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Automatic Pill Reminder

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Abstract: *It is important to take medicines at correct time in actual quantity. Our automatic pill reminder is designed to discard two most common causes of administration error such as misunderstanding of medication directions and inconvenience of harsh medication timings. Nowadays due to unhealthy lifestyle, there is drastic increase in the number of people with chronic diseases. Thus we finally end up visiting hospitals frequently. Sometimes we people forget to take medication on time and this worsens our health condition much more. Natural and clinical errors could be serious to the patient, affecting total treatment method, recovery, immune system and probably dangerous effects. To avoid this, a best solution is automatic pill reminder, which will help us to take medicines on time. This system uses Arduino which is a programmable device that can easily detect and interact with its environment. LCD display is provided for getting proper directions. For giving alert, buzzer is used. Then we have a pill container and dispenser. This product is very economical solution to an everyday problem, portable, user friendly, reliable and stable. It is good in performance and quality. It is very helpful for aged patients because they always need extra care and attention of family members or care takers. So anyone can fully utilize the system.*

Keywords: *Pills, Alert, Arduino, Buzzer, Dispenser.*

I. INTRODUCTION

On these days people are getting very busy that they don't have any time to waste on anything. So in the developing countries people are busy with their jobs. So they have to be reminded all the time to do their job perfectly. This leads to the need of a reminder which can alert them to do their work. We basically focus on medical field. In the earlier period if everyone is busy with their work they will forget to take their medicine. So they will use sticky notes to make them remember about what to do next.

So here comes the need of an automatic pill remainder where we started with the basic needs of any patient to get their medicine. We started with a simple microcontroller to alert the patient about how much of the pill should be taken from it. The pill reminder consists of a buzzer, RTC Module, Display unit, Power source etc. The buzzer will alert the patient or anyone who is responsible of that. The RTC Module helps us to set the time and date for our own need. The power source is provided to give power to all the sections. In the case of an elderly people in our house they will always try to be independent in their own house. So because of that their children are worried about them. Sometimes the aged fail to remember to take their medication on time and because of that the son or daughter will try to put a home nurse for them. So here also comes the need of an automatic pill remainder. Some of the basic functions of an automatic pill remainder is given below.

A. For Elders

In most of the houses there are elderly people who are trying to live an independent life without the help of their sons. So they will have to take medicine by themselves. So for them the automatic pill remainder is an effective solution. Because they will be given alarms that will help them remember to take the medicine as well as the amount of medicine to be taken. If the aged person cannot walk from the bed, even the small kids or anyone can easily understand the function of the pill remainder such that they can easily take the right pill of right amount by looking at the display and can be given to the elder for having their medication. Each medicine is placed inside a block which is given by a name so that anyone can easily understand it and anyone can also put medicine in it as required.

B. For Domestic Purpose

For daily vitamins and medicine that cannot be avoided even one day can be put in pill remainder so that it can give an alarm and they will never forget to take that medicine because the pill remainder is made portable. It can even be placed inside a purse so that they will never forget to take medicines. We get to know when to take medicine before or after the meals.

C. For Hospital Purpose

For hospital purpose the pill remainder is very needful. If u have a pill remainder then the need for the doctor and nurses to check the patient reduces .so they don't need to come for frequent check up called as rounds. If the doctor comes he can easily identify the amount of medicine taken and when by looking at the pill remainder and can check the patient. Since the use of pill remainder can help doctor to give more attention towards the patients who are in greater need for medical attention.Thus pill remainder can become a great help on people living on developing countries. They will get to know when to refill the pill remainder and when to take medicine with the help of buzzer. The project is specifically designed for elders and people who are busy in their life due to job or for looking after their children's with great concern.

II. LITERATURE REVIEW

My MediHealth [1] is a medication reminder system for children. It uses mobile devices such as smart phones, and provides user interfaces for getting medication schedules and user alerts for reminding users about the time and type of medicines according to prescriptions.

RMAIS [2] a novel and practical medication self-management system. The features of this system are hardware interface designed for the scale, the spoke mechanism used to position medicine containers, and the software protocols used to interface the system with the pharmacy. The system can alert the patient in various ways, such as an alarm sound, cell phone or pager text message, or automatic phone call, when it is the time to take medicine. Data on a medicine bottle's RFID tag enables the system to automatically read the medicine's information without requiring manual input from the patient or caregiver. With the built-in scale, the system can automatically tell if the patient has taken the right amount of dosage for each medicine

Automatic Pill Reminder Bottles [3] Invented and patented in 2004 by innovator and inventor Joseph Lai the pill reminder bottle the device is compatible and can be retrofitted inside a regular conventional pill bottle cap. This reminder device is installed inside the conventional pill bottle between the bottle cap and the bottle container. When the user closes the pill bottle cap on the bottle container, the electronic timer, with factory predetermined time interval, is automatically activated. That activated timer will generate alert signals not only remind user last pill has taken but also to remind the user to take his/hers next dose at time-out.

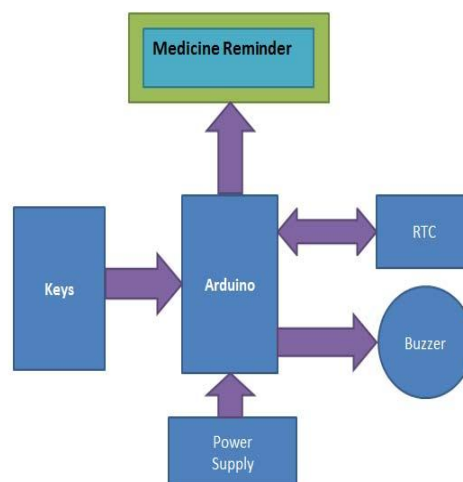
Smart medicine dispenser [4],this programmable device designed allows the caretaker to reliably administer medications to a patient without needing to be present every time the medication is scheduled .The care taker pre-programs the SMD that allows it to set up to 21 medications doss through an alphanumeric keypad and LCD display. The SMD can be pre-programmed to repeat the same cycle for one month.

Alarm Pill Box Pill Mate Event Reminder [5], it reminds at a pre-set time to take medicines or attend certain events. A smart phone application is designed to help patients to avoid mistakes.

Smart Pill Box [6], the basic ideology is integrating the principle of alarm clock with light based slot sensing on a normal pill box. There is an inbuilt GSM module for alerting the patient and also the chemist at the needed instant.

III. DESIGN

A. Block Diagram



The working of Automatic pill remainder is done with the help of components like Arduino Uno, LCD display, buzzer, RTC module and a power supply. In this, we have used Arduino for controlling the whole system. For this first we coded a program that can be used to work as a pill reminder. Then we connected the RTC module as shown in the schematic diagram. The purpose is to transfer the time and date information through serial communication updating the information in real-time. When we start this system real time clock runs the time on 16x2 LCD. When LCD shows time and number of medicines with compartment number, buzzer starts beeping continuously. Buzzer is directly connected with pin number 13 of Arduino for medication time indication. And a power supply is provided for regulating DC.

B. Design Of The Product

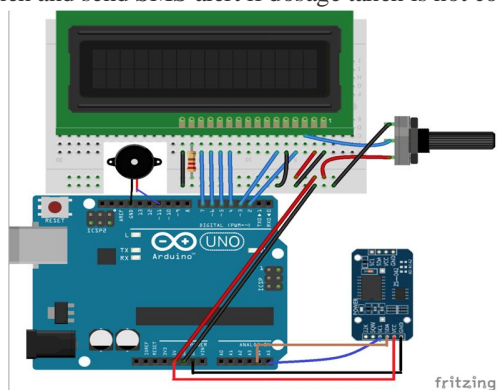
We initially sketched different images of how we imagined the smart pillbox to be designed. We started with a few different concepts:

- 1) Auto-dispensing circular design that would rotate to the compartment holding the pill dosage at the correct time. Modular design also allows stacking to add more pills.
- 2) Modular rectangular compartment design with push-tray design that would activate a piezo to notify caregiver that tray has been opened and a weight sensor beneath the tray detects whether pills have been taken out.
- 3) Modular design that can be assembled in a matrix design and also taken apart for on-the-go. Flip-top design allows easy access to pills.

Ultimately, we chose the auto-dispensing design of a square box, which is small in size and also easy to carry everywhere, because the competitors in this space have much more room for improvement, and it tackles a more urgent need of patients with memory loss.

C. Connections

The Arduino [7] board loads the required libraries as it is powered on. It waits for the user to feed the medicine information. The user can feed the information of each medicine in the five-step process. As the user presses the Save button after every 5-step wizard, the information of the respective medicine is saved to the internal EEPROM of the Arduino board. Once the user presses the #/Exit button, the Arduino board starts fetching real-time from RTC module and compare the dosage timing of the medicines with real time. At three instants of time - morning (9 AM), afternoon (12 PM) and night (9 PM), the Arduino seeks the confirmation of dosage taken by detecting the press of the confirmation button by the user. If the user does not press the button, after a delay of 2 minutes, the board sends an SMS through the GSM module to the registered mobile number of the user. The program code describes how the Arduino board manages to input and store medicine information, keep track of time using RTC, compare dosage time with real time, track confirmation of dosage taken and send SMS alert if dosage taken is not confirmed by the user.



Connection Diagram

IV. RESULT AND DISCUSSIONS

The product was developed as expected. The LCD displays the time and number of medicines with compartment number as per the program was installed on it. At the same time buzzer starts beeping continuously reminding the patient to take the respective pills from the compartments. There are 4 compartments with the storage facility of 16 pills of any shape. Also when the pills in the compartments are over it gives an indicates on the LCD display.



V. CONCLUSION

By the end of the project, a successful working prototype was made. The pill dispensing system that we are proposing will dispense the right number of pills, at the specified times and is capable of storing medicines. Automatic Pill Reminder reduces the accidental overdose, since it already stores the number of medicine to consume and enhances the quality of life of its users, hence. The device helps in track of regular medical taking activities and reduces manual supervision and human effort with simple circuitry, which is a great aid to elderly peoples. This is easy to use and cheap device. It can find its use in every household or hospital and can be marketed as an efficient solution. For easy detection and alert, a buzzer is attached so that it will make sound reminding us to take the pills. The person in concern takes pill in time and in the right quantity without personalized supervision.

VI. FUTURE WORKS

There are several ideas for improving the prototype generated by this project. The system can be reduced in size in many ways. The linear motion track can be replaced with a circularly rotating track. To increase the user friendliness, helpful sounds can be incorporated into the design. Further we can increase the interaction between the machine and its user by extending the range at which it can communicate that is via sms or phone alarm. To reduce the size of the product we can use ArduinoNano which is much smaller than Uno. Replacing these materials with something more lightweight would also lend itself to the overall weight loss of the machine. Also we can implement this inside a purse which will be useful while travelling.

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