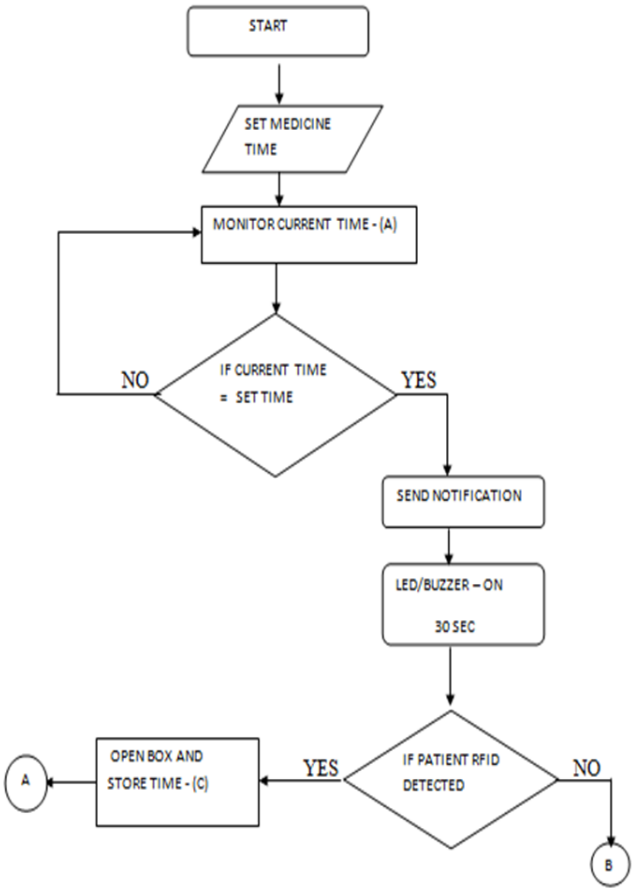

Fig. 2: Flow chart

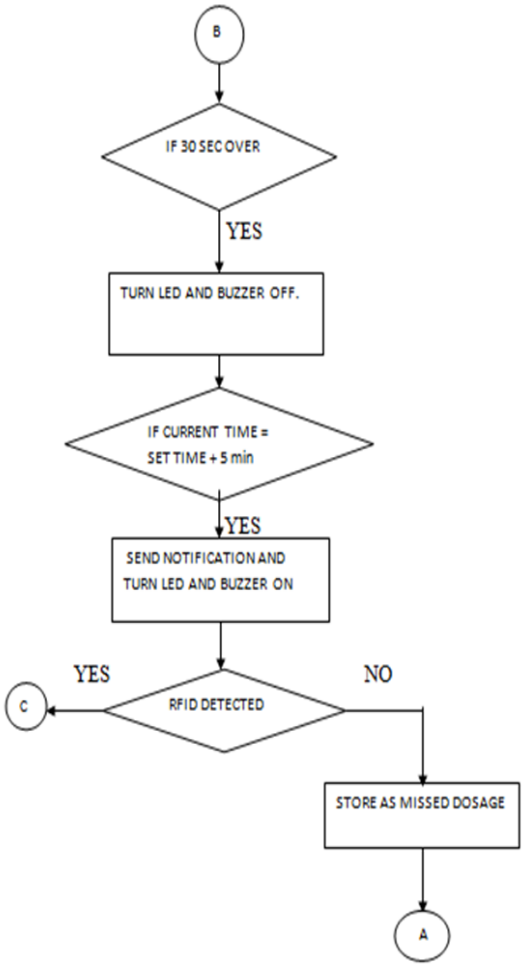

Fig. 3: Flow chart

The box will open the particular section of the box allocated to the patient/user. The box will be open about 60 sec and then the section will be closed, also it will store data as DOSAGE TAKEN.

It will then go back to monitor the current time. If the condition is false and 30 sec after the notification was send are completed the LED and BUZZER will be turned off.

It shall then check for the current time is equal to set time + 5 minutes, if the condition is true, the patient/user will receive the second reminder. The LED and BUZZER will be turned on again for 30 sec.

The controller shall check for detection of RFID TAG. If detected, it will follow the procedure of opening the box of the particular patient/user and storing the data.

Even after waiting for 60 sec the RFID TAG is not detected the data would be stored as DOSAGE MISSED.

After that, the controller will again go back to monitor the current time until the set time of other patient is achieved. The process is then repeated for other patient/user.

4. CONCLUSION

There are many systems that are serving the same purpose. But these systems are difficult to use, non-mobile, expensive and a complex process. The proposed system overcomes all of the above problems and it is simply affordable with better accuracy. This system is helpful to every age group. It is helpful for tracking regular medicine intake and reduces manual supervision and human effort. With the simple circuitry and cheap device comes as a boon for the young and elderly, a simple solution for mothers for their adolescents and caretakers for the aged and suffering. It can find its use in every household or hospital that has medical supervision and can be marketed as an efficient solution for us. The main goal of the system is to provide healthy, tension free life to those who are taking pills regularly and to provide it at an affordable cost.

5. FUTURE SCOPE

- **Touch screen:** Touch screen facility can be added which is not available in any of the smart pill boxes till date.
- **Hospital applications:** The pill boxes can be used in hospitals where huge manpower is not available for a group of patients
- **Security:** With the addition of facial recognition technology, biometric or retina scanning, this pill box can be made more secure so that no unauthorized person can handle the pill boxes or exchange the medicines without authentication.

6. ACKNOWLEDGMENT

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7. REFERENCES

[1] H.-W. Kuo, "Research and Implementation of Intelligent Medical Box, "M.S.thesis, Department of Electrical Engineering, I-Shou University, Kaohsiung, TW, 2009

[2] S.-C. Huang, H.-Y. Chang, Y.-C. Jhu and G.-Y. Chen, "The intelligent pillbox-design and implementation," in Proceedings of the IEEE International Conference on Consumer Electronics, May 26-28, Taiwan.

[3] T.L. Hayes, J.M. Hunt, A. Adami and J.A. Kaye, "An electronic pillbox for continuous monitoring of medication adherence," in the processing of the 28th IEEE EMBS Annual International Conference, Aug. 30-Sept.3, 2006.

