# AUTOMATIC PILL DISPENSER

## ABSTRACT

**Abstract This paper presents the architecture and implementation of an automatic medication dispenser specifically for users who take medications without close professional supervision. By relieving the users from the error- prone tasks of interpreting medication directions and administrating medications accordingly, the device can improve rigor incompliance and prevent serious medication errors. By taking advantage of scheduling flexibility provided by medication directions, the device makes the user's medication schedule easy to adhere and tolerant to tardiness whenever possible. This work is done collaborative by the medication scheduler and dispenser controller in an action-oriented manner. Servo motor are the key components. An advantage of the action-oriented interface between the components is extensibility, as new functions can be added and existing ones removed with little or no need to modify the dispenser control structure. The LCD display unit is used to display the output of the project .By also using buzzer. The paper first describes the action-oriented design, major components and hardware and software structures of the smart device. It then provides an overview of the heuristic algorithms used by the medication scheduler and their relative merits. This is a hardware project done by using ARDUINO.**

**Keywords: ARDUINO,LCD DISPLAY,SERVO MOTOR**

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# LIST OF ABBREVIATIONS

| S.No | Abbreviation | Expansion |
|---|---|---|
| 1 | LCD | Liquid Crystal Display |
| 2 | IR | Infrared |
| 3 | USB | Universal Serial Bus |
| 4 | I/O | Input/Output |
| 5 | UART | Universal Asynchronous Receive And Transfe |
| 6 | IDE | Integrated Development Environment |
| 7 | TX | Transfer |
| 8 | RX | Receive |
| 9 | PWM | Pulse Width Modulation |
| 10 | LED | Light Emitting Diode |
| 11 | DC | Direct Current |

# CHAPTER 1

# INTRODUCTION

The system is designed for optimum energy usage and is very beneficial in case if we want to count the number of people going to attend a particular event or any function thereby helps in collecting data by counting the number of people. This is done by simply incrementing (also decrementing) the counter.

At this time the system also counts the number of people present and increments a counter on each arrival, this count is displayed on a LCD display. This sytem can be used in public places like malls,marriage halls,in a office, college, etc.. we can know the exact no. of people inside those places accurately in a efficient manner.

## LITERATURE REVIEW:-

Before the advent of electronic people counters manual people counters were used. These required a store employee to stand near the entrance of the store and click on a counting device each time a person entered the store. This was considered to be inaccurate due to the high level of human error, as well as being an inefficient usage of human resource. Pressure sensitive sensors that count walk-ins based on the number of footsteps on a pressure sensitive platform or mat were used as well.

In our system we are totally digitalizing the system using microcontroller.

## TOOLS USED:-

- ARDUINO NANO
- SERVO MOTOR
- BUZZER
- RTC MODULE
- LCD DISPLAY
- DHT11 SENSOR

## BLOCK DIAGRAM:-

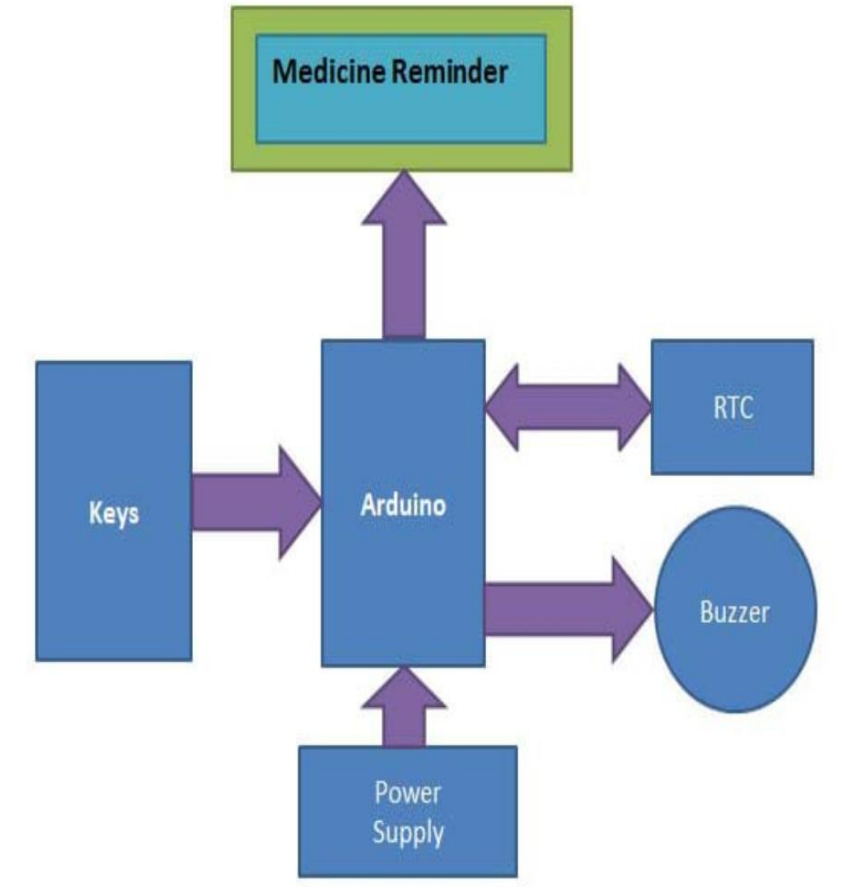


**Figure 1 :Block diagram**

## CIRCUIT DIAGRAM:-

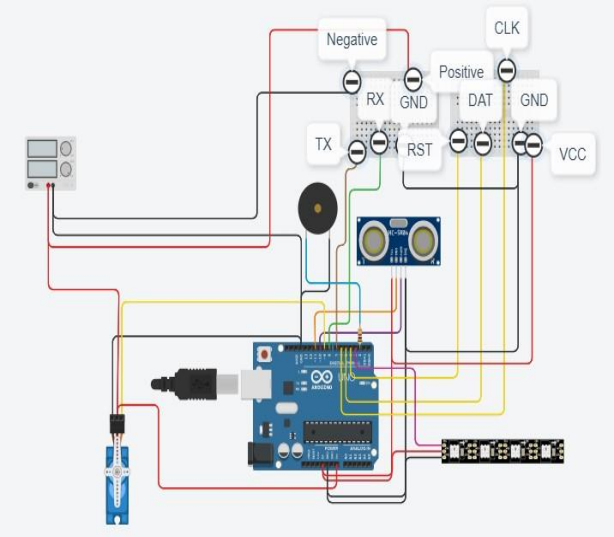


**Figure 2 :Schematic diagram**

From the above (figure 2) .The list of the parts which are produced either by 3D printer or by Laser cutter is provided. All dimensions and geometrical aspects are chosen in order to have a proper matching between all the parts with strong connections as well as a good looking design.

However, dimensions and geometrical aspect may be changed according to the different purposes. In the next sections it is possible to find the CAD of all the components listed here.

In particular, the initial idea for the project was creating a pill dispenser with more wheels so as to dispense the highest amount and the highest variety of pills. For the scope of the course, we limited our attention only to 2 of them, but with little modification on the design, more wheels can be added and reach the goal. That's why we let you the possibility to modify our design freely so that, in case you like it, you are able to change it and to adapt it to whatever personal taste.

## COMPONENTS REQUIRED:-

## ARDUINO UNO:

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller (From the figure 3) .The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It is similar to the Arduino Nano.

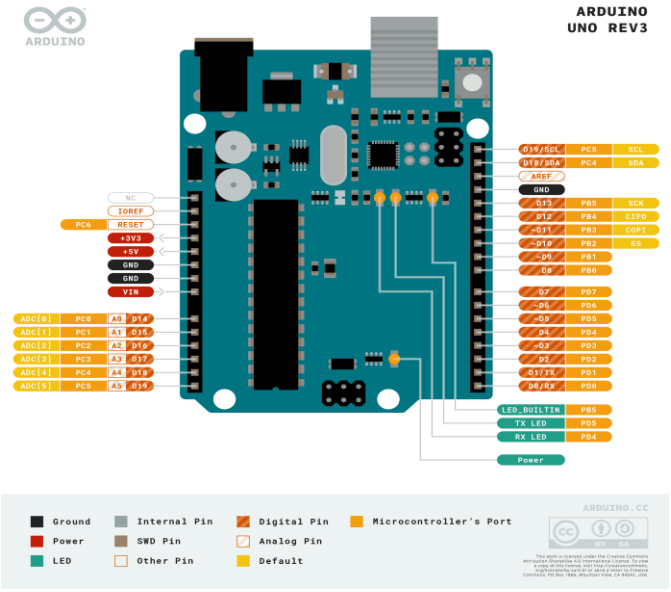


**Figure 3 :ARDUINO UNO**

## SERVO MOTOR:

A servo motor is an electrical component widely used in Arduino-based projects. It provides controlled and precise movements by rotating within in specific range of angles, generally from 0 to 180 degrees. [7] It consists of a DC motor, a

gear, and a feedback mechanism. The Servo motor has three wires, a power supply, a ground, and a control signal, each serving a specific purpose.


**Figure 4 :SERVO MOTOR**

## BUZZER:

Buzzer is a device which uses sound to indicate the user.It is controlled by the microcontroller Arduino nano.When the digital pin is HIGH to the Buzzer .The Buzzer is activated and it creates the sound and Indicates the user.(shown in the figure5)

**SPECIFICATIONS**

- The frequency range is 3,300Hz.
- Operating Temperature ranges from – 20° C to +60°C.
- Operating voltage ranges from 3V to 24V DC.
- The sound pressure level is 85dBA or 10cm.
- The supply current is below 15mA.

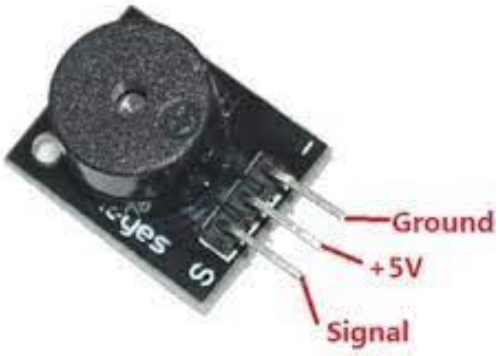


**Figure 5:BUZZER**

## LCD DISPLAY:

This is an LCD Display designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports.

## Specifications :

- Operating Voltage: 4.7V to 5.3V.
- Can display (16x2) 32 Alphanumeric Characters.
- Custom Characters Support.
- Works in both 8-bit and 4-bit Mode.

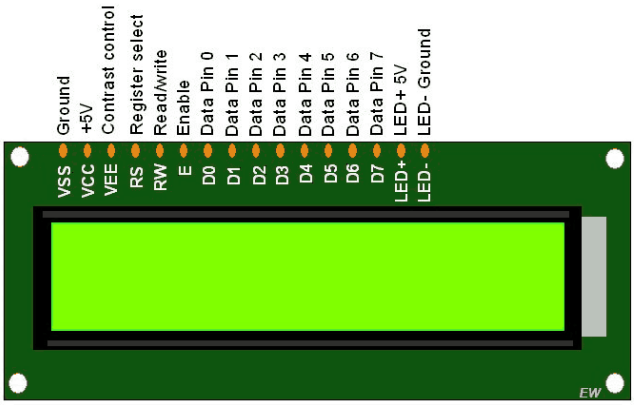


**Figure 6 : LCD DISPLAY(16x2)**

## RTC MODULE:

In this Medicine Reminder Project, RTC DS3231 is interfaced through I2C protocol with Arduino Uno. You can also use RTC IC DS1307 for reading the time with Arduino. RTC DS3231 also has inbuilt 32k memory which can be used to store additional data.

**Figure 7:RTC MODULE**

## DHT11 SENSOR:

The DHT11 is a commonly used Temperature and humidity sensor. The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.

The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. So if you are looking to measure in this range then this sensor might be the right choice for you.

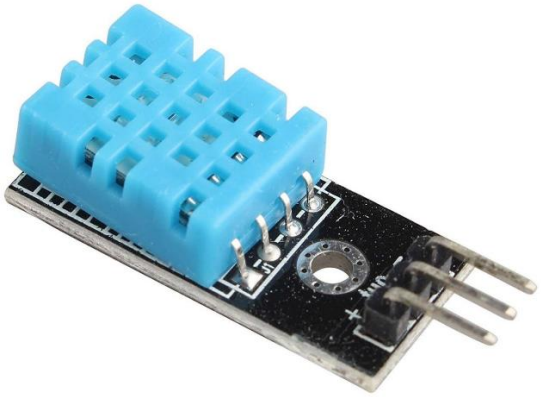

**Figure 8: DHT11 SENSOR**

## Connection diagram:

The data pin is connected to an I/O pin of the MCU and a 5K pull-up resistor is used. This data pin outputs the value of both temperature and humidity as serial data. If you are trying to interface DHT11 with Arduino then there are ready-made libraries for it which will give you a quick start.

If you are trying to interface it with some other MCU, then the datasheet given below will come in handy. The output given out by the data pin will be in the order of 8bit humidity integer data + 8bit the Humidity decimal data +8 bit temperature integer data + 8bit fractional temperature data +8 bit parity bit.

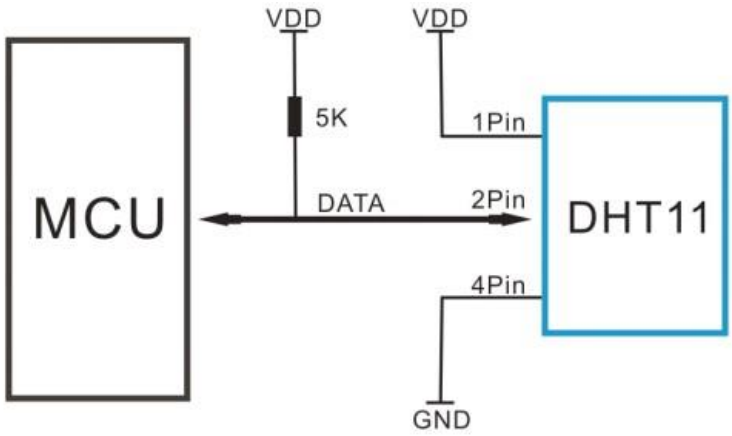


**Figure 9 : Block Diagram**

**EXPERIMENT PROCESS:**

From the list of the parts which are produced either by 3D printer or by Laser cutter is provided. All dimensions and geometrical aspects are chosen in order to have a proper matching between all the parts with strong connections as well as a good looking design. However, dimensions and geometrical aspect may be changed according to the different purposes.

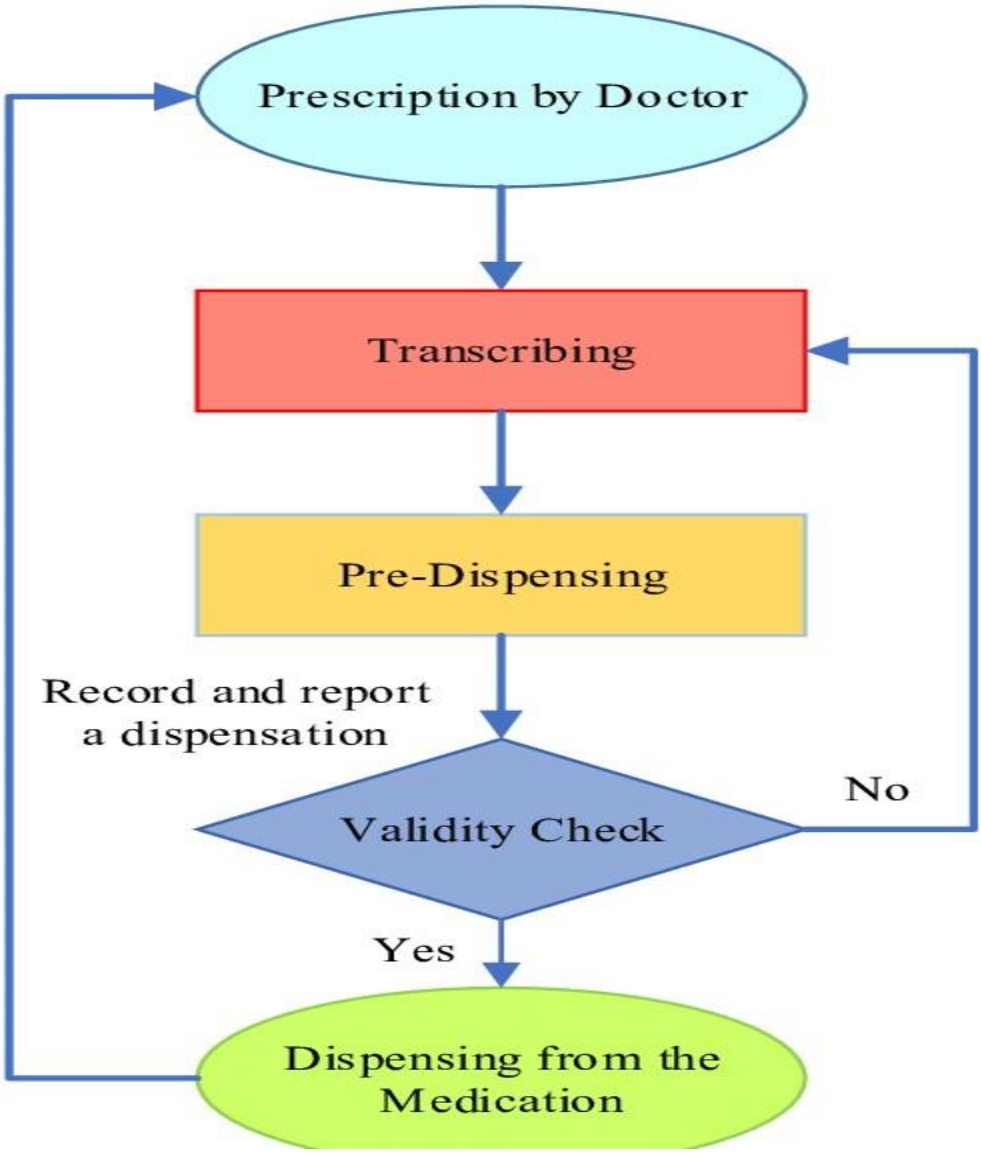


**Figure 10: Block Diagram**

In the next sections it is possible to find the CAD of all the components listed here. In particular, the initial idea for the project was creating a pill dispenser with more wheels so as to dispense the highest amount and the highest variety of pills. For the scope of the course, we limited our attention only to 2 of them, but with little modification on the design, more wheels can be added and reach the goal. That's

why we let you the possibility to modify our design freely so that, in case you like it, you are able to change it and to adapt it to whatever personal taste.

## CONCLUSION:

The first part of the assemble has been devoted to the mounting of the structural part of the robot. On the base plate, the 2 lateral plates and the frontal plate have been set and the funnel was fixed. In the meanwhile, each wheel was linked to its stepper motor by means of the shaft coupler and then mounted with its cap. Afterwards, the wheel-cap system has been mounted directly on the robot. At this point the electronic components were set on the robot. Finally, the remaining plates were assembled to complete the project.

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## OUTCOME