



## SUN TRACKING SOLAR PANEL

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**Abstract:** Our task Sun Tracking Solar Panel will encompass the sketch and development of an Arduino-based photo voltaic panel monitoring system. Solar monitoring approves extra strength to be produced due to the fact the photo voltaic array is in a position to continue to be aligned to the sun. Solar strength is unexpectedly gaining reputation as an vital skill of increasing renewable strength resources. As such, it is critical that these in engineering fields apprehend the applied sciences related with this area.

This machine builds upon matters discovered in this course. The intention of the assignment is to maintain the photo voltaic photovoltaic panel perpendicular to the solar during the 12 months in order to make it extra efficient. The dual axis photo voltaic photovoltaic panel takes astronomical statistics as reference and the monitoring device has the functionality to continually factor the photo voltaic array towards the solar and can be established in a number of areas with minor modifications. The vertical and horizontal action of the panel is acquired with the aid of taking altitude attitude and azimuth attitude as reference. The Arduino has been used to manage the function of DC motors. The mathematical simulation manage of twin axis photo voltaic monitoring gadget ensures the factor to factor movement of the DC motors whilst monitoring the sun.

**IndexTerms – Solar Panel, Panel, Tracking, Sun.**

### I. INTRODUCTION

With the speedy extend in populace and financial development, the issues of the strength disaster and international warming outcomes are nowadays a reason for growing concern. The utilization of renewable power sources is the key answer to these problems. Solar power is one of the foremost sources of clean, plentiful and inexhaustible strength that now not solely affords choice power resources, however also improves environmental pollution. Solar monitoring is the most gorgeous technological know-how to decorate the electrical energy manufacturing of a PV system. To reap a excessive diploma of monitoring accuracy, numerous methods have been broadly investigated. Generally, they can be labeled as both open-loop monitoring sorts based totally on photo voltaic motion mathematical fashions or closed-loop monitoring sorts the usage of sensor-based remarks controllers. In the open-loop monitoring approach, a monitoring system or manage algorithm is used. Referring to the literature, the azimuth and the elevation angles of the Sun have been decided by means of photo voltaic motion fashions or algorithms at the given date, time and geographical facts. The manipulate algorithms have been completed in a microprocessor controller. In the closed-loop monitoring approach, a range of energetic sensor devices, such as cost couple gadgets (CCDs) or light based resistors (LDRs) were utilized to experience the Sun's function and a remarks error sign was once then generated to the manipulate gadget to continually get hold of the most solar radiation on the PV panel. This paper proposes an empirical lookup method on this issue. Solar monitoring procedures can be applied with the aid of the use of single-axis schemes, and Dual-axis constructions for greater accuracy systems. In general, the single-axis tracker with one diploma of freedom follows the Sun's motion from the east to west at some point of a day whilst a dual-axis tracker additionally follows the elevation perspective of the Sun. In latest years, there has been a developing Volume of lookup involved with dual-axis photo voltaic monitoring systems.

However, in the present research, most of them used two stepper motors to function dual-axis

solar tracking. With two monitoring motors designs, two motors had been installed on perpendicular axes, and even aligned them in sure directions. In some cases, each motors may want to no longer pass at the identical time. Further more, such structures usually contain complicated monitoring techniques the use of microprocessor chips as a manage platform. In this work, using a dual-axis with solely single monitoring motor, an try has been made to increase and put into effect a easy and environment friendly manipulate scheme. The two axes of the Sun tracker have been allowed to pass concurrently inside their respective ranges.

Utilizing traditional digital circuits, no programming or laptop interface was once needed. Moreover, the proposed gadget used a stand-alone PV inverter to force motor and grant electricity supply. The device used to be self-contained and autonomous. Experiment effects have verified the feasibility of the monitoring PV gadget and proven the blessings of the proposed manage implementation. Man has wanted and used strength at an growing charge for his sustenance and well-being ever in view that he got here on to the earth a few million years ago. Solar electricity guarantees of turning into a reliable electricity supply besides any polluting effects. Solar power can be used each immediately and indirectly. It can be used without delay in a range of thermal functions like heating water or air, drying, distillation and cooking. The heated fluids can in flip be used for functions like

electricity technology or refrigeration. A 2d way in which it is transformed to electric powered strength is with the aid of not directly inflicting the winds to blow, plant life to grow, rain to fall and temperature variations to manifest from the floor to the backside of oceans. Useful strength can be got for industrial and non-commercial functions via all these renewable sources.

### 1.1 Why we go for Solar?

Generally we can generate strength in two approaches Convention al Fuels. Non Convention al Fuels Due to the immoderate utilization of traditional fuels there has been depletion in our herbal resources. According to the scales, fuels like coal will closing about for about 100years and petrol and diesel for about 15 years. Therefore the future energy relies upon completely on Non Conventional Fuels. Under the class of Non-Conventional Fuels we have are Solar, Wind, Ocean, Tidal, and Geothermal power sources. The cause as to why we are deciding on solely photo voltaic electricity in our venture is due to the fact of its deserves when in contrast to the different electricity sources. 1) In India, the pace of the wind is solely 15 to 20km/hr. and additionally this is viable solely at hilly and tremendous areas (remote areas) however nonetheless the conversion of wind electricity to beneficial strength is economical. 2) For Tidal power we require full moon and half-moon days. Also we can extract greater quantity of strength at full moon days due to the fact there are extra tides on this day. This is due to the fact the Sun, the Moon, and the Earth come in a straight line on full moon day, whilst they are perpendicular on half-moon days. Moreover, we have 702 tides per yr in accordance to the scales.

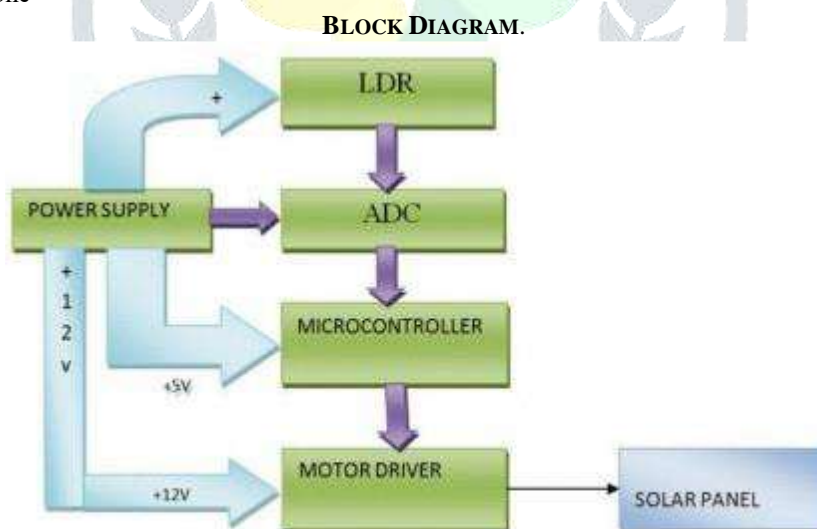
### 1.2 Purpose

The reason of this mission is to study how a gadget of mild sensors can be used as a photo voltaic tracker for a photo voltaic panel. The mild sensors will be established to the photo voltaic panel rig and be uncovered to the sun. By analyzing which mild sensor is uncovered to the most sunlight, the photo voltaic panel will exchange each the course it is pointing and its perspective relative to the floor so that it is pointing closer to the sun, and there with the aid of shooting extra of the sun's energy. The intention is to decide the effectivity and viability of this type of system. This will be performed through answering the following lookup questions:

- Can you get a photo voltaic panel to efficaciously observe a mild supply by way of the usage of Light sensors as a photo voltaic tracker?
- How a good deal extra electricity will be produced if photo voltaic monitoring is implemented?
- How tricky is the software program for the mechanism?

## II. MERITS OF SOLAR ENERGY

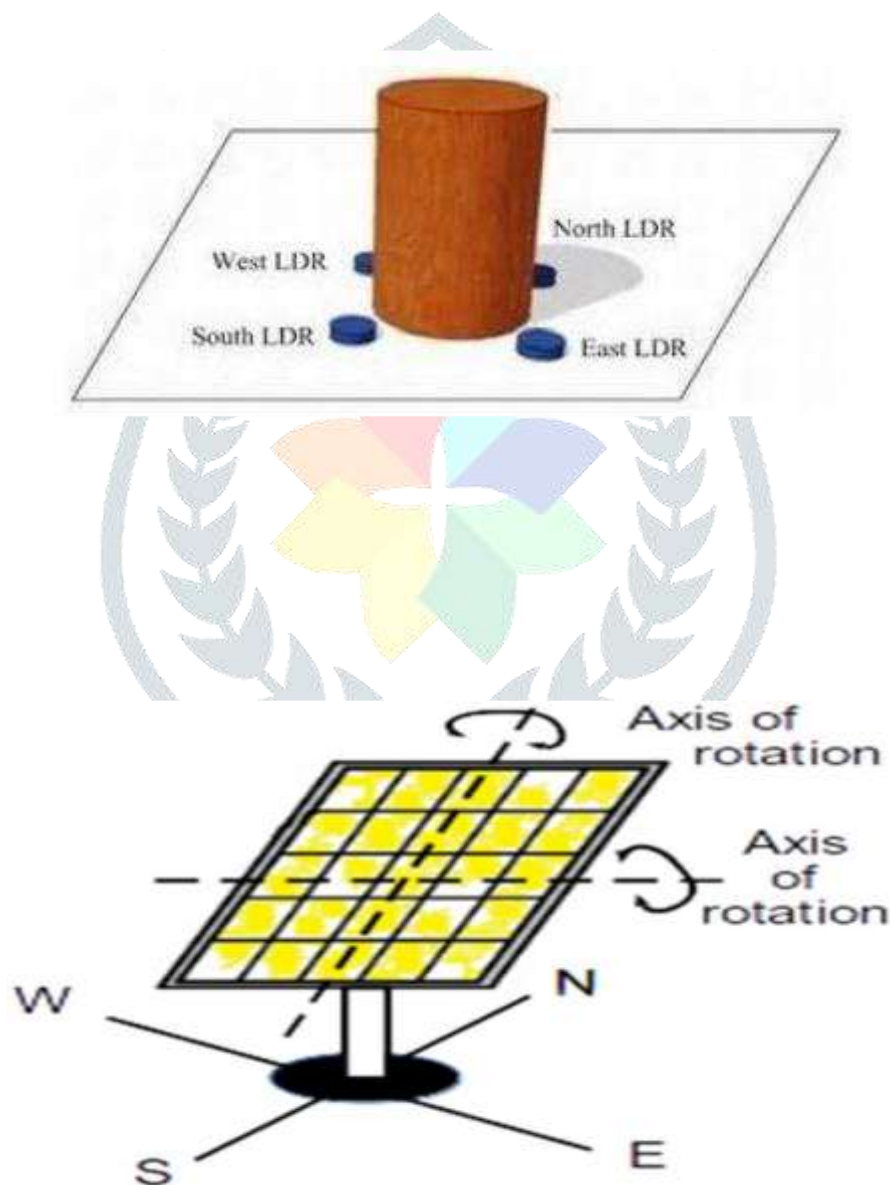
- It is a Non-Conventional Fuel power source.
- The Sun is a standard supply and it can't diminish.
- Free from Pollution.
- Cost of gas is free.
- It is a dependable one



**Fig: Automatic dual axis solar tracking system**

#### IV. Scope

To advance this twin axis monitoring device mild established resistor (LDR) is used as sensor. The resistance of LDR decreases with growing mild intensity. Two 12 volt full geared stepper motors are used right here for rotating the photo voltaic panel in two special axes. In this twin axis we are the usage of 4 LDR s for detecting the mild intensity. To song the solar motion precisely twin axis monitoring device is necessary. With the solar continually going through the panel, the most strength can be absorbed as the panel operates at its biggest efficiency. The most important goal of this paper is to enhance the electricity attain with the aid of correct monitoring of the sun. The every day movement motives the solar to show up in east to west course over the earth whereas the annual action reasons the solar to tilt at an perspective of 23.5 tiers whilst shifting alongside east-west direction. So the most effectivity of the solar panel is no longer being used by way of single axis monitoring system. In this task L293D is used for binary facts into mechanical facts . Two pair of mild established resistors (LDR) is used as sensors to tune the sun's genuine role One pair senses the function the solar in vertical axis i.e. east and west aspect and different pair in the horizontal axis i.e. north and south side. This statistics is then exceeded to the mild contrast unit. The relaxation LDR senses the night time mode and the sign is despatched to the mild evaluation unit. A mild structured resistor (LDR) is a resistor whose resistance will increase with growing incident mild intensity. Microcontroller is the primary manipulate unit of this complete system. The output from the mild assessment unit comes to the enter of the enter of the microcontroller which determines the route of the motion of the motors each in the horizontal and vertical axes. For this assignment 89v51RD2 microcontroller is use. The layout of the mild sensor is primarily based on the use of the shadow. If the PV panel is now not perpendicular to the sunlight, the shadow of the cylinder will cowl one or two LDRs and this reasons distinct mild depth to be obtained via the sensing device.





## V. CONCLUSION:

The empirical discovering s lead us to accept as true with that the lookup work may additionally grant some contributions to the improvement of photo voltaic power applications. A easy and fee positive manipulate implementation, a stand-alone PV inverter to energy the complete system, potential to cross the two axes concurrently inside their respective ranges, capability to modify the monitoring accuracy, and relevant to transferring systems with the Sun tracker. In this paper a twin axis solar monitoring machine has been correctly designed, constructed and tested. It approves the sun's direction from morning to nighttime and then receives returned to the preliminary function dealing with toward east side. So the device saves lot of strength with the aid of maintaining the motors off in the course of night time period. This monitoring science is very easy in design, low in fee and correct in tracking. Several photo voltaic applied sciences are handy on the market. But this twin axis monitoring science has greater strength reap evaluating with each constant photo voltaic panel and single axis photo voltaic monitoring technologies.

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