Project Report: Rain Sensing Alarm System with Shelter Deployment using Arduino

1. Introduction

The rain sensing alarm system integrated with a servo motor-operated shelter aims to detect rain and protect items from getting wet. It utilizes an Arduino board along with sensors to detect rain, trigger an alarm, and automatically deploy a shelter using a servo motor to safeguard items from rainfall.

2. Components Used

- **Arduino Uno**
- **Rain sensor module**
- **Servo motor**
- **Buzzer for alarm**
- **Jumper wires**
- **Breadboard**
- **Power supply**
- **Materials for shelter construction**

3. Circuit Diagram
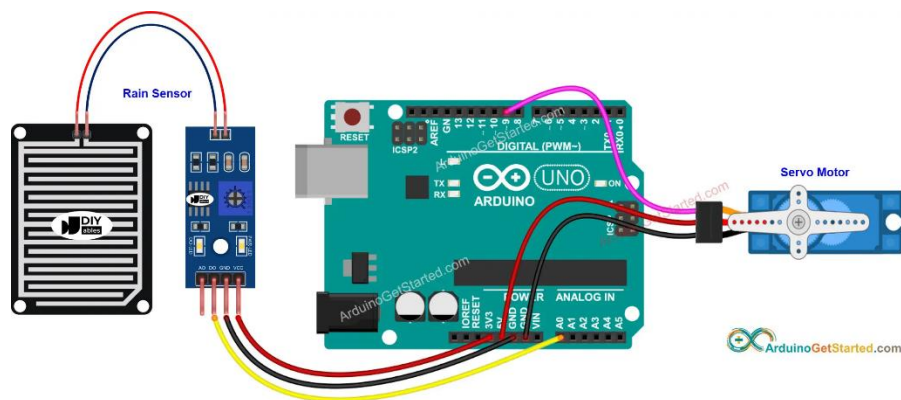
4. Codes

note : you can add a buzzer for alarm as well at defined pin in code

```
include <Servo.h>
const int rain_module = 7;
const int buzzer = 2;

Servo my_servo;
```

```
void setup() {
  pinMode(rain_module, INPUT);
  pinMode(buzzer, OUTPUT);
  my_servo.attach(9);

  // put your setup code here, to run once:
}

void loop() {
  // Read the value from the rain sensor
  int sensorValue = digitalRead(rain_module);

  // Convert the analog sensor value to a voltage value (0-5V)


  // Check if it's raining based on the sensor value
  if (sensorValue == HIGH) {
    digitalWrite(buzzer, HIGH);

    // If it's raining, move the servo motor
    my_servo.write(180);   // Rotate the servo to 0 degrees position
                           // Wait for 1 second

  } else {
    my_servo.write(0);
  }

  delay(500);   // Add a small delay between sensor readings
}
```

5. Result

Upon rain detection, the system triggers an alarm and deploys the servo motor-operated shelter to protect items from getting wet. After a preset time, the shelter retracts automatically.

6. Advantages and Disadvantages

Advantages

- **Provides immediate warning with an alarm upon rain detection.**
- **Automated shelter deployment safeguards items effectively.**
- **Versatile and adaptable for various shelter sizes and materials.**

Disadvantages

- **Possible false alarms due to factors like humidity or water splashes.**
- **Maintenance required for the mechanical components over time.**

7. Future Scope and Applications

Future Scope

- **Integration with a mobile app for remote monitoring and control.**
- **Improving rain detection accuracy using advanced sensor technologies.**
- **Enhancing shelter design for larger coverage and durability.**

Applications

- **Residential use to protect drying laundry or outdoor furniture.**
- **Commercial applications in markets or events to shield merchandise from rain damage.**
- **Agricultural settings to safeguard sensitive equipment or crops from rainfall.**