

A Smart Pill Box with Medication Reminders and Confirmation Functions

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Abstract – The progress in medical technologies is one of the main contributions to the aging population. Most of the elders have the chronic diseases and they need to take medications over a prolonged period of time in order to stabilize their conditions. So Medication safety for the elderly is extremely vital. The most commonly encountered situations of drug abusing are excessive drug usage and disobeying the medication instructions.

We have developed a device called "smart pillbox" to help aging Population to consume the right medication at the appropriate time according to his requirement. This system improves the existing system by alerting the user at the particular time again by setting the count each time and the order for the particular pill is sent by the system automatically to medical shop through GSM.

Key Words: Smart pillbox; Medication Reminders; IOT, order for pill, Message Gateway and Email, Arduino Wemos.

1. INTRODUCTION

Poor medication adherence is one of the major causes of illness and of treatment failure. The classical practice of dispensing medication to a patient has allowed the patient to take the medication by himself, or delegate those responsibilities to a keeper or a doctor. The supervision by nurses and doctors is often expensive and unrealistic for the administration of medicine within home. For getting to take medication or taking wrong dosages is common in elderly patients who frequently are lonely and lose track of time [6]. Nowadays there are systems like scheduled alarm clocks or apps dedicated to schedule and notify medication's time in Cell phones. Also there's a pill organizers commonly used by patients to save and remind by themselves dosages. The disadvantages of those systems are; pills are not stored and it doesn't have an alarm system. The connectivity of sensors and other healthcare devices (IoT) plays an important role on care of patients, because it allows getting access in real-time of medical information. Thus, the study and development of an effective Healthcare/IoT gateway could be crucial in patient care.[1]

In this paper, we propose a new way of reminding and taking dosages at the right time by using new technologies linked to free hardware and software, with a low cost that does not have limitations on licenses and functions. Which allows the organization of several medication schedules that health disorders used to present in elderly need.

2. RELATED WORK

The approach related to the design of AT device [1] gives a new choice in taking medication dosages. It gives a programmable alarm system with an automatic opening and closing system, an interactive user interface and a notification system through GSM network.

A pillbox called a MedTracker [2] monitoring of medication Adherence on a continuous basis. It gives more detailed information about non-adherence and medication errors, and the familiar interface of a 7-day drug store pillbox.

A smart pillbox equipped with a camera and based on the medicine bag [3] concept. The matrix barcode printed on the medicine bags are used to interact with the pillbox in order to perform pill remind and confirm functions.

An intelligent pill box (IPB) [4] is based on the medicine bag [3] [4] 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. A pillbox [5] based on an MCS-51 micro-controller 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.

3. PROPOSED SYSTEM

In day together life, People have trouble to remember the pills they need to take from the bag of medicine. Multiple times the problem is the time required to take medicine is not printed on the box of medicine or they couldn't read English. People have also habit to sometimes forget to take pills. Due to this, some medicines were expired. In order to reduce the responsibility of family members the proposed pill box is of great help.

By adding some required medicine to the pillbox and set the pill time for that particular medicine. The Real-time clock is used to identify the pill time. If the system time matches with pill time the buzzer starts continuously until the push button is not pressed to alert the user to take pills. Figure 2 gives the architecture of the proposed system. When the push button pressed the buzzer stops and the pills required to take at that time comes out to the user to avoid confusion among medicines.

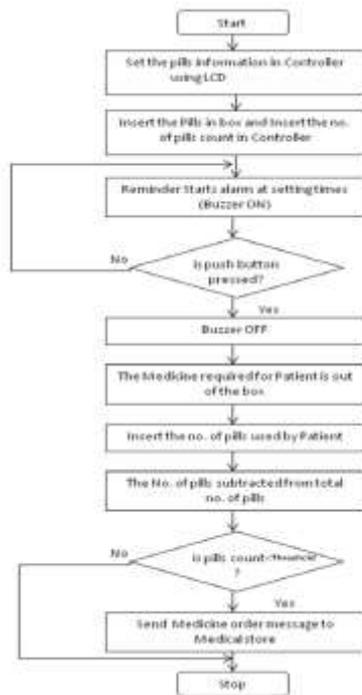


Fig-1: Flowchart of the System

Multiple times a user required more than one pills of same medicine or more than one person are using the same system. So it is required to update the count of no. of pills removed by the user. If pills remain less, the purchase order sends automatically to medical shop. Figure 1 gives the flow of the proposed system.

Only guardian can use the android application. User can login in app through their mobile IMEI number. User can do all functionality through android app, which they can do from web application like, add medicine schedule, set schedule, view patient details, add medicine etc.

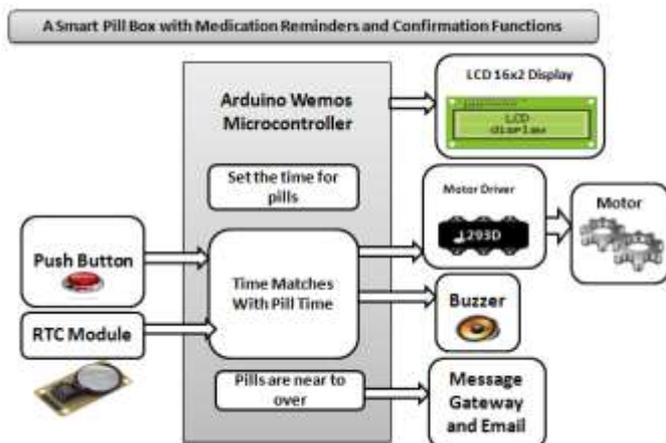


Fig-2: Architecture remind and consumption using IOT

4. RESULT

The working experimental setup of the proposed system is given in below figure which gives the alert at the time of pill taken. The Pill box rotates and pill which is to be taken is come out of the box.

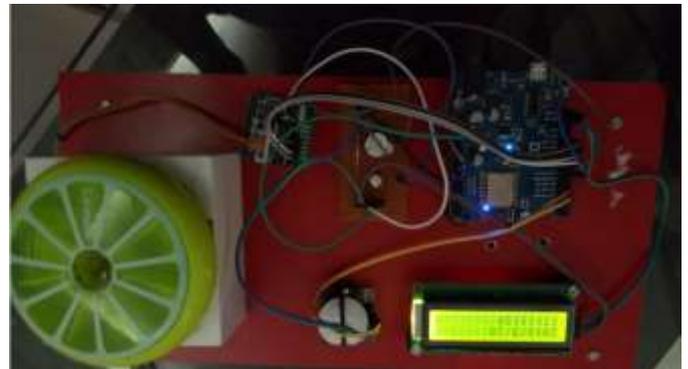


Fig-3: Experimental Setup

For using this system admin have to register the patients with name, age etc as shown in figure3.

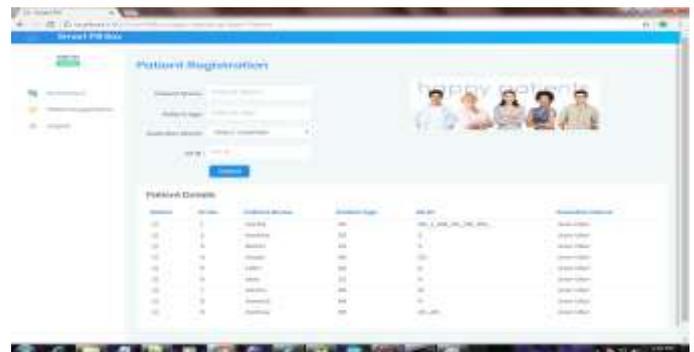


Fig-4: Patients Registration

After registration admin can add the medicine with name and dosage and set the timing for that pill.



Fig-5: Add Medicine

The time is set for the particular medicine with the count of the pills to be taken.



Fig-6: Medicine Schedule

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

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We can also get the medicine details for family members if they are taken the medicine or not.

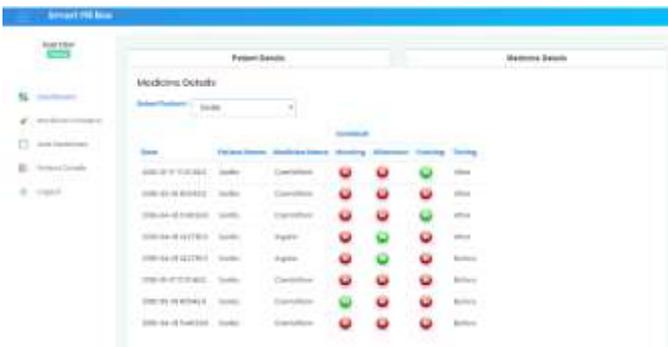


Fig-7: Medicine Details

5. CONCLUSIONS

Elderly people have trouble to remember the pills they need to take. We have developed a device using the emerging technology in order to improve medication safety and to avoid confusion in taking the tablet.

This system reduces family member's responsibility towards ensuring the correct and timely consumption of medicines by alerting the user to get the pill at the particular time.

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