Dual Axis Solar Panel Rotation using Arduino Uno

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ABSTRACT

The goal of this project was to develop a laboratory prototype of a solar tracking system, which is able to enhance the performance of the photovoltaic modules in a solar energy system. The operating principle of the device is to keep the photovoltaic modules constantly aligned with the sunbeams, which maximizes the exposure of solar panel to the Sun's radiation. As a result, more output power can be produced by the solar panel. The work of the project included hardware design and implementation, together with software programming for the microcontroller unit of the solar tracker. The amount of rotation was determined by the microcontroller, based on inputs retrieved from four photo sensors located next to solar panel.

At the end of the project, a functional solar tracking system was designed and implemented. It was able to keep the solar panel aligned with the sun, or any light source repetitively. Design of the solar tracker from this project is also a reference and a starting point for the development of more advanced systems in the future.

1.Introduction

The unavoidable shortage of fossil fuel sources in the future, renewable types of energy have become a topic of interest for researchers, technicians, investors and decision makers all around the world. New types of energy that are getting attention include hydroelectricity, bio energy, solar, wind and geothermal energy, tidal power and wave power. Because of their renewability, they are considered as favorable replacements for fossil fuel sources. Among those types of energy, solar photovoltaic (PV) energy is one of the most available resources. This technology has been adopted more widely for residential use nowadays, thanks to research and development activities to improve solar cells' performance and lower the cost. According to International Energy Agency (IEA), worldwide PV capacity has grown at 49% per year on average since early 2000s. Solar PV energy is highly expected to become a major source of power in the future.

One of the main methods of increasing efficiency is to maximise the duration of exposure to the Sun. Tracking systems help achieve this by keeping PV solar panels aligned at the appropriate angle with the sun rays at any time. The goal of this project is to build a prototype of light tracking system at smaller scale, but the design can be applied for any solar energy system in practice.

2.Problemstatement

The main goal is to keep solar PV paanel perpendicular to the sun throughtout the day in order to increase the energy generation.Dual axis solar rotating system can be an effective way to increase the efficiency of solar cells. The devastating problem on both biotic and abiotic component of our home can be reduced by using solar energy has the major source for power generation. The natural source like fossil fuels,woods etc. which is limited in amount can be saved from crisis and extinction. For people Due to its more efficiency and less harmful dual axis solar rotating system might be good decision for the intermediate future.

3.Objectives

Solar tracker are uesd to keep solar collectors/solar panels oriented directly towards the sun as it moves through the sky every day. Using solar tracker increase the amount of solar energy which is received by the solar energy collector and improves the energy output of the heat/ electricity which is generated.

4. List of Components

Sr.no	Component	Quantity
1	Ardunioo Uno	1
2	LDR	1
3	Solar panel	1
4	Resistor	1
5	Serrvo motor	1

5. Design
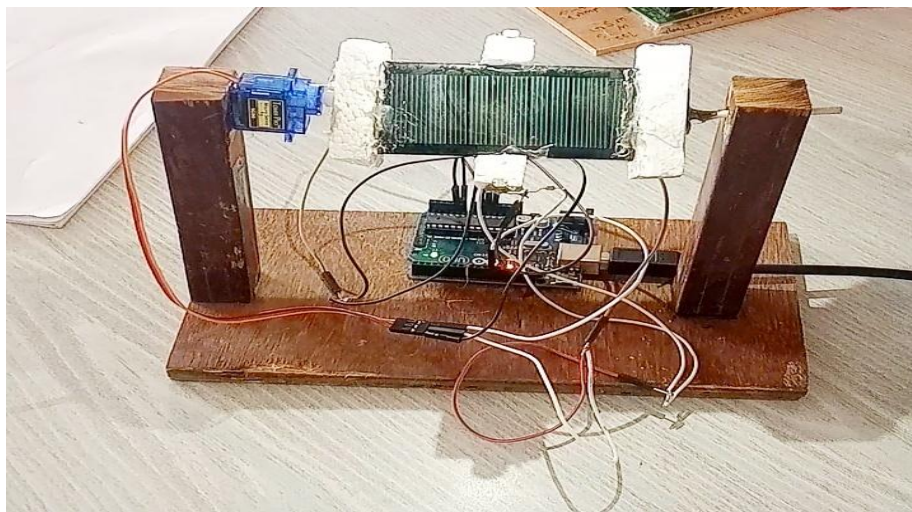
Working

For east west tracking the analog values from two top ldr are compared and if the top set of LDR's recive more light. The vertical servo will move in that direction. The servo moves in that direction.

6.Applications: -

The most common application for solar trackers are positioning photovoltaic panels so that they remain perpendicular to the sun's rays and positioning space telescopes so that they can determine the sun's direction .

7.Result and Conclusion

project was implemented with minimal resources We build Dual Axis Solar Tracker a demo model of solar tracker to track the maximum intensity point of light source so that the voltage given at that point by the solar panel is maximum. Solar Panel is the alternate energy source. Our panel senses the light in a sensing zone, beyond which it fails to respond. If multiple sources of light appear on panel, it calculates the vector sum of light sources & moves the panel in that point.

Acknowledgment

References

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