Intelligent Pillbox for Monitering the Health using IoT Concepts

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Abstract - *Many older people live alone, some with disabilities, who find it difficult to take care of themselves. Delaying their medication or at the wrong time can lead to potential health problems. Intelligent Pillbox's current paper design for tracking patient pill health reminders from anywhere using the Internet of Things (IoT) concept. The search is usually on the other side of the drug, which is related to healthcare/maintenance, a modern precautionary IoT platform with intelligent pillbox with sensors for health inspectors is proposed here. The proposed Intelligent Pillbox can be used by patients as well as caregivers and care can be taken that the appropriate dose of each medication is being taken at the correct time. The Intelligent Pillbox provides audio instructions to alert the user when the drug is taken or refilled, and this helps a blind person. Functions of Pillbox: Which pill to take, when to take the pill in time, the patient should take that pill and inform using Android Applications and LEDs, Vibrator motor buzzer, vibrator and voice alarm, LCD 16*2,I2C, RTC. In situations where the exact timing of the pill needs to be taken, the use of Pillbox helps patients, especially those who take the time to take the medicines.*

Keywords: **Pillbox, ESP8266, IoT, RTC, Arduino, Android Application, Alarm Notification.**

1. INTRODUCTION

Nowadays, everything is in the age of technology, many things should be done fast. People who do not take immediate care to get medical attention may need constant help, perhaps because of family members, the elderly, some of them with disabilities, the special needs, the blind, and others. Older people are affected by taking pills. Patients with the same patients suffering from blind or short-term memory should not remember the right time to take the medicine.

Many people forget to take medication at the right time and this can affect their health. The Intelligent Pillbox is a useful solution that makes it easier for patients to take their medications. The importance of resolving medication is stated in the case of patients with short-term memory, blindness, or patients who have forgotten to take medication each time.

Now developed applications are characteristic but due to their complexity and high cost they will not work efficiently in the society. Users' pillboxes cannot be used individually just because of their cost and maintenance costs. Reminds and monitors that some pillboxes remain alert and vigilant without any interaction with your family members. Modern developed smart boxes have some shortcomings or drawbacks.

The Proposed system for Intelligent Pillbox where consumer application and Pillbox help prescribe drugs to people who forget to take medication. In this system, we use two major parts one is software and the other is hardware. The software in which we use mobile applications such as Android applications is called Medicine Reminder which uses it for alarms and sets reminders to take tablets at the right time. We also keep a pill store with their box. So to reduce maintenance costs, we reduce the interaction of special people so that the general public can also interact with the system. In the hardware section we used the Wi-Fi module for Arduino and MySQL database storage for hardware interaction. So it was easy to use the right time tablets as a short-term memory patent or a blind person.

2. MOTIVATION

The pain of losing a pill led to the creation of such a product by observing the eldest member of the family. Blind people in the society cannot take medicines, all these incidents motivate us to come up with a solution.

3. LITERATURE SURVEY

[1] A pillbox based on the MCS-11 micro-controller was proposed to deliver the drug to the pillbox using a stepper motor at the scheduled time, but there is no provision to record the time when the patient takes the drug. [2] MedTracker proposes an electronic pillbox called MedTracker, which records when each lid is opened or closed, and transmitted to the PC via a Bluetooth link.. [3]When the alarm system is operated on the pillbox, the

door of the specific compartment is automatically opened using a step motor controlled by arduino.[4] This action when the door is opened. At that moment, the patient's information is displayed on the LCD display. [5] This paper is used Arduino Mega 2560 for controlling hardware. [6] This pillbox is used for the camera on the inside of the cover so you can find the matrix barcode and tablet bag. Reminds us when the user is using us for alarm function. [7] Suppose a patient does not miss a drug, but the doctor and family members send it via SMS notification.. [8] Whenever the patient opens the wrong container. LED on the right box compartment selection at that time..[9] Bio patches and audio playback ICs used for patient monitoring such as taking patient medications to alert in voice messages etc.. [10] These pillbox connectivity sensors and other healthcare devices (many) play an important role in meeting the specific needs of the patient as they can provide the patient with real medical information.

4. PROPOSED METHODOLOGY

To Implemented the Intelligent Pillbox schedule here to ensure people were taking medications on time. In Intelligent pillbox the mobile application name as a Medicine Reminder , ESP8266 wifi module, Arduino Uno, Buzzer, LEDs, Vibrator motor, Push Buttons, LCD 16*2, I2C, RTC. Arduino Uno is used as a microcontroller to control all sensors or specific events.
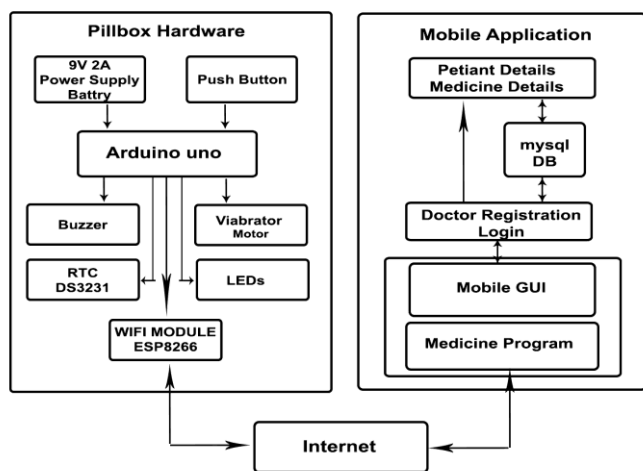

Fig 1 : Intelligent Pillbox System Architecture

Fig.1 Shows the architecture of the Intelligent Pillbox system architecture. This architecture includes Pillbox hardware and mobile applications.

4.1. Pillbox Hardware: The Pillbox is wirelessly connected to the internet. The Pillbox is come up with different compartments for storing the Pills. The Pillbox Hardware consists of Arduino uno, ESP8266 wifi module, LEDs indicator, Push Buttons, LCD 16*2, I2C, Vibrator motor, Buzzer. Pillbox hardware architecture show **Fig. 2.**

Arduino Uno: The Arduino Uno is an electronics control device based on easy-to-use hardware and software connectivity. This is intended for anyone creating an interactive project. Arudino became alert by receiving input from numerous sensors and controlling the lights, motors and other electronic devices in the surrounding area. In Fig. 2 show that Arduino Uno controls all electronic devices such as buzzer, LED, vibrator motor, push buttons, LCD 16 * 2, I2C, RTC, ESP 8266 etc.
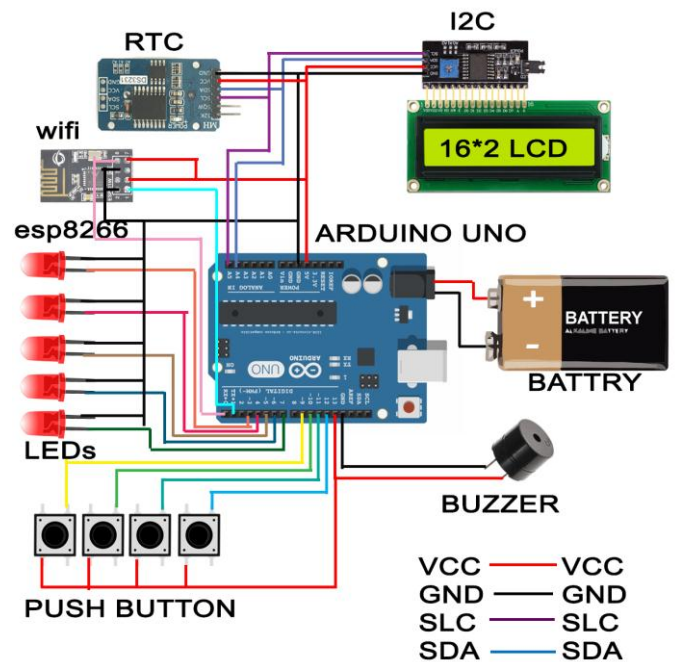

Fig. 2 Pillbox Hardware Architecture

ESP8266: The ESP 6626666 WiFi module is a self-contained SOC with an integrated TCP / IP protocol stack that can give any microcontroller Arduino Uno access to your WiFi network. This is useful because Pillbox connects to WiFi using the Internet.

RTC DS3231: Time Clock Module DS23211 is a module that measures time through its Arduino card or independently dependent cell. The module calculates the time elapsed since the Arduino card was turned on in ms. The module is integrated with an easy to use battery. It indicates the right

time for the patient's medication and is useful as a timely drug reminder in the pillbox.

LEDs Indicator: An LEDs display box at the top of each box. It is used to give visual instructions to the user. When the drug reminder indicates the drug time, the LEDs indicate the appropriate pills in the pillbox.

Vibrator Motor: The vibrator motor is used for vibration alarm time in addition to LED to indicate when the user should take the drug. The advantage of a vibrator motor is that it is easy for blind people to choose medicine when using a pillbox.

Buzzer: The buzzer is used to provide an audio alarm in addition to the LED to indicate when the user should take the drug. Buzzers can also benefit blind people when using a pillbox.

LCD 16*2 with I2C: The I2C module, you will see a potentiometer that you can turn on with a small screw driver. Plug in Arduino uno USB connector to power the LCD. You should see the backlight light up. Turn the potentiometer to one side (16 × 2 LCD). They use the drug to indicate the name and time to take the right dose of the drug at the right time.

4.2. **Mobile Application**: The Pillbox app (Android Application) is installed on the doctor's mobile phone. This Pillbox app, also known as Medicine Reminder, allows doctors to view details of medication decisions when prescribing medications for patient it show fig. 3.

Keep track of the number of pills in each compartment - give the user an alarm if a drug needs to be refilled, instruct the user via LED and buzzer at that time to take a specific drug. The phone application will send a continuous signal to lock or unlock the medical box, depending on the medication intake schedule or the order placed by the user.

The entire information is stored in the Mysql database, patient data can only be accessed by a doctor.
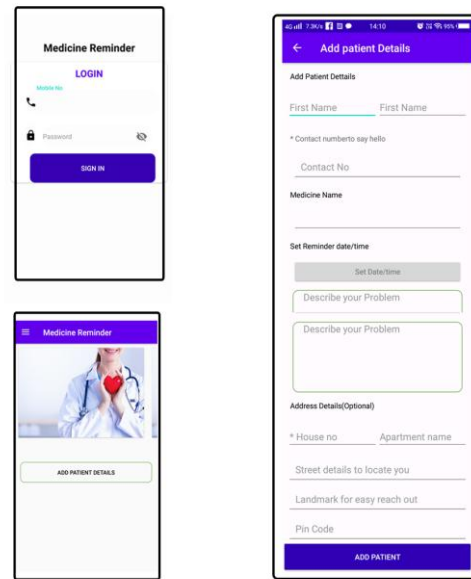
Fig. 3: Medicine Reminder Android Application

4.3. Database: A database is used to store information about each bin and user, doctor data. Below are the main fields in the database table; Pill name, number of pills to be taken daily, dosage time and total number of pills Pill status - Update each condition depending on usage.

The main program can be used by two types of users, patients and administrators. The logged in patient can only view and read the Pillbox information. The administrator can view, add, and delete tablet information. The mobile application informs the user about the latest status of Pilbox.

Fig.3 Displays the GUI of the mobile application. Each box will show the number of pills and a prescription for taking the pills.

5. CONCLUSIONS

In this paper low cost efficient intelligent pillbox develop by using electronic device and mobile application. Cost and Power Efficient Device for People Help People take their medications that often forget the pill. Voice commands and alerts for the blind also implement indicators for the blind people of the right pillbox using a vibrator.

The Intelligent Pillbox analyzes a particular patient's frequency of overeating or dose forgetting.

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