



PC223 Report Exploration Project II

DryShield

Group 18

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Introduction :

Our project aimed to design a model to protect clothes from getting wet due to sudden rain. During the rainy season, many families face the problem of leaving clothes out to dry, only for them to get wet when it suddenly rains. To address this issue, our group decided to create a 'Dry Shield', a device that automatically deploys a plastic cover when it detects rain.

Project Implementation and Prototype Development :

The implementation of our project followed the plan given in the PC122 course. The process was divided into several phases:

1. Component Collection:

- We were able to collect generally all electrical components except the rain sensor from the institute inventory and purchased the remaining mechanical parts from external sources, ensuring to maintain bills for accountability.
- Meetings were held to evaluate the quality and price of the components to optimize costs while meeting project requirements.

2. Procedure for Model Construction:

○ Circuit Construction:

i. Component Selection:

1. Components such as the FC-37 rain sensor, L298N motor driver, motors, and jumper wires were selected for their compatibility with the circuit.

ii. Soldering and Assembly:

1. Initial soldering of components was performed to establish connections.
2. A rough circuit sketch was created based on online research.
3. The circuit was assembled using jumper wires.

iii. Testing:

1. Since an artificial rain environment wasn't available, the rain sensor module was placed in a water tub for testing.
2. When the sensor detected water, the motors rotated forward for 3 seconds.
3. Upon removal from water, the motors rotated in reverse for 3 seconds, functioning as per the code logic.

○ Mechanical Stand Construction:

i. Stand Design and Assembly:

1. A 1m-long stand was designed using pipes and joints, which were purchased accordingly.
2. Hooks were made from thick wires to enable a plastic cover to scroll from one end to the other.

ii. Improvements:

1. Efforts are underway to find a more suitable plastic cover for better functionality.

○ Code for Circuit Control:

```
const int rainSensorPin = 7;  
  
const int motor1Pin1 = 5;  
  
const int motor1Pin2 = 6;  
  
const int motor2Pin1 = 9;  
  
const int motor2Pin2 = 10;  
  
bool isRaining = false;  
  
void setup() {  
  
pinMode(rainSensorPin, INPUT);
```

```

    pinMode(motor1Pin1, OUTPUT);

    pinMode(motor1Pin2, OUTPUT);

    pinMode(motor2Pin1, OUTPUT);

    pinMode(motor2Pin2, OUTPUT);

    Serial.begin(9600);

}

void loop() {

    int rainState = digitalRead(rainSensorPin);

    Serial.println(rainState);

    if (rainState == LOW && !isRaining) {

        Serial.println("Rain detected, running motors forward.");

        runMotorsForward();

        isRaining = true;

    }

    else if (rainState == HIGH && isRaining) {

        Serial.println("Rain stopped, running motors in reverse.");

        runMotorsReverse();

        isRaining = false;

    }

    delay(500);

}

void runMotorsForward() {

    digitalWrite(motor1Pin1, HIGH);

    digitalWrite(motor1Pin2, LOW);

```

```

    digitalWrite(motor2Pin1, HIGH);

    digitalWrite(motor2Pin2, LOW);

    delay(3000);

    stopMotors();
}

void runMotorsReverse() {

    digitalWrite(motor1Pin1, LOW);

    digitalWrite(motor1Pin2, HIGH);

    digitalWrite(motor2Pin1, LOW);

    digitalWrite(motor2Pin2, HIGH);

    delay(3000);

    stopMotors();
}

void stopMotors() {

    digitalWrite(motor1Pin1, LOW);

    digitalWrite(motor1Pin2, LOW);

    digitalWrite(motor2Pin1, LOW);

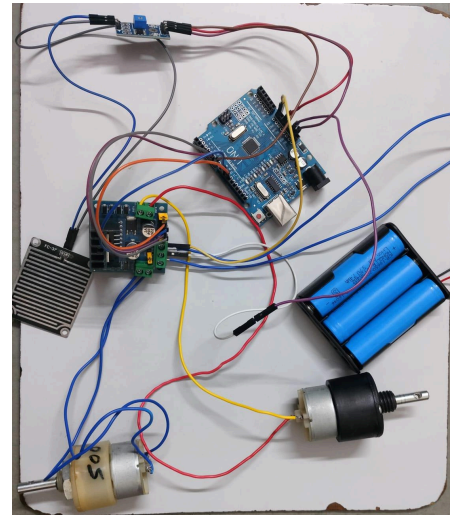
    digitalWrite(motor2Pin2, LOW);
}

```

3. Modifications and Consultation:

- Initially we planned to use AMN3411 but it was not working properly, so now we modified our sensor to FC-37 for detecting rain, which has been provided by the institute.

4. Photos of Circuit Connection and Stand:



Individual Contributions :

Group Members: All members have equal contributions, in different domains based on their availability.

- Pranav Bavadiya(202301458): Circuit connection, components research and report making.
- Ansh Badresiya (202301477): Hardware and mechanical model of the project and collecting electrical components, Making report.
- Dushyant Varshney(202301278): Making report and circuit connection.
- Manthan Gajera (202301488): Making report and purchasing components.
- Kavish Patel (202301074): Purchasing components.

Challenges Faced and Solutions :

1. Motor Coordination:

- Initially, we had two motors operating at different speeds, which made it very difficult to coordinate their movements. Therefore, we decided to replace one of the motors.

2. Sensor Modification:

- We ordered an AMN3411 optical sensor for rain detection, but it was unable to work properly. So now we decided to upgrade the sensor to FC-37 for detecting rain.

3. Plastic Cover:

- We found a plastic cover which we are currently using but we are not satisfied with it. We are planning to upgrade it depending on the availability of plastic cover in the market.

Conclusion

We gained valuable knowledge and skills through this project. We learned how to code using Arduino, effectively connected and debugged circuits, and enhanced our teamwork and collaboration abilities. This project required significant effort, challenging us to overcome obstacles and work together to achieve our goal successfully.