RAIN DETECTOR WITH AUTOMATIC DOOR OPENER

INTRODUCTION TO ENGINEERING

REPORT

Submitted by

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FRESHMAN ENGINEERING

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BONAFIDE CERTIFICATE

Certified that this project **"RAIN DETECTOR WITH AUTOMATIC DOOR OPENER"** is the bonafide work of **G.SAI TEJASWINI (21UEEE0004), T.RAMYA (21UEECO325), M.SHUKRIYA (21UEEA0082), U.GEETHA (21UEEE0023), M.ABHINANDHANREDDY (21UEECO189), M.VENKATEH(21UEECO178)** who carried out this project work under my supervision**.**

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EXAMINER 1

EXAMINER 2

ABSTRACT

Rain Alarm project is a simple but very useful project that detects Rain (Rain water) and automatically triggers an alarm or buzzer. A rain sensor or rain switch is a switching device activated by rainfall. There are two main applications for rain sensors. The first is a water conservation device connected to an automatic irrigation system that causes the system to shut down in the event of rainfall. Water is a basic need in every one's life. Saving water and proper usage of water is very important. Here is an easy project which will give the alarm when there is rain, so that we can make some actions for rain water harvesting and also save the rain water for using it later. With the help of saving this rain water through rain water harvesting, we can increase the levels of underground water by using underwater recharge technique. The simple and reliable circuit of rain water detector which can be constructed by low cost. This is based on versatile, multipurpose timer chip 555. The timer 555 is used in the monostable mode in the project. The sensor is connected between the trigger pin ground. water conservation and good use are important. Here is a simple project that will sound an alarm when it rains, allowing us to take action to gather rainwater and store it for later use. We can increase the groundwater level with the aid of underwater recharge technologies by saving this rainwater and using it. When the achieved in various aspects of using rainwater detectors in irrigation, home automation, electronics, vehicles, and other fields. Here is a low-cost rainwater detector circuit that is simple and effective.

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LIST OF ABBREVIATIONS

SYMBOLS	ABBREVIATIONS
LED	Light Emitting Diode

CHAPTER 1

INTRODUCTION

Rain water detector is a simple circuit which detects which detects the rain and makes an alert. In this project, we use a raindrop sensor for detecting the rain and a dc motor for covering the roof. Rain water the rain and makes an alert Rain water detector is used in the irrigation field home automation communication, automobiles etc.. Rain water detector is a simple circuit which detects the rain and makes an alert. Here is a simple project that will rains, allowing us to take action together rainwater and store it for later. Rain water detector is used in the irrigation field, home automation, communication etc. Rain water detector is a simple circuit which detects the rain and makes an alert. Rain water detector is used in the irrigation field, home automation, communication, Automobiles etc. It is a simple project to detect rain instantly. Detect it accurately and quickly using this rain detector circuit. This circuit is very useful to close your window doors and can manage your outside setting before heavy rain. Detection rain and save some water or use it for different applications in different fields such as home automation, automobiles and irrigation field. Rainfall detection can be used to automatically regulate the irrigation process. Also, continuous rainfall data can help farmers use this smart system to automatically water the crop only when absolutely required.

CHAPTER II

EXISTING SYSTEM

RESISTIVE RAIN SENSOR

The rain sensor is a plate on which nickel is applied in the form of lines. It works on the principle of resistance. The resistance between each contact is extremely high when the sensor is dry (open circuit). When there is water on the board's surface, it forms a resistive and connection across the two-copper strip. This difference in resistance enables the circuit to distinguish between dry and wet states allowing the sensor to detect rain. Resistive sensors are shown in figures 1,2

Fig 1. Resistive rain sensor

Fig 2. Resistive rain sensor

Cloud and Rain Detection (weather sensor):

This is an advanced weather sensor capable of detecting cloud and sky conditions. Air velocity, temperatures, and other variables can also be detected. This sensor can detect dark clouds and oncoming rain. Close the dome automatically before rain destroys the precision telescope equipment due to weather. Figure 8 shows blotwood cloud sensor.

Fig 3. Blotwood cloud sensor

CHAPTER III

PROBLEM IDENTIFICATIONS

DETECTION OF RAIN: How can we identify that it's raining?

SOLUTION:

Through this project we can detect the rain and get alert. The raindrop sensor module detects rainfall. It works on the principle of Ohm's law. When there is no rain the resistance on the sensor will be very high because there is no conduction between the wires in the sensor. When the rain occurs it triggers a buzzer so that the farmers and industry workers can be alert and take necessary actions. For example farmers can get alert and store their wheat grains in safer places and also they can store rain water and use it for irrigation purposes .

DECRESING OF GROUND LEVEL WATER: How can we increase ground water level percentage?

SOLUTION:

Now a days water percentage is very less. In this project we are arranging a pit so that we can store the rain water and can use it later for other purposes. And also it increases the ground water level. In many places people are suffering from water scarcity especially in summer season. Even if we dig bore wells water is not available upto1000m depth. Ground water grow our food. 64% of ground water is used for irrigation to grow crops. Groundwater is an important component in many industrial processes. Groundwater is a source of recharge for lakes, rivers, and wetlands.

SAFETY FOR PEOPLE BY PIT: How can we prevent animals and humans from falling into pits?

SOLUTION:

In many areas farmers have arranged these types of pits for underground water. Small kids and some animals fell into these pits. So to avoid this we are making the pit closed and setting an automatic door opening technique. So when the rain in detected and have reached some extent, through the sensors the door will automatically opened. When the rain stops, through the dry mode of sensor automatically door closes. By this process we can prevent animals and humans falling into pits.

CHAPTER IV

PROPOSED SYSTEM

Now a days water percentage is very less. By this project we are proposing a rain detector using automatic door opener. when the rain drops fall on the sensor detects and activates the buzzer. when the buzzer activates door open automatically Rain operated motor was designed based on conduction of sensor (tough sensor) circuit, dc motor. The sensor is used to detect the rain or water flow. Therefore when the rain stops automatically door closes. With some small a modification the circuit can also be used as water level indicator, agriculture field irrigation etc. The biggest advantage of proposing this project reliable and consumes an less power. This is mainly used for farmers to save water by underground water by using pit. For controlling the dc. motor L293D motor driver is used. So whenever it’s raining outside your roof will automatically cover with a shelter. Similarly, in the automobiles sector windshield wipers can be used made fully automatic by using the rain detection system.

CHAPTER V

BLOCK DIAGRAM

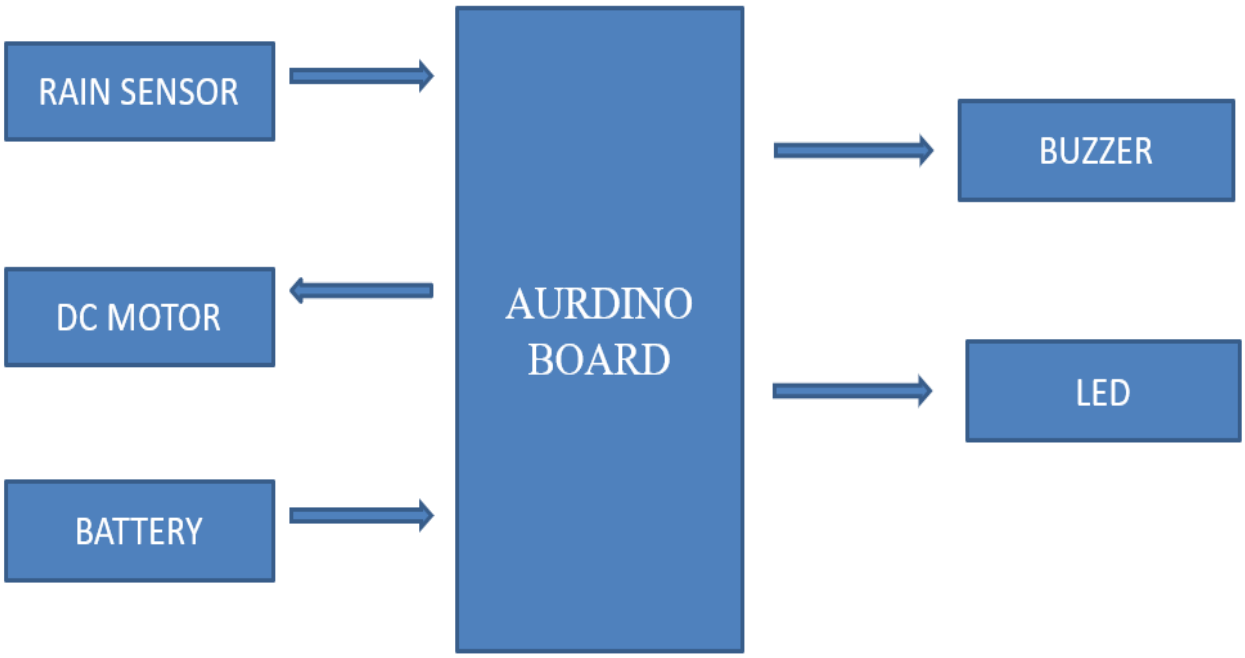

Fig 4. Block diagram

BLOCK DIAGRAM EXPLANATION

When rain drops falls on the Rain Resistive Sensor, it sends signals to the aurdino UNO board. Now Aurdino Board starts working with the help of program code which is inserted in the chip. It sends the signals to LED, Buzzer and Motor Drive(1293d) connected with the 9V battery. Motor Driver is connected to the DC Motor which is used to open or close the door automatically. When it sence the rain drops, the door will automatically opened. When the rain sensor gets dry then the door will automatically closed.

DESIGN

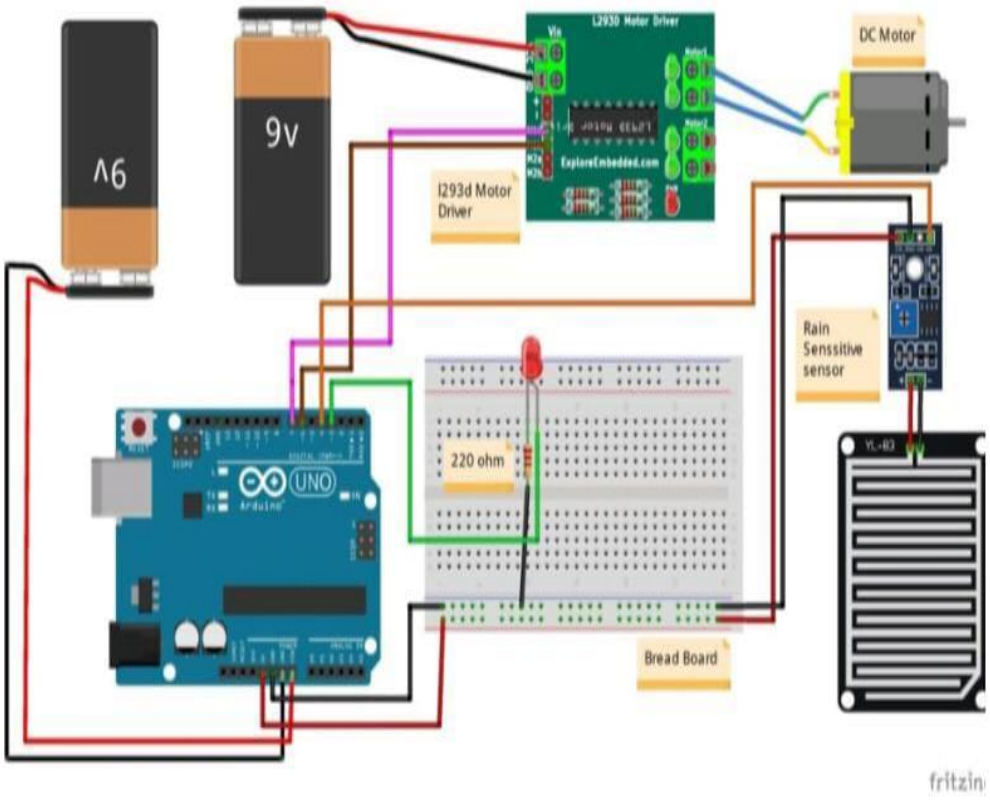

Fig 5. Design diagram

CHAPTER VI

MATERIALS

BUZZER:

A buzzer is an audio signaling device, which may be mechanical, electromechanical or piezoelectric. Typically uses of buzzers include alarm device timers.

Fig 6.Buzzer

BATTERY CONNECTOR:

Battery terminals are the electrical contacts used to connect a load or charge to a single cell or multiple cell battery.

Fig 7.Battery connector

JUMPER WIRES:

Jump wire is an electrical wire or group of them. In a cable with a connector or pin at each end. Wires are used to connect. Components to each other on the bread board or other prototypes, internally or with other equipment or components, without soldering.

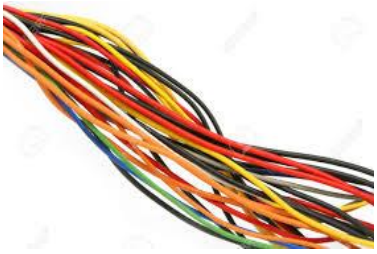

Fig 8.Jumper wires

ARDUINO BOARD (UNO):

Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. CPU: Microchip AVR (8-bit) Memory: SRAM Storage: Flash, EEPROM.

Fig 9.Arduino UNO

CHAPTER VII
WORKING PRINCIPLE

When rain starts falls apart on the Rain Resistive Sensor it transmits signal to the Arduino UNO Board. Then with the help of program code which is inserted in the Arduino UNO Board. It transmits signals to LED, Buzzer and Motor Driver(1293d) which is connected with 9V Battery. Now, the Motor Drive is also connected with DC Motor which helps to open the door automatically. After getting rid of rain, Sensor gets dry and then the door closes automatically.

A simple Rain detection system can be easily built by interfacing an Arduino with Rain sensor. The sensor will detect any rainfall falling on it and the Arduino board will sense it and can perform required actions. During a sunny day, due to the dryness on the rain board module, it offers high resistance to the supply voltage. This voltage appears on the output pin on the rain board module as 5v. This 5v is read as 1023 if read by an analog pin of the Arduino. During rain, the rainwater causes an increase in the wetness on the rain board, which in turn results in the decrease in the resistance offered for the supply. As the resistance decreases gradually, the output voltage starts to decrease. A system like this can be used in many different fields, such as agriculture and automobile fie.

CHAPTER VIII

SOFTWARE DETAILS

ARDUINO IDE

Arduino IDE is software for Arduino. It is a text editor like a notepad. It is used for writing code, compiling the code to check if any errors are there and uploading the code to the to the Arduino. Arduino software contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. Programs written using Arduino software(IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension. Ino. The editor has features for cutting/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

CHAPTER IX

PROGRAM

```
int val = 0;
void setup()
{
   Serial.begin(9600);
   Pincode(4,INPUT);//rain sensor
Outputpin connected
  Pinmode(8,OUTPUT);//Buzzar
  Pinmode(3,OUTPUT);//ledpin
  Pinmode(6,OUTPUT);//motor
  Pinmode(7,OUTPUT);//motor
}
Void loop()
{
 Val = digitalRead(4);// rain sensor
Output pin connected
  Serial.println(val);// see the value in
Serial mpnitor in Arduino IDE
  Delay(100)
If (val == 1)
{
```

```
 digitalWrite(7,HIGH)
 digitalWrite(6,LOW)
 digitalWrite(3,HIGH)
 digitalWrite(8,HIGH);
 Serial.println(“RAINING”);
Delay(1000);
}
Else
}
digitalWrite(7,LOW);
digitalWrite(6,HIGH);
digitalWrite(3,LOW);
digitalWrite(8,LOW);
Serial.println(“NOT RAINING”)
Delay(1000)
}
}
```

CHAPTER X

HARDWARE DISCUSSION

Fig 10.Ideal Image (Non working stage)

CHAPTER XI

ADVANTAGES AND DISADVANTAGES

Rain water detector will detect the rain and make an alert; rain water detector is used in the irrigation field, home automation, communication, automobiles etc. Here is the simple and reliable circuit of rain water detector which can be constructed at low cost

- Low cost
- Automated operation
- Low power consumption
- Very flexible
- Easy to manufactured

In order to avoid false detection of rain, it requires rain sensors to take decision after few minutes, The rain sensor based system functions when water falls on the sensor directly

Following are the disadvantages of Rain sensor :

- The rain sensor based system functions when water falls on the sensor directly.
- The cost of overall system increases as additional components are needed along with rain sensor.
- In order to avoid false detection of rain, it requires rain sensors to take decision after few minutes.

CHAPTER XII

CONCLUSION

To conclude, this sensor will detect rain and sound a buzzer, indicating that action will be taken in the future. The rain detection of that the alarm system can be used in both residential and commercial settings. It alerts users to the presence of rainfall and rain when it is forecasted to fall. It is activated by even the tiniest drop of water, allowing the user plenty of time to reclaim their belongings, Cover windows and in some situations, prepare to collect rainwater. When the Appropriately positioned to catch the first set of raindrops in the device can we protect objects drying in the Sun /rain from invading homes, business and soils among other places.

REFERENCE

S.NO	TITLE	PUBLICATION	AUTHOR	YEAR
1	Rain sensor	Number of papers about rain sensor technologies	Raymond	1978
2	The 8501 Microcontroler	Lattice science publication(LSP)	Kenneth J.Ayala	Since year 2021
3	Hand book of electronics	Originally published	A.K.Maini	23 December 1996
4	Htts //www.elprocus.com.			
5	htts//www.piccontrol.com/rain-sensor			

CHAPTER XIII

LIST OF MODELS

CARPENTRY:

- Wooden window
- Sliding door
- Wheel chair
- Crank and slotted link
- Wooden shelf

ELECTRONICS:

- Power supply board
- Portable mobile charger circuit
- Emergency light
- Relay Board

MACHINE SHOP:

- Sheet metal tray
- Machine vice
- Bolt and nut assembly
- Simple and compound Gear train

SELECTED MODELS

CARPENTRY: WOODEN WINDOW

MACHINE: SHEET METAL TRAY

ELECTRONICS: POWER SUPPLY BOARD

13.1 MODEL 1 – CARPENTRY: WOODEN WINDOW

AIM:

To make wooden window

APPARATUS:

Nails, scale, pencil, handles, hinges, Anabond.

PROCEDURE:

1.First mark the dimensions on the wooden window by using scale and marker. Cut the wood into required dimensions.

2. By using glue attach or join the wooden pieces which we cut already according to the shape required.

4. Prepare a handle. Now attach the handle to window

DIAGRAM:

Fig. (10)Wooden window

RESULT:

Thus, the making of wooden window is completed

13.2 MODEL 2 - ELECTRONICS: POWER SUPPLY BOARD

AIM:

To make the power supply board

APPARATUS:

Drilling machine, soldering

PROCEDURE:

Clan the rust from the copper clad by using a sand paper. Apply heat through iron box on the glossy paper which placed on the copper clad. After 5min, dip the clad into normal water tub. Put the clad into FeC13 solution upto the removal of extra copper. Again clean the clad by use of sand water and drilling whenever required to place the components. Place the components as per the circuit and do the soldering. Connect which the stepdown transformer and the output, will be checked by the use of multimeter

DIAGRAM:

Fig. (11)Power supply board

RESULT:

Thus, the making of power supply Board is completed

13.3 MODEL 3 - MACHINE SHOP: SHEET METAL TRAY

AIM:

To make the sheet metal tray

APPARATUS:

Sheet metal, welding machine, pencil, meter scale

PROCEDURE:

1.Firstly, we have to cut the sheet metal tray as per the measurements mentioned in the diagram.

2.Now we have to cut the sheet metal to the mentioned dimensions in five pieces.

3.Leave one side open to put or remove the plates with plastics. Weld the pieced sheets using gas welding to make a box.

4. Finally we will get the sheet metal box.

DIAGRAM:

Fig.(12)

Sheet metaltray

Fig. (13)

RESULT:

Thus, the making of sheet metal tray is completed