Technical Documentation

Project Title: Dual Axis Solar Tracking System Using Arduino

1. Introduction

The Dual Axis Solar Tracking System is designed to automatically position a solar panel toward the direction of maximum sunlight. Unlike fixed systems, this tracker can move both horizontally (azimuth) and vertically (elevation), allowing it to follow the sun's path throughout the day and across seasons. This system increases solar energy efficiency by ensuring that the solar panel remains perpendicular to the sunlight at all times.

2. Objective

Enhance solar panel efficiency by tracking the sun's movement on two axes, reduce energy losses, and demonstrate sensor-actuator control.

3. System Overview

The system uses four LDRs, two servo motors, an Arduino Uno, and a mechanical frame that allows horizontal and vertical rotation.

4. Components Required

Component	Quantity	Description
Arduino Uno	1	Main controller board
LDR Sensors	4	Detect sunlight intensity
10kΩ Resistors	4	Form voltage dividers
Servo Motors	2	Control panel movement
Solar Panel	1	For demonstration
Jumper Wires	-	Electrical connections
Breadboard	1	Circuit prototyping
Frame	1	Holds panel and motors
Power Supply	1	5V DC source

Conclusion

The Dual Axis Solar Tracking System demonstrates how sensors, actuators, and microcontrollers can work together to optimize solar energy collection. It is a practical example of automation and renewable energy integration.