MEDICINE DISPENSER AND REMINDER

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Abstract: Many medical errors are due to the fact that people in charge of patient or elder's medication have to deal with sorting huge amounts of pills each day. This paper consists on the conception, design and creation of a pillbox prototype intended to solve this deficiency in the medical area as it has the ability of sorting out the pills by itself as well as many other advanced features, with this device being intended to be used by hospitals or retirement homes.

This medication pill box is focused on patients who frequently take medications or vitamin supplements, or attendants who deal with the more seasoned or patients. Our smart pill box is programmable that enables medical caretakers or clients to determine the pill amount and timing to take pills, and the service times for every day. Our shrewd pills box contains nine separate sub-boxes. At the point when the pill time has been set, the pillbox will remind clients or patients to take pills utilizing sound and light. Contrasted and the conventional pill box that requires clients or attendants to stack the crate each day or consistently. Our shrewd pill box would essentially discharge medical attendants or clients' weight on much of the time preloading pills for patients or clients and overlook the measurements which must be taken.

I. INTRODUCTION

Device which gives medicine to be taken at time. These devices are very useful to take proper medication at ease. Automatic dispenser has separate compartments for each pill which can be dispensed at required time with required number of The course of taking medicines prescribed by a practitioners are often recessed due to the forgetfulness of taking the same at the right time .Thus the course gets discontinued at the earliest .

Such negligence should be avoided or else the results come out are often catastrophic , hence a permanent solution to this problem is rendered through the medium of this paper. In order to palliate such problems we have come up with smart medicine dispenser which helps in assisting the individuals for taking their medicines on time. Pill trays, which are manually sorted compartments is the most commonly used method.

The pills required for a particular time are sorted manually and kept in different compartments capable of holding pills of different shape sand sizes. But the process of sorting and loading pills into these trays need to be done frequently and is an error prone process. Such cumbersome tasks can be avoided with the help of an automated mechanism Senior citizens consume medication in the form of pills on a daily basis. Due to the age factor, they often tend to forget the right time to take the medicine as well as the right medicine[3].

Fostering the aged is a major concern for every family and the less aged are responsible for the care and management of the doddering people. once that set time is reached it signals that the box open and enable the buzzer and that compartment details onto the LCD(Liquid Crystal Display).

It uses GSM(Global System For mobile Communication)module interfaced with processor which notifies the patient when to imbibe medicines . This project is an attempt to create something that is more useful than current products on the market, by minimizing the work that the user must do in order to regularly take their medication.

II. COMPONENTS REQUIRED

a. Arduino Mega2560
The Arduino Mega2560 is a microcontroller board, which has 54 digital I/O pins (Input/output Pins). Of these 54 pins,

14 can also be used as PWM outputs [9]. Apart from the aforesaid detail, the processor also has 16 analog inputs, 4 hardware serial ports, a 16MHz crystal oscillator, a power jack, a USB connection, an ICSP header and a reset button.

b.   Motor Driver (L293D)

For the purpose of providing the user with the ease of access and friendly interfacing, the L293D motor driver is made available. In order to easily utilize driver IC's pin functions , the pins of the L293D motor driver IC are connected to the connectors. A good quality, single sided non-PTH PCB is used for mounting the L293D motor driver.

Having the capacity to drive up to 1 Ampere of current per bridge with a supply voltage of 24 V, the L293D made itself known as a Dual Full Bridge driver [10].

2.3 liquid Crystal Display

A very popular display widely used in many digital watches and portable computers is the liquid crystal display. Two sheets of a polarizing material are used with the insertion of a liquid crystal between them. The crystals align in such manner so that the light cannot pass through them when an electric current is passed through them.

The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. It requires a single power supply (+5V) [11].

2.4 DC Motor

A motor is an electrical machine converting electrical energy into mechanical energy. The principle of working of an electric motor is that whenever a current carrying coil is placed in a magnetic field, it would experience a mechanical force exerted on it, thus it works on the principle of electromagnetic induction. The direction of movement of the coil is decided by Fleming's Left Hand Rule. Motors used in the project are geared running at 30 rpm at 12V supply [12].

2.6 Buzzer

The buzzer is basically an electronic sounder with the characteristic of making a high pitched tone like a Son Alert. This device typically makes itself usable in automobiles and household appliances like oven. This is a small 12mm round speaker that operates around the audible 2 kHz range [14].
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BLOCK DIAGRAM
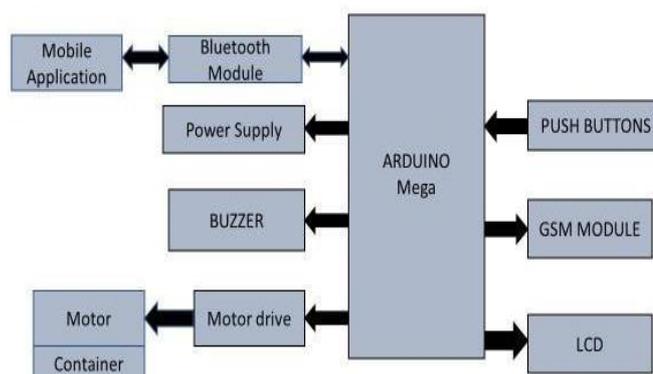
III.   PROPOSED SYSTEM

There are several types of pill dispensers available in the market that have been produced by different companies consisting of built-in alarm to notify the users without having online database to save the users and pills, or having remote access functionality

To state a few:
-   An electronic pill dispenser realized using pic microcontroller with keyboard and an LCD that lets the user schedule his/her pills manually on a plate. It dispenses the pills and generates an audio alarm to alert the patient.

- A pill dispenser was created using a combination of infrared sensors and Arduino microcontroller with alarm system to help the patients take their pills at the correct time. The alarm system was implemented using a popup notification on smartphone .

- Another pill dispenser that is created using Arduino microcontroller that dispenses only one pill at a time to prevent overdose. Then it notifies the user via SMS that the pill is ready to be taken. Also it was connected to an android application that is used by the caretaker to edit the dates and times of the pills to be dispensed .

- The proposed SMD system takes the idea of automated dispenser to the next level as it has some functionalities that are not included in any other automated dispensers. An account is provided for each patient and no one else can access it except the patient and the caregiver if the credentials were provided to him/her. Also, some statistics are provided about the pills taken with their alarms and the already existing ones. Online database of the users, pills and their alarms is also a great feature that helped in the design of the project. The alarms can be edited and created using an android application remotely through smartphones.

IV.   MEDICINE DISPENSER METHODOLOGY

- This section describes the methodology of the proposed prototype system. The explanations consist of the SMD design and its external peripherals. In this paper, we built an Android application that is responsible of controlling the whole system.

   It's the primary way of interacting with the system, the application stores its data on the cloud and performs synchronization upon login. To dispense the pills, the phone will automatically connect to the Arduino via Bluetooth and starts sending commands indicating which container and Stepper Motor should be rotated

A. Android Application Overview The whole system relies on the android application to provide the user interface, control the medicine dispenser and manage user schedule and usage data.

B. After the user login, the application will show an overview of the pills to be taken on the same day and on the next day in another Tab, it will also provide a History Tab that shows when old pills were taken

C. The User can select a pill timer to change it or delete it. Or if he/she sees that the remaining pill supply is low he/she can click on the refill button the increase the remaining pills

D. Patient not take the pill, where the application will then alert the number, saved in the settings, that the patient skipped his/her pill via SMS.

E. Database Management
   The pill alarms and usage data are stored first locally using SQLite Database. The local database is then synced with an online MySQL Database, hosted on the 000webhost.com servers for free, whenever the user enters the application or changes something in the schedule using PHP and JSON as a way to communicate and transfer data between databases .   hardware design

MD modular as prototype, with expandable container units. Each container is controlled separately with its own LED and can keep up to 7 servings (a serving can consist of multiple pills of the same type).

Servo motors are used to rotate the cylinders; the motors are controlled by an Arduino Uno R3, using PWM signals that make the servo rotate for a bit then stop, and are connected as shown in Figure 11.

When the user wants to take his pills, his smartphone will connect to the Arduino via Bluetooth, and sends it which container should be rotated.

Step by step procedure of the working of the project is as follows:

- STEP 1: Start
- STEP 2: Given time input is compared with the Real Time Clock if it returns true goes to step 3 else step 2
- STEP 3: Buzzer sound is given as remainder
- STEP 4: If the button is pressed then goes to step 5 else messages are sent for every 30 minutes for 6 time to the mobile   STEP 5: Trays are opened based on the time one by one
- STEP 6: Tablets are taken and the trays are closed indicating the completion of the process
- STEP 7: Notification is sent to the mobile indicating that tablets are taken
- STEP 8: Stop
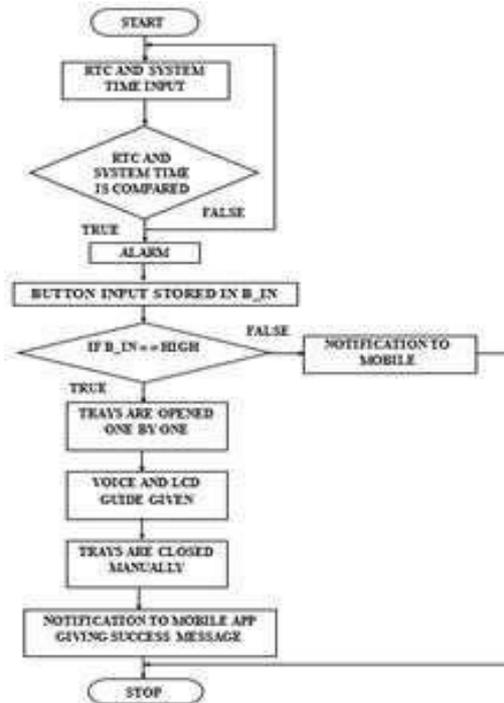
V. CONCLUSION

The proposed system is made ease and helpful for the old age patient especially who used to forget to take medicines on time or they couldn't recognize name of the medicines. It has the facility to send remainder. In case patient do not take medicines even after alarms, system sends a message to the care taker's number given in the application. It is possible to change the prescription of the medicines as per requirement. As the world is moving towards digitalization this kit can be further developed to a complete IOT based product, which in turn can be used to track health of any person anywhere at any time. And can be developed for hospitals in large scale to help nurses to keep track of the prescriptions of many patients

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