

ALERTING SYSTEM FOR MEDICINE DISPENSING

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ABSTRACT

It is an alerting system for medicine which helps disabled people are unable to take their medicine on time. This project is helpful for those who are lazy and forgets to take medicine on time. Buzzer will irritate them to take medicine on time. Authenticity is given in the project hence no other unauthorized person can take the medicine; hence medicine cannot go in wrong hands. As the project helps people to take medicine on time, the people will remain more healthy and life expectancy will increase.

Keywords: medicine, alert, biometric, buzzer, sensor

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1. INTRODUCTION

Everyone forgets to take their medication at one time or another. But for those on a complex pill regime, not taking prescribed drugs at the right dose and at the right time can have major consequences, particularly if they are elderly or vulnerable. Using this alert system, people can take their medicines regularly, which means their health will improve and they will be less dependent on others. It uses a microcontroller to keep track of when a patient should take their medications with a feature of biometric authentication so that the medicine is accessed by the right person. This alert system sends a message to the user at time of medication and also sends a message to patient as well as relatives in case the medication is missed.

2. PROPOSED MODEL

1. First, we will connect and complete the setup and circuit. Real time clock will be running and as soon as it reaches a preset time, we'll code the arduino to send the output to the LCD display and the Buzzer.
2. The LCD display will display the time slot of the medicine and Buzzer will keep on buzzing.
3. Now if the person/user takes the pills, i.e. opens the lid, the IR Sensor attached to the lid will detect that the lid is opened and hence will send the output to Arduino which

will stop the Buzzer from Buzzing and this will be taken into the log that the person has taken his medicine successfully.

4. In case the person fails to take the medicine (Lid is not opened), the buzzer will automatically stop after a preset time and will be put on snooze. If a person again misses the medicine, the output will be sent to GSM module which in turn will send a message to the person reminding him that he has missed a pill.
5. And if once again the person misses the pill, a message will be sent to family members/hospital.
6. For the authentication purpose, Fingerprint sensor will be connected so that the wrong person does not take the medicine by any chance.

3. REQUIREMENTS

1. Real time clock
2. Arduino Uno
3. Arduino IDE
4. IR sensors
5. GSM Module
6. LCD Display
7. Pill Box
8. Connecting wires
9. Bread Board
10. Fingerprint Sensor

4. LITERATURE REVIEW

[1] John T. McLaughlin et al (1988) proposed a medicine dispenser comprises of a container which has a lid and a removable tray with compartments that can be placed upon an interior container ledge and held within immediately beneath the lid when closed. The tray includes a series of openings dimensioned and positioned on the boundary of the tray to interact with a series of pegs positioned on the ledge. Only a properly encoded tray is permitted to be positioned within the container interior. The lid is enabled with a profusion of spring-loaded, hinged tray compartment covers aligned exactly over corresponding tray compartments. The contents of any desired tray compartment can be selectively opened. The medicine dispenser has a microprocessor within the container interior which works with a control button on the lid to control the operation of an audio-visual alarm and the automatic opening of selected compartments

[2] Lisa W. Rogers et al (1995) proposed a vacuum operated system for individually dispensing items of solid medicine that are to be taken orally, from bulk storage to a user. The medicine dispenser is computer controlled. The quantity and type of medicine is chosen in advance by the user. The medicine dispensing equipment is connected to a computer that provides a user interface. Many storage containers arranged in a rotatable carousel or a rectilinear array may be used to cater to various needs in the form of pharmaceutical articles, or various types, dosages, ages, and medicines. Refill of the storage containers is done via inserting modular refill cartridges into them. After getting data from the user, a universal vacuum probe is aligned with the storage container that contains the desired items. The universal vacuum probe is then lowered to the chosen storage container and engaged with a container probe that is specific to that storage container. The vacuum source is used to create

suction within the universal vacuum probe and the container probe. Universal vacuum probe and container probe are operated to individually extract items from the storage container.

[3] Sam Lerner et al (1998) proposed a new Programmable Medicine Dispenser and Storage Device which allows the user or physician to program a medication administration schedule, alert the user by means of a loud alarm, schedule the medication administration time, open a corresponding medication compartment upon user response to the alarm and, instruct the user on the right method to take the medication. A real time clock has been included for generating real time signals, a keypad for setting each medication administration time, an acknowledgment key for creating an acknowledgment signal, a programmable controller for activation of the alarm in response to the real time signal and to process the acknowledgment signal, and at least one medication compartment having a lower compartment and a lid latched on in a way that each medication compartment unlatches when each medication administration time corresponds to the real time signal. In response to the acknowledgment signal, the unlatching mechanism is connected to the programmable controller.

[4] John H. Brown et al (1980) proposes a mechanism for dispensing medicine on a timely basis for a patient and to alert the patient to take the medication. The invention consists of a dispensing wheel which includes many medication storage compartments, labelled to show various times of the day and the week to collect the medicine. The timing device is made up of an electric motor which drives a gear which turns a transfer gear which in turn rotates a driven gear to move the compartmentalized dispensing wheel one compartment at a time to dispense medicine.

[5] Jens Ostergaard et al (2001) puts forward an invention regarding the art of dispensing medicine to patient, and relates specifically to a medicine dispenser for dispensing doses, a loader for filling doses of medicine into the medicine dispenser, a medicine distribution box, a packing device for packing medications in prescribed doses, a Central Medication Database and a system integrated with all these objects. Moreover, the invention relates to method of dispensing doses of medicaments, loading medicine into a medicine dispenser, distributing medicine, packing medicaments in predefined doses, carrying out various aspects related to dispensing medicine and, integrating all the above-mentioned methods.

[6] Gordon M. Campbell et al (1993) proposed a programmable medicine dispenser with color coded medicine container made of a cabinet with a spring-loaded door. It can be manually overridden. A vertical magazine with a loading port at the top and a dispensing port at the bottom, holds a many medicine canister where each contain medicine to be ingested at a certain time. The canisters are divided into groups which are identified by colored patches which help segregate based on the scheduled doses during a day. The door is locked using an electro-mechanical latching mechanism to prevent rogue access to the medicine. The latching mechanism uses a programmable electronic timer to unlock the door at selected times of the day. The canisters may be accessed sequentially to take medicine in the proper order. Unlocking the door causes lever switch to activate a lamp and a buzzer to alert the patient or a caretaker about the scheduled medicine for that time. The latching mechanism is located above the override pin, and can be operated from the outside of the cabinet. Medication may be accessed during emergencies as the pin enables the manual operation of the mechanism independently of the timer. An override lockout bar can optionally disable the override pin as a child safety measure.

[7] Chean-Shui Chen et al (2000) proposed a medicine dispenser carried on pacifier which is designed for babies and infants. It includes a small container adapted for filling medicine into and a pacifier combined with the container to fluidly communicate with the interior in the container. When a baby or an infant suck on the nipple portion of the pacifier, the medicine

flows from the container into a passage in the nipple portion. The medicine will be administered into a baby's mouth via the passage in the nipple portion for treating diseases in babies.

[8] David B. Zamjahn et al (2001) proposed a calculated medicine dose dispensing apparatus. It contains a medicine bottle and a calculated dose medicine dispenser specific to a particular medicine. A bottle cap installed on the neck of the medicine bottle. The dispenser includes a dose cup shaped like a truncated cone which has a large diameter open end and an end wall closes the small diameter end. The dose cup is fitted on the bottle cap with the large open end facing down and the bottle cap installed frictionally in an indent on the cup. On the exterior of the end wall, a dial assembly is installed on the dose cup. The dial assembly is used to calculate the proper dose of the medicine that should be administered to the patient based on parameters like weight. The dial assembly comprises of a dial and a data disc. The data disc carries at least two information sets that are arranged circularly. Each information bit of a set is functionally related to the information bit of the other set. A dial plate is installed over the data disc of the dial. One sight window corresponds to each information set on the dial plate. Rotation of the dial plate over the data disc displays functionally related information bits displayed on the sight window.

[9] Purnendu Shekhar Pandey et al (2018) proposed an issue of Adverse Drug Reactions (ADRs) caused by human error. ADRs due to carelessness is fairly Common place among elderly citizens or in people who need to follow multiple prescriptions from day to day. They find it difficult to track their medications over time. This paper discusses the development of a Smart Medicine Dispenser to manage the issue among patients who confuse the dosage and timing of their medications. This led to the making of Smart Medicine Dispenser (SMD) which has all the prescribed doses for a scheduled block of time like a month, and dispenses them at the right timings. It will monitor the medication habits of patients and reduce the risk of overdose or intake of the wrong medication. The concept of electromagnetism is used in the design to make it comparable with the existing product. The components used in SMD are easily available and inexpensive in comparison with the current solutions in the market.

[10] Nitesh Ratnakar et al (2004) proposed a dispenser having the means to dispense desired number of pills from a variety of pills contained in the dispenser. The dispenser comprises of storage compartment having bulk supply of pills and has a discharge port that empties into counting compartment the counting compartment contains first and second conveyors moving at different speeds; where the second speed is greater than the first speed thus enabling pill separation; the second conveyor discharges pills into dispensing compartment. Strategically placed sensors along the conveyors count pills discharged into dispensing compartment. A pill recovery system and apparatus is disposed inside the dispenser in order to recover pills remaining on conveyors upon completion of a dispensation cycle. The recovered pills are deposited back into the storage compartment for use in future dispensation cycles. A docking station having repositories to accommodate dispenser is provided. Docking station has communication ports enabling two-way communication with personal computer.

5. ARCHITECTURE

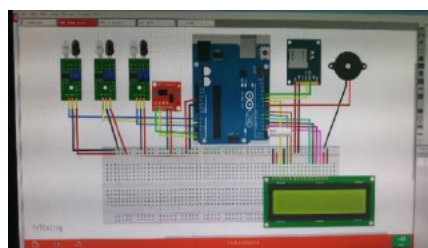


Figure 1

6. IMPLEMENTATION

6.1. Pseudocode

1. Clock = T (Initializing Time)
2. LCD = Display (Time, Dose, Taken) //Display the time and doses and whether the dose is taken or not.
3. If (taken):
 - Dose Taken = true;
 - Buzzer = false
 - 3. Display ("Dose Taken");
4. Else:
 - Buzzer =true;
 - Message = "Your Dosage is due please take the medicine from the Dispenser"
 - Send (MobileNo., Message);
 - GoTo 3:
5. If(DosesOver):
 - Display ("Feed new Doses");

6.2. Development Details

1. It has been found that the dispenser can be programmed for 4 different people.
2. The LCD display will display the time slot of the medicine and Buzzer will keep on buzzing.
3. Now if the person/user takes the pills, i.e. opens the lid, the IR Sensor attached to the lid will detect that the lid is opened and hence will send the output to Arduino which will stop the Buzzer.
4. In case the person fails to take the medicine(Lid is not opened), the buzzer will automatically stop after a preset time and will be put on snooze.
5. If a person again misses the medicine, the output will be sent to GSM module which in turn will send a message to the person reminding him that he has missed a pill.
6. It has a biometric system for authorization using the fingerprint.
7. It is possible programmable to dynamically change the number of times and the number of pills to be picked as per requirement.

7. CONCLUSION

In this project, we have proposed the smart medication dispenser to overcome the problems of existing medication dispensers, such as their non-expandability, inconvenience, low reliability, and communication inefficiency. The proposed dispenser has three advantages over existing medication dispensers. (1) To achieve a high degree of scalability, the medication-dispensing trays can be attached in succession, and therefore, a single dispenser can support multiple users. (2) To achieve a high degree of remote manageability and (3) to reduce management costs and efforts, remote management methods are designed and implemented. These methods facilitate updating of the medication schedule configured in the smart dispenser. Further, system settings, embedded programs, and operational errors can be remotely managed by medical staff and system administrators. The smart medication dispenser can be used to improve medication adherence. It prevents overdosing, misdosing, and under dosing. However, it cannot prevent voluntary nonadherence, such as pretending to take medication or spitting it out afterwards. For future work, we plan to develop additional functions that detect a patient's motions using a

camera sensor to verify actual compliance. We also plan to extend our method to apply the smart medication dispenser to other personal health devices such as activity monitors.

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