MINI PROJECT

Solar Tracking System
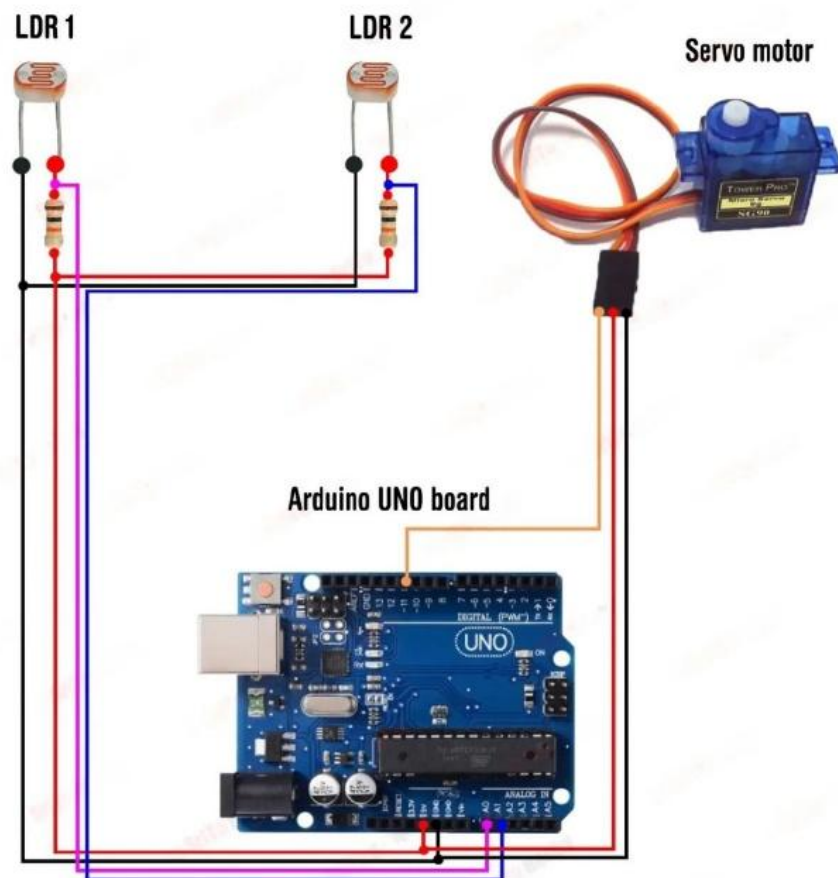
By:- Utkarsh Patel

G11 ES

Overview

The Solar Tracking System is designed to maximize the efficiency of solar panels by automatically aligning them with the sun's position throughout the day. This project uses sensors, motors, and a microcontroller to track the sun's movement and adjust the solar panel's orientation.

Components Used:

- Arduino UNO R3
- LDR * 2
- Battery
- Servo
- Bread Board
- Hookup Wires
- Solar Panel (optional)
- Resistor (1K ohm) * 2

Circuit Diagram

Program:

```arduino
#include <Servo.h>

#define LDR1 A0
#define LDR2 A1
#define error 10

int Spoint =  90;
Servo servo;
void setup() {
  servo.attach(11);
  servo.write(Spoint);
  delay(1000);
}
void loop() {
  int ldr1 = analogRead(LDR1);
  int ldr2 = analogRead(LDR2);
  int value1 = abs(ldr1 - ldr2);
  int value2 = abs(ldr2 - ldr1);
  if ((value1 <= error) || (value2 <= error)) {
  } else
    {
      if (ldr1 > ldr2) {
        Spoint = --Spoint;
      }
      if (ldr1 < ldr2) {
        Spoint = ++Spoint;
      }
    }

  servo.write(Spoint);
  delay(80);
}
```

Testing and Calibration:

1. Place the system under a controlled light source (e.g., a flashlight).

2. Observe the servo movements and ensure it aligns with the light source.

3. Adjust the threshold value in the code to fine-tune the sensitivity.

4. Ensure smooth servo operation within the range of 0-180 degrees.

Future Enhancements:

1. Use an RTC module to implement time-based tracking as a backup.

2. Add a solar energy monitoring module to measure system efficiency.

3. Integrate wireless monitoring and control using an IoT platform.

4. Implement a larger and more robust structure for real-world deployment.

Advantages:

- It increases the efficiency of the solar panel.
- It manages the direction according to the sun.
- It will increase the falling time of sun rays on it.

Limitations:

- It requires more space than space required for normal solar panels.
- It will increase the overall cost of the solar project on roof.