MICRO CONTROLLER MEDICINE PILL REMINDER

[1]Pavan Shukla, [2]Rookmani Gupta, [3]Sailvi Gupta , [4]Sweta Singh , [5]Vaibhav Mishra

[1,2,3,4,5]*Students Department Of electronics and communications engineering,*

Raj Kumar Goel Institute of technology

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Abstract - The main objective of the project is to remind and dispense medicine at right time to the right person automatically from a single machine. The ratio of nurses per patient in developing countries is very low along with this the availability of 24 hours' medical staff is also ambiguous which has led to the occurrence of easily avoidable death as well critical situation leading to a ruckus in the health industry. The medical dispensers which are available today are expensive and there is less availability of products that are a combination of a reminder and a dispenser. Automatic medication dispenser is designed for people, who undertake medication without professional supervision,

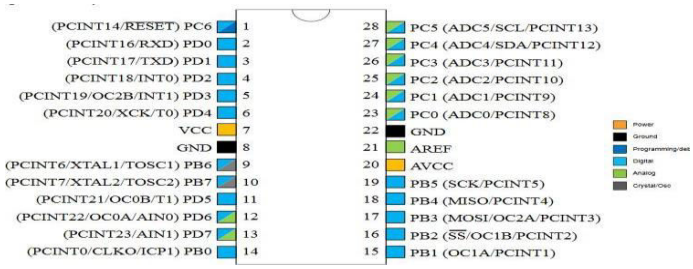
The product can be used by an individual as well as multiple patients. It saves the person from the error-prone task of administrating wrong medicine at the wrong time prominent components of this project are push buttons interfaced with a microcontroller, LCD Display, a motor controller, an alarm system, multiple pill container, and dispenser. The prominent operation is to facilitate the patient in taking correct medication and avoid any mishap due to negligence or improper care. The Alarm system is designed to provide two types of indications one by lighting an LCD and the other by providing a beep sound.

The major goal is to keep the device easy to use and economic. The software that works is dependable and stable. The elderly population will be gain enormously from the device as it can replace sumptuous medical care. This can be a boon for the elderly as well as the poor sector of the society.

1. Introduction

The motivating force behind this design is based on the desire to alleviate the problem faced by the aged and physically challenged people in trying to monitor patients in hospitals or at home. It also takes into consideration the disabled or aged people that may have problems to remind themselves of the time and the medicine to be taken. A substantial number of patients, particularly the handicapped and the elderly do not follow instructions in taking medication. This can result in a patient failing to take medication, taking the wrong medication, taking an incorrect amount of medication, or taking the medication at a wrong time, leading to either a drug overdose or an ineffective application of medication to the patient. The elderly are especially prone to problems since they often take several medications and have failing memories. Caretakers such as nurses also need to be reminded on occasion that a patient needs to take a particular medication at a predetermined time(Rita M. Agans, 1992). There is a recognized need for providing medicines on a regularized basis with timed notice to the person requiring them.

Patient medication reminder is useful to all patients. Nowadays, patient monitoring is a critical task. The physician has to monitor the patient's health continuously, and the prescribed medicine has to be given from time to time. There are instances when patients remember to take medicines at the stipulated time but forget which pill has to be taken. The task is to design, a patient medication reminder circuit system that records the time and the name of the medicine to be taken by patients at a correct time. The time and medicine names are changed according to the patients' need through the keypad connected.



2. Body of Paper

2.1 EXISTING SYSTEMS

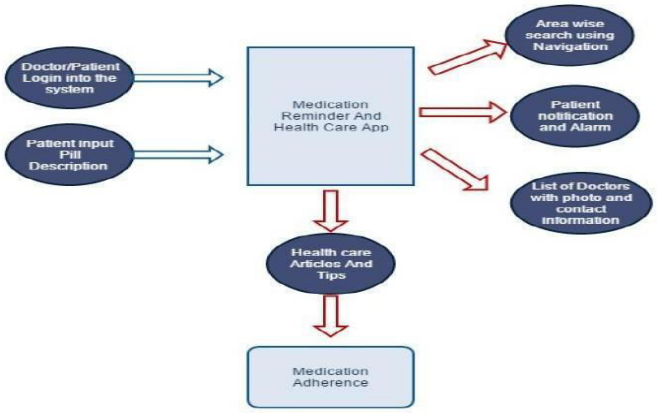


Fig 1. Medication Reminder and Healthcare: System Overview

Figure 1 reflects the overview of the app. The input to the system is the information entered by the patient which includes date, time, medicine name, doctor's name, etc. The output of the system focuses on "Medication Adherence." Medication adherence usually refers to whether patients(Rita M. Agans, 1992) take their medications as prescribed (e.g., twice daily), as well as whether they continue to take a prescribed medication. Medication nonadherence is a growing concern to clinicians, healthcare systems, and other stakeholders because of mounting evidence that it is prevalent and associated with adverse outcomes and higher costs of care

2.2 MATERIALS AND METHODS

Block Diagram of the System

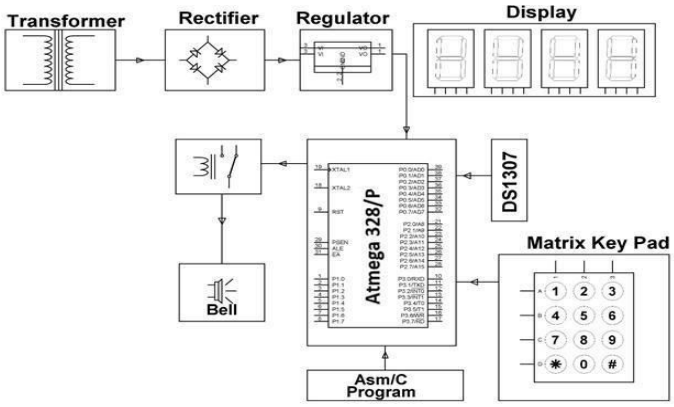


Fig 2. Show block diagram of the system

Components Description

Power Supply Unit (Transformer)

The power will be derived from AC mains and transformer to provide an isolated voltage of 12V AC up to about 100mA. A 12V AC supply was bridge-rectified by a rectifier and smoothed by a capacitor producing a DC supply of about 5V.

2.3 Methods of data collection

2.3.1 Analysis of existing system

The working of the medicine dispenser can be simply explained. It can be easily handled with the help of three buttons that are set button, Increment button, and Next button. The device consists of four compartments for four different medicines; a number of compartments can be increased according to the prescription. The working of this is controlled by a microcontroller, RTC, and the motor driver

1. The motor driver gets the command which will initiate the motor action. The no. of times the motor will rotate will be equal to the no. of medicines to be dispensed. The shaft of the motor contains two circular plates, one of which is rotating and the other fixed. The diameter of both these plates is equal to the diameter of the bottle

attached. The corner of the plates contains slots of the size nearly equivalent to that of one medicine. When the motor rotates and the slots of both these
Plates i.e. the slots of rotating plate coincides with the slots of
The fixed plate, the medicine will get dispensed, which will
ultimately get deposited in the container through the bottle
connected at an angle of the range of 25 t0 30 degree.

The function of three buttons used is-
1. Set button- It is used to set the medicine.

2. Increment button- It is used to date, time and No. of Medicine from different compartments.
3. Next button- It is used to set the cursor to next.
After following above procedure, the buzzer will sound at the
entered time and will also sound at the time of dispensing.As
soon as we give the power supply to the dispenser unit, we
will press the set button. After this, the LCD will display the
name of the project as per loaded in the program. Now, we
will press the 'NEXT' button, pursuant to which the dispenser
will ask the time for dispensing medicine 1, so we will then
press 'SHIFT' button to set the time which will get saved in
the RTC. Again after pressing the 'NEXT' button, the
dispenser will ask as to how many medicines to be dispensed
from each slot, which will be set using the 'SHIFT' & 'NEXT' buttons. The same process will be repeated for medicine 2 & medicine 3. After setting both the quantity and
time of all the medicines, we will commence the dispensing process. Now the role of buzzer comes into play. The buzzer
will sound until and unless someone presses the 'NEXT' button. For the consumption of the patient, as soon as the' NEXT' button gets pressed, the machine dispenses the predefined dosage as specified and set for that particular time

3) COMPONENTS REQUIRED

This section enlists all the components that we used in order to materialize our project.

3.1 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 . 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.

3.2 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)

3.3 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 .

3.4 Push Buttons

In simple words, the push buttons are used to set or reset data, thus they are nothing but setting buttons with a straight functionality. We, in our project, utilize the push buttons for setting, incrementing and entering text data.

The power pins are as follows:

·**VIN- Provides** input voltage for Arduino board when connected to external power source (as opposed to 5 volts from the USB connection or another regulated power source).

Voltage can be supplied with the help of a pin or via power jack.

·**5V-** The regulated power supply used to power the microcontroller and other components on the board. This can come either from VIN via an on-board regulator, or be supplied by USB or another regulated 5V supply.

·**3V3-** A 3.3-volt supply generated by the onboard regulator. Maximum current draw is 50 mA.
·**GND-** Ground pins.

3.5 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 .

3.6 real Time Clock (DS1302)

Containing 31 bytes of static RAM along with a real-time clock/calendar, the DS1302 Trickle Charge Timekeeping Chip communicates via a simple serial interface with the microprocessor. The real-time clock/calendar plays a vital role in the working of the chip by providing information of the seconds, minutes, hours, day, date, month and year . Operating in either of the two formats i.e. 24-hour and 12-hour, with the provision of AM/PM indicator, the clock also adjusts the end-of-the-month date for months with less than 31 days.

Conclusion

The Automatic Medicine Dispenser works for pills and capsules of a variety of sizes. It has been found that the dispenser can be programmed for a number of days for a number of different medicines. It has the facility to send alarms three times a day and even more. It is programmed as such that allows the dispenser to dynamically change the number of times and the number of pills to be picked as per requirement.

The machine is also self-contained in the sense that it can be unplugged from the wall, picked up, and moved anywhere with traditional wall outlets), be plugged in, and function as expected. The modularity of the design was a huge triumph in itself.

The working of the machine is very easy such that anyone can operate it and it is not so expensive that is its cost is very much less than the medicine dispenser available in the market. The programming of the controller is very easy but little bit lengthy. The working of automatic pill dispenser is very effective and user-friendly.

The major demand of the user is performance, serviceability, reliability, capital, and safety. The performance required is lightweight, easyto use for both the attendant and the patient, appropriate construction to avoid possible meddling, a vivid warning LED 70+ decibel audio alerts and good a display unit.

The product AMDR is high durability and is easy to repair. The software used is trustworthy and mechanically safe.The salient features are minimum bulkiness, small size, ability to go back to default setting. A lock for safety with safeguards the Arduino as well the Motor.

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