A REAL TIME SUPPORT SYSTEM TO IMPART MEDICINE USING SMART DISPENSER

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Abstract--In this paper, we are providing a solution for the real-time problem faced by the patient in their day to day life. Most of the patients may forget or mislead with the prescribed dosage. This type of mislead level of dosage cause a severe problem. It majorly affects elder peoples who are prescribed multiple prescriptions per day. It is necessary to take the right amount of drugs at a specific quantity and time. Our device mainly targets patients who frequently take medications. It is designed in an away which make them independent in handling proper measure of dosage at accurate time, using medication dispenser, it is an automated system. That atomize the tablet on time, they don't need to remember all the pills. It helps in people who are affected by Alzheimer's disease, it is progressive brain cell death that happens over time. It is hard then to consume a tablet at the right time with an accurate quantity. To help it out, we have designed devices that make independent from their caretaker

Keywords-- Atmega328, Crystal oscillator, Buzzer, Keypad, LCD screen, Power Supply Unit, and Resistor

I. INTRODUCTION

The chief motive of design is based on the problem faced by elderly people, physically challenged people and also patients who suffer from Alzheimer's disease in hospitals or at home. the disabled or elderly have trouble in reaming tablet on time and also they may confuse with their dosage that may lead to many serious problems this result in a patient fainting, taking the wrong tablet, taking an incorrect amount of medication at a wrong time leading to either a drug overdose or an ineffective application of medication to the patient.

IEEE ICSCAN 2020 ISBN 978-1-7281-6202-7

To avoid that we introduce smart medical device not only for elderly peoples but also for people who skip their tablet due to their busy schedules .main theme of this device is taken tablet on time without skipping their tablet and also to consume the right amount of tablet dosage This reminder is for all type of patients.

In recent times patients monitoring is a nail-biting task. The caretaker has to conscious of the time and amount of tablet that patients consume has to be given from time to time. This is recognized needs should be provided for patients who are suffering from multiple tablets per day with a specified time slot.

When patients remembered to take tablet on stipulated time but they confuse with their quantity of tablets. Our design based on both of these conditions.

Time and tablets can be changed according to our preferred or prescribed condition through keypad input with keypad we can enter the input parameter time at which the tablet to be taken and also which tablet should be taken with prescribed time. The current time and date are displayed on the LED to deliver a correct tablet at the correct time.

Our design is choosy for elder people and who take multiple dosages per times a day. This device tries to reduce the manual work to decrease the independence of the people .it helps not only for elderly people but also for a patient who take multiple dosages per day.

It is designed in way more compactable and easier to handle. it is portable, easier to carry away the device .more knowledge is not needed to handle this device. Common operating knowledge is enough for handling the device.

This automates device helps in handling multiple tables to be taken at the correct time. We like to make it more portable, reliable and reduced in size. Our smart dispenser is to eliminate the two most common causes of administration error. It is a system that helps in administrating the patient medication. The whole device is under control of Atmega 328p, which has an inbuilt EEPROM and a real-time circuit. It is carried out by an embedded program where input variables given in certain predefined parameter inputs.

The keypad is used as a user interface. All the conditions made on a keypad concurrently and simultaneously show up on the LCD, which is placed on the top of the device. The idea of processing is built into an embedded program to notify a user's attention through alert initiation such as an audio alarm. Devices not only have a display LCD but also an alarm system to indicate on time.

The main purpose of the SMD system is to help elderly people, who are suffering from multiple prescriptions per day. To solve their problem by automate methodology used in this design medicine explained below devices with alerting their times to take pills.

II.RELATEDWORKS

There are different types of medical dispensers are available in the market. We have come with compact structures of dispenser. It consists of a built-in buzzer to notify the users of urgent and pills. It also provides an alarm sound for the user's point of time.

On analyzing a survey on a health medication system. elder people faces major issue in handling a medication by confusion in dosage or ignorance .there are a lot of medical devices is available in the market for this problem.

The function of the device will be having a similar operation to each other. Wellesley implemented a dispenser that consists of 60 tablet capacity in storage and we can refill it automatically through call or Internet it is difficult for a patient who are located at a remote place where a data connection is poor .it lead to a critical situation for a patient who takes the important tablet to solve is this problem and not to put patient lives in danger.

Smart Medicine Dispenser decline patient danger as good as no other device. In the above passage, it is good such as ideas in the current market. They are not as good at handling medicines of different shapes. Besides, these products are overpriced it higher in the range of around500 USD. On the other side, the capability of holding medicines in a different shape that led to more cost- effective.

IEEE ICSCAN 2020 ISBN 978-1-7281-6202-7

To gain information in the manifestation of adverse drug reaction and the class of possible side of where interrupt may reduce the duty of ill patient.

A biomedicine based disease driven an object for reducing drug finding is implemented and verified. The chart view is given for this model analysis. All drug notice call up a tool to evaluate its harshness, avoidable identifying it earlier, and its track record of incidence report. Medical error steady increase and affect its difficulty in the society.

We try to reduce the medical error using technology in computerizing the medication and frequently identical in matching the prescription with the situation of the health.

It is developed using a combination of IC pins and microcontrollers, we are creating an individual microprocessor for this process for doing our specific task in the devices. It created to alarm at the correct time to take pills. It is to prevent overdose, and tablet usage and it has an LCD on the top of the devices, which is used to display the pills consumed and the remaining tablet in the device. The sensor that connecting LCD is placed on the PC. The display use to indicate the number of pills. By using this LCD indicate the pills to be stored in the devices. The proposed SMD system takes the idea of the automated dispenser to the next level with some functionality that are not included in any other automated dispensers. we get a patient medical pill log from the doctor.

According to that the automated devices deliver a pill on time with the right amount quantity of dosage is given. The alarms can be edited and created using programs.

Misleading of dosage is due to unawareness is one of the problems faced by patient. One of the primary causes of the health industry is misleading the drugs in the elderly patient. Alzheimer patients forgot to take their pills within the given prescribed time and dosage by the doctor it gives major problems to health. As it is an eminent fact with increasing age, patient health slowly esteemed and their humanity. In this scenario it is required for them to take medicines daily but due to the reduction, this process becomes very dangerous.

III METHODOLOGY

In this section we describe the methodology used in our prototype system. They describe the methodology used in our prototype system.

The description consists of SMD design and its peripherals. The programmable automatic medicine dispenser designed to take care of the patients without needing to caretaker to be presented whenever the medication is scheduled.

The pre-programmed on the SMD to maintain the medicine log of patient and tablet to be taken on time. LCD is provided on the top of the device. It is to tell the remaining pills in the device and indicates when pills to be refilled in the devices. Authorized people only can refill the smart medical dispenser. They will be practiced to maintain the patient pills log they will be worked accordingly for one month.

It is a prototype model consists of many internets that work to build up the device with the specified specification. It relies on the time spelled on the RTC device. The whole device is to contribute a problem faced by elderly people.

We have layout an action on account of aging people to handle the device smoothly. The object of the exercise is to wield a smart device benefits. The reckless attitude of people can be prevented by bringing off eminence in the device. We try to provide a set of values for satisfying the elderly face up difficulties.

The LCD has 16*2 size of the display. That is attached to the RTC and load sensor. It is to display the count of the tablet in the device. When you on the device, LCDs the initial amount of tablet present in the tray. There can be a number of tray in the device. According to the user, the Requirement tray is to implement the user's prescribed tablet is set with the value of the tablet number specified. These tables are set with the value of the tablet number specified. The no of tablets in the service is mentioned on the LCD.

It is to display the remaining tablet after the patient has taken. It is counted number of tablet in the tray by using a load sensor. It is placed under a tray where it is to measure the tablet gram with the sensor, it calculates that how many tablets can be present in the tray with this prediction, the tablet count is taken into account. That is a display using an LCD. Before talking tablet, the Buzzer alarm is sounded with the set of timeslots.

According to a set of time slots alarm is rang we have to notify it with the help of alarm sound or mobile notification people can acknowledge the slot timing of the tablet with these remembering techniques.

The people may forget to take tablet in their busy routine work. They may confuse with their time slot to avoid that buzzer sound is indicated. When an alarm is indicated a long press on a buzzer to off it after that you can take a tablet from the device. It has an automatic magnetic lock. When referred slot time is indicated the automatic magnetic open door is made. It happens to be before switch off the buzzer sound.

The magnetic lock is automated in the device to make user more comfortable to consume a tablet. It is easier for the user to handle the tablet. When a specified time slot comes as per prescript time buzzer is used to sound and the automatic lock is open for a specific referred time. After consuming a pill, a lock can be made manually.

The LCD shows the remaining tablet in the tray. The count of the tablet is seen on the top. The following compounds is used

PWM: 2 to 13 and 44 to 46. Provide 8-bit PWM output with the analog Write () function.

SPI: The SPI pins are broken out on the ICSP header, which is physically compatible with the Uno, Duemilanove, and Decimal.

LED: There's a built-in LED connected to digital pin 13. When the value is high.

LED is on, when its value is low LED is off.

TWI: 20 (SDA) and 21 (SCL). Support TWI communication using the Wire library. Note that these pins aren't within the same location because of the TWI pins on the Duemilanove or Diecimila.

The Mega2560 has 16 analog inputs, each of which gives 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to five volts, though is it possible to vary the upper end of their range using the AREF pin and analog Reference () function.

There are a few other pins on the board:

AREF: Reference voltage for the analog inputs. Used with analog Reference ().

RESET: when the line is low to reset the microcontroller. Typically won't to add a push button to shields which block the one on the board.

IV. HARDWARECOMPONENTS

A) HX711 SENSOR:

HX711 acts like an analog-to- digital converter (ADC) and it's a precision 24-bit for weighing scales and industrial control applications to attach directly using a bridge sensor. The multiplexer is given as input to selects either Channel A or B supported different input to the low-noise gain amplifier which is programmable

The small changes in electric resistance done by the Load Cell got to be amplified and it's read by Arduino which is the HX711 board does. It fetches the info from the Load Cell, amplifies the signals then passes it to Arduino for the sequential process.

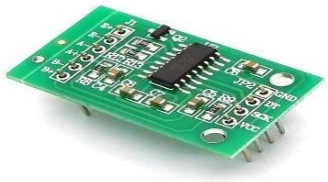

Fig 1 hx711 sensor

B) CRYSTAL OSCILLATOR

It is an oscillator with a electronic circuit which uses a vibrating quartz of piezoelectric material .The creation of electrical signal with a particular frequency is stimulated. An oscillator is nothing but a tool that offer you a clock at a particular frequency for a given voltage when in constant. It's an excellent filter. Preferably, some micro controllers only require a crystal because they accommodate all other parts of an oscillator.

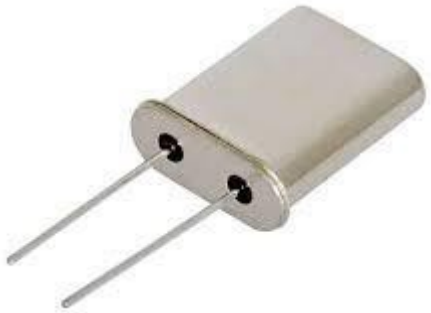

Fig 2 crystal oscillator

C) LED:

Light Emitting Diodes. It burns light about 90 percent much efficiently compared to incandescent bulbs. LEDs work by emitting the electrical current through a microchip, which causes the sunshine emitting diodes to irradiate. LED lights can sustain more years before they get to be changed.

Fig 3 LED

D) RTC:

A real-time clock (RTC may be a computer clock (most within the sort of an IC which is named as integrated circuit) that remain the track of the present time. This term often refers to the devices in personal computers, servers and embedded systems. RTCs is present in almost any device which must track the accurate time.

Fig 4 RTC

E) LOAD CELL :

A load cell may be a transducer which converts one sort of energy into other form that measures force and outputs this force as electrical signal. Most load cells use a strain gage to detect measurements, but hydraulic and pneumatic load cells also are available. This signal are often a voltage change, current change or frequency change depend upon the variability of load cell.

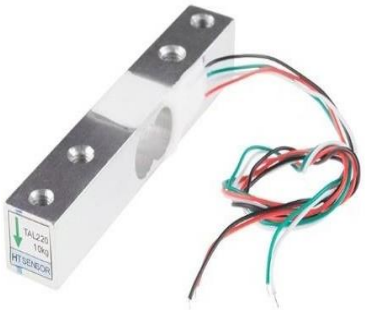

Fig 5 load cell

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F) RESISTOR:

Resistor may be a component in electrical which reduces the electrical current. It's the power to scale back the present is called resistance which is measured in units of ohms (Ω).

Fig 6 Resistor

G) CAPACITOR:

A capacitor is that the device that stores electricity in an electrical field. It's an electronic component during a passive way with two terminals. The effect of a capacitor is named as capacitance

Fig 7 Capacitor

H) ATMEGA328P MICROCONTROLLER:

ATMEGA328P has the features like performance in high, low power controller from Microchip. ATMEGA328P is an 8-bit microcontroller supported AVR RISC architecture. It's the most popular of all controllers in AVR because it is employed in ARDUINO boards

Fig 8 Atmega 328p

V .SOFTWARECOMPONENTS

A) ARDUINO IDE:

The Integrated Development Environment (IDE) of arduino is one among the cross-platform application. Mostly for Windows, Linux, MacOs .It is written in functions from C and C++

It also won't to write and upload programs to Arduino compatible boards with the assistance of third party cores and other vendor development boards. This integrated development environment is employed for the arduino microcontroller.

The arduino may be a free software and it electronics prototype platform which establish on flexible, easy-to-use hardware and software. It's the aim for artists, designers, hobbyists and who is far curious about creating interactive objects or environment.

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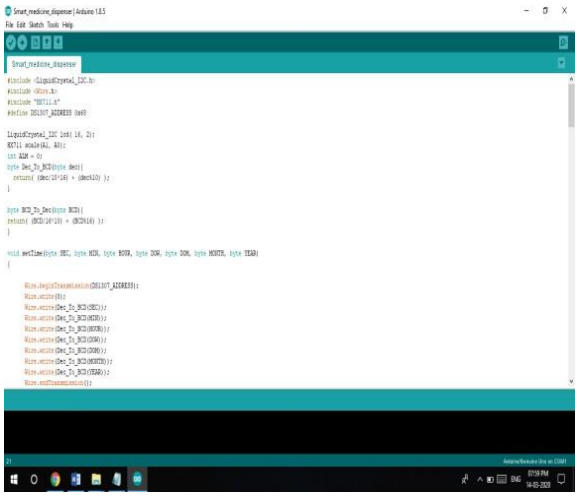

Fig 9 Screen shot of arduino code

B) BLUETOOTH:

Bluetooth Module is employed because the Bluetooth SPP (Serial Port Protocol) module. The Bluetooth has the name called HC-05. It's a simple way of handling module which is meant for transparent serial connection setup and its wireless.

The Bluetooth communication is completed through serial communication that creates a simple thanks to interact with the controller or pc. The Bluetooth modules can impart and acquire the info wirelessly by using two devices that's from a number system with the help of the host controller interface.

Fig 10 Bluetooth

VI. IMPLEMENTATION:

The below architecture represents the flow of our project which is deeply explained through this architecture. The flow of the below architecture has initialized from the power supply. The power supply is supplied to all the components like real time clock, load cell, Bluetooth, hx711 and alarm module.

These hardware components are controlled by atmega 328p-pu which act as a microcontroller. The output of the device be through the LCD, buzzer, led and tablets. Using relay we made the magnetic lock system to make the automatic open and close door.

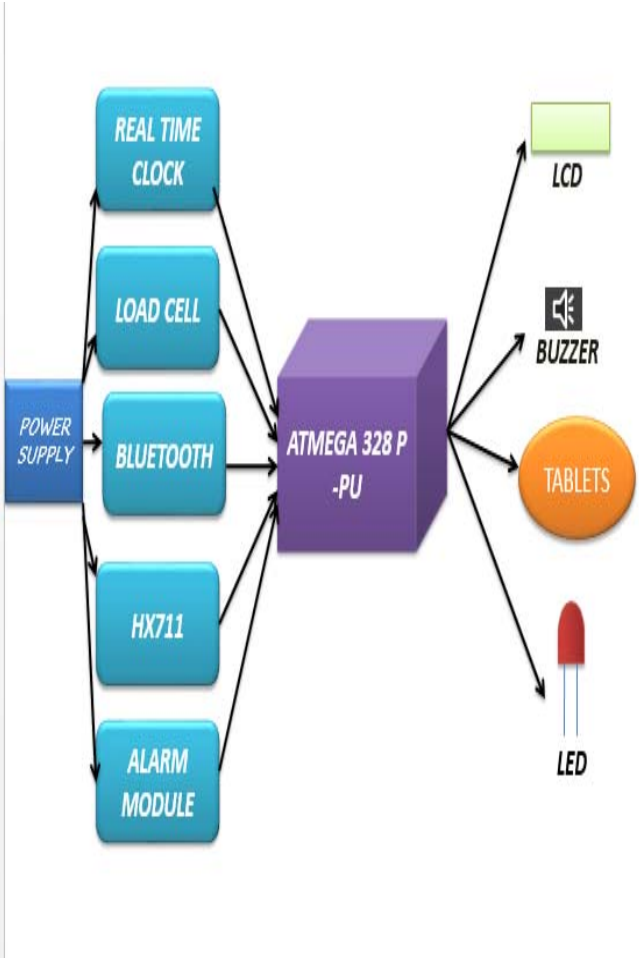

Fig 11 Architecture of proposed system

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VII. MODULE DESCRIPTION:

A) AUTHENTICATION:

It gives the tablet count to the specified mobile using the Bluetooth. In case of emergency it will accessed to the others who are in charge of the patients or people.

B) EMERGENCY ALERT:

It gives the sound of buzzer to make or alert the patient to intake their medicines on time based on their prescriptions.

C) INDICATION:

The light emitting diode will glow at the time of the medicine intake .It helps to show the kit in night mode or else in dark room.

FLOW CONTROL:

First step is to give power supply to the device. Manually, the tablets are stored in the device and closed by the clinician.

Second step is to display the LCD by an RTC which gives the date, time and tablet count.

Third step is to fix the time for the convenient of the patient to take the medicines on time.

After a time is reached, the buzzer will automatically get alarmed and the led will glow.

Simultaneously, the door will be opened. Final step is to off the buzzer and take out the pills.

Take out your pills and slightly close the door it will automatically get locked.

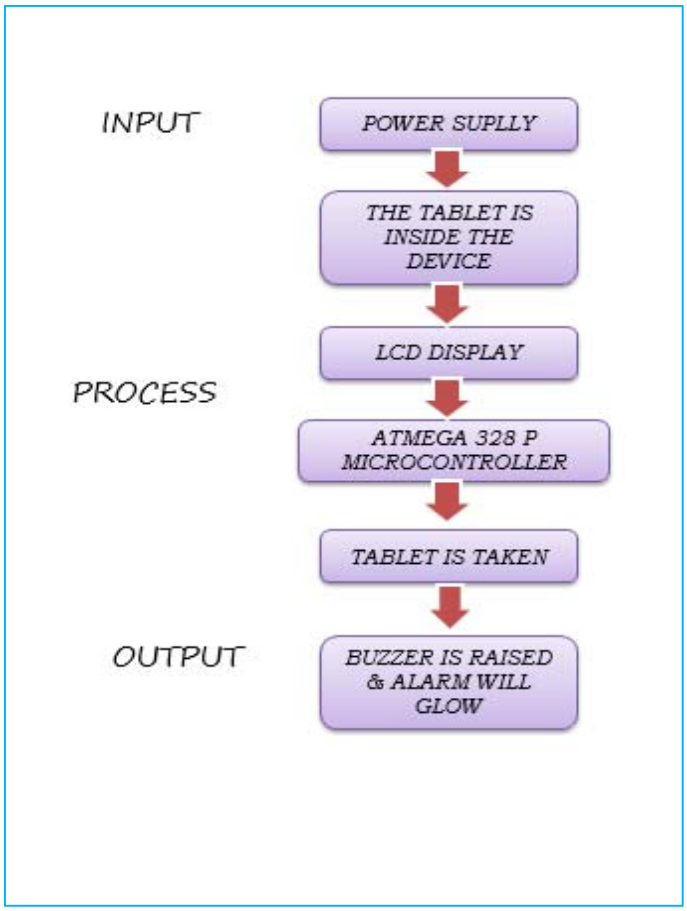

Fig 12 Block diagram of the device

Fig 13 Front view of the dispenser

ISBN 978-1-7281-6202-7

The module of the front view design is shown above. The automatic door is displayed clearly. The circuits are embedded inside the dispenser device. The top content had the LCD display where the date /month/year is displayed. Along with that the timing of the clock is shown in right side of the LCD display which is the 16X2 size.

The below diagram represents the connectivity of the hardware components inside the dispenser. The RTC (Real Time Clock) is connected with the switch, atmega, led and to all connections. The Bluetooth is connected with LCD display to make the tablet count survey that should be shown in the mobile phone or personal computers. The switch is placed in right of the dispenser. The pin configuration is shown in different colors of wire in the figure 14.

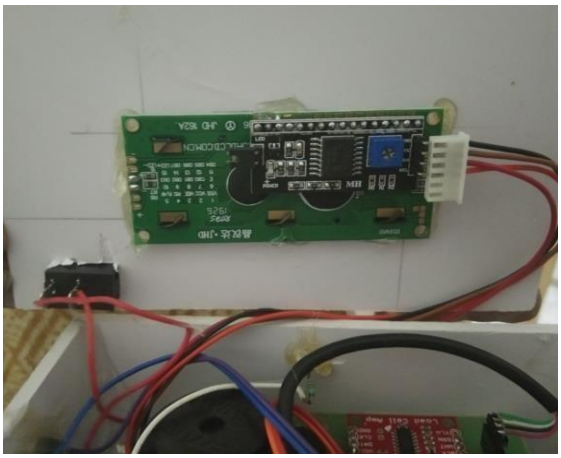

Fig 14 Top of the device components

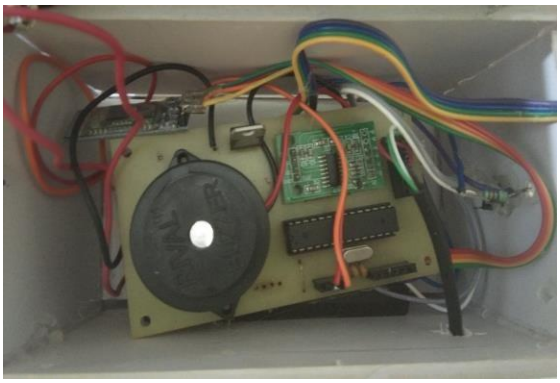

Fig 15 inside the dispenser

VIII. CONCLUSION

Any size of tablet and capsules are worked in our smart medicine dispenser.it has some facility like buzzer, alarm and led which are the indication to the user for taking pills. Dynamically, it can able to change the number of pill store picked and the number of times to be fixed. The automatic pill dispenser designed to intent the patient congenial wag of taking the pill and reduces drug reactions. The alarm and Bluetooth notification features will enhance the medicine dispenser effectively.it improves the quality of life by intake of pills using our smart pill dispenser. This pill dispenser helps the elders to take medication.it controls the drug reaction which is taken by the user at a periodic time for their comfort requirements.

IX. FUTURE ENHANCEMENT

It includes in social case services. We can use the voice system or fingerprint biometric system to increase the features. Using IOT, we can collect the data or information for future storage and make it as a database. Adding a machine learning concept to predict the level of diseases using the usage of drugs.by sensor descriptions, use can predict the face recognition for the specified user.it gives the security purpose authority.

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