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# SUN TRACKING SOLAR SYSTEM

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**ABSTRACT:** The goal of this concept is to determine whether or not a solar panel can produce more energy if it is always pointed toward the sun. The feasibility of creating an effective tracking system and the degree of complexity of the necessary software and mechanism will also be looked into. A prototype was created in order to provide answers to these queries. There are three main components to this project: hardware, software, and electronics. The solar panels were rotated by stepper motors, and light sensors were light dependent resistors (LDR).

## I. INTRODUCTION

An Arduino-based solar tracker system is anticipated to employ the photovoltaic conversion panel in this. The tracker follows the sun and modifies its location to maximise the sun's production of energy. Two geared DC motors are used to move the solar panel in order to maintain the solar panel's alignment with the sun's light. A servo motor that is intelligently controlled by a dedicated drive moves a small photovoltaic panel during the operation of the trial model of the gadget. The presence of two cheap but effective light sensors allows an Arduino to receive signals from them. Experimental analysis is done of the solar tracker device's performance and attributes.

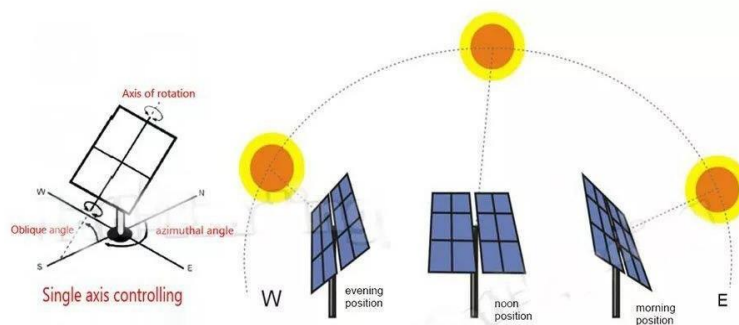
Reasonable power source assemble by sunlight powered charger in type of daylight is changedover in to drive which would then have the option to be used to empower electric burdens. A few individual sun powered cells are contained by sunlight powered chargers which are themselves made from layers of silicon, phosphorous which gives the negative charge, and boron which gives the positive charge. Sunlight based chargers ingest the photons and in doing as such beginning an electric stream. The resulting energy created from photons striking the beyond the sunlight powered charger empowers electrons to be struck out of their atomic circles and released into the electric field made by sunlight based cells which by then move these free electrons into a directional stream what's more, this strategy is called Photovoltaic impact. The point of this venture is to guarantee the daylight beams are falling oppositely on the sunlight powered charger to give the most extreme sun oriented energy. Ordinarily a sunlight based charger switches simply 30 over completely to 40 percent of the occurrence sun powered radiation in to electrical energy. A robotized framework is expected to get a steady result, which ought to be fit to pivot the sunlight powered charger continually. The sun global positioning framework was made as a model to tackle the issue. It will be programmed and keeps the board in front oriented of sun until that is apparent. The exceptional attribute of this framework is that as opposed to taking the earth as its reference, it accepts the sun as a directing source. The daylight is observed by the dynamic sensors and turns the board towards the course where the force of daylight is maximums.

Climate alternate is a topic that has been mentioned profusely those current years. The results that fossil fuels, amongst different things, have had at the surroundings have caused many scientists looking for alternatives, greater environmentally pleasant fuels and cleanser re-assets of power. An instance of a cleanser supply of power is the energy generated with the aid of using sun panels, there's excellent capability in sun power and any upgrades to sun panels can be of excellent assist for society. Solar panels paintings with the aid of using soaking up the daylight and changing it to energy thru the photovoltaic effect. The intention is to seize as lots solar power as possible. The quantity of power that may be accrued is decided with the aid of using the quantity of mild intercepted with the aid of using the panel, or in different words, the location of the shadow from the sun panel on a perpendicular floor to the direct beam is equal to the power intercepted. Most of the sun panels are constant and do now no longer move. The attitude and path the sun panel have to be pointing is decided with the aid of using numerous calculations, and might range relying on season and vicinity of the panel. Solar panels with an automated mechanism which could alter the angle band the path of the panels are capable of seize greater daylight, however additionally require power to transport the sun panel.

## II. RELATED WORK

The solar monitoring gadget may be used to make use of the most sun strength. This gadget seize strength from solar through extrade their orientation during the day to observe the solar` s course to maximise the strength utilization. The photovoltaic panel gadget, trackers assist us to decrease the resistance among incoming mild and the panel. Which will increase the quantity of strength set up produces. CSP (Concentrated sun photovoltaic) and focused sun thermal have optics that without delay receive sunlight, so trackers need to be angled efficaciously to accumulate strength. In twin axis trackers constantly face the solar, due to the fact they are able to circulate in unique directions. The trackers observe the solar vertically and horizontally they assist gain most sun strength generation. There also are numerous approach of riding sun trackers, passive trackers circulate from a compressed fuel line fluid pushed to 1 facet or different facet. Motor and tools trains direct lively trackers via a controller that responds to the solar` s direction . In this mission we've got designed a mini sun monitoring gadget for sun panel. The gadget is built through the use of Arduino Uno, LDR sensor, sun paneland servo motors.

## III. METHODOLOGY

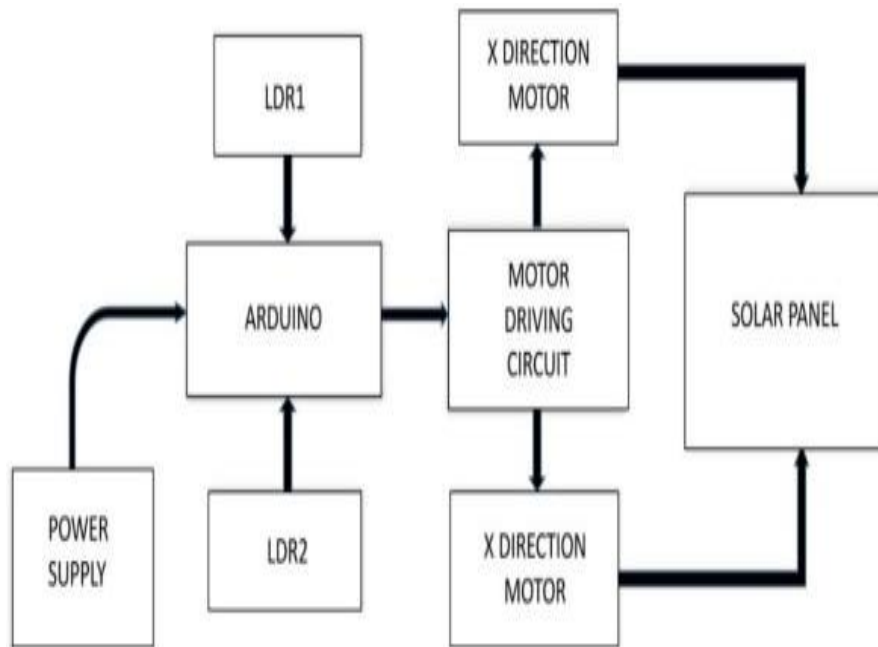


**What is Solar Tracker??** Solar tracker, a gadget that positions an item at a perspective relative to the Sun. The maximum not un usual place packages for sun trackers are positioning photovoltaic (PV) panels (sun panels) in order that they stay perpendicular to the Sun` s rays and positioning area telescopes that allows you to decide the Sun` s path. PV sun trackers modify the path that a solar panel is going through consistent with the placement of the Sun with inside the sky. By maintaining the panel perpendicular to the Sun, extra daylight moves the sun panel, much less mild is reflected, and extra electricity is absorbed. That electricity may be transformed into power. Solar monitoring makes use of complicated gadgets to decide the place of the Sun relative to the item being aligned. These gadgets normally encompass computers, that could technique complex algorithms that permit the gadget to song the Sun, and sensors, which give statistics to a pc approximately the Sun` s place or, whilst connected to a sun panel with a easy circuit board, can song the Sun without the want for a computer A Solar Tracking System includes 2 LDRs, Solar



panels, Servo motor and a AT- mega328 Microcontroller. Two mild structured resistors are organized on the rims of the sun panel. LDR produces low resistance while mild falls on them. The servo motor related to the panel rotates the panel with inside the route of the sun. Panel is organized in this sort of manner that mild on 2 LDRs is as compared and panel is circled in the direction of LDR that have excessive depth. When the depth of the mild falling on proper LDR is more, Panel slowly actions in the direction of proper and if depth at the left LDR is more, Panel slowly actions in the direction of left. In the midday time, Sun is in advance and the depth of mild on each the panels is same. In such cases, Panel is steady and there may be no rotation.

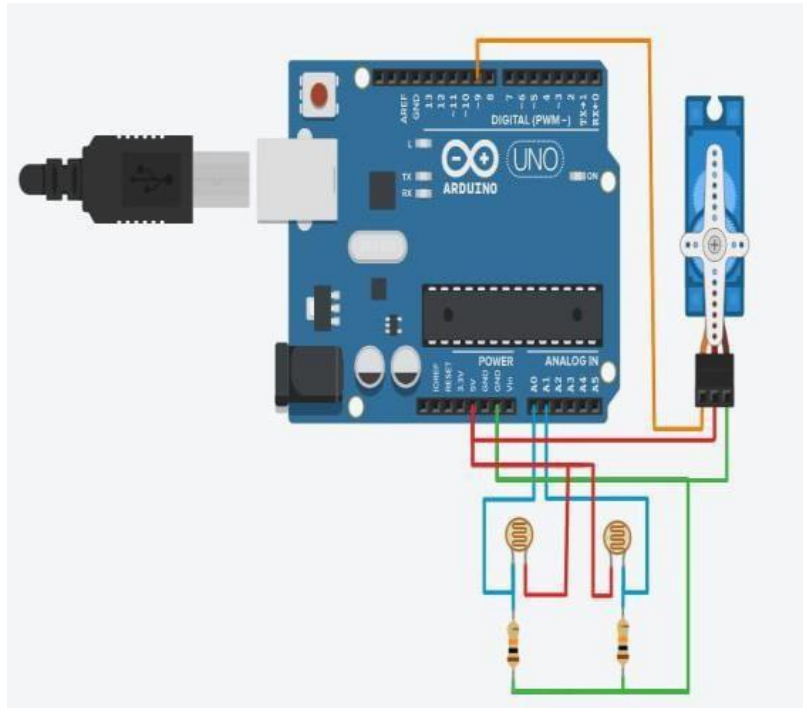
**BLOCK DIAGRAM**



The most important thing of the block diagram is Arduino-uno microcontroller, LDR circuit, sun panel and servomotor. Arduino Uno Board makes use of ATmega328 microcontroller, it's far an open-supply electronics platform for the clean use of hard- ware and software. A servomotor has a closed loop servo mechanism. Servomotors are commonly used as a high- overall performance opportunity to any motor .LDR circuit is used to song the placement of solar. It includes 4 LDRs this is with inside the top, right ,left and backside function. LDRs are related to Arduino analog pin AO to A3 that acts because the enter for the gadget. The LDR converts the analog values into virtual with the assist of analog to virtual converter that's already constructed in. daylight after which sun panel receives tilted to- wards that function the usage of servomotor in line with the programming.so the sun panel song the mild in directions. for example, if the solar rises with inside the morning the gadget movements in the direction of the identical course. If the sundown is with inside the contrary course so the gadget can even pass with the solar.so the gadget can get the most energy through the solar monitoring in sun panels to make greater energy to greater depth. meaning the sun energy transformed to power is without delay proportional to the depth of mild..



### CIRCUIT DIAGRAM



### Circuit Description

Firstly we need to begin via way of means of assembling the additives onto your sun panel, or bread-board. The LDRs (mild structured resistors) or PRs (photo-resistors) alternate resistance with converting mild, consequently they want to be related in any such manner that the converting resistance is transformed right into a converting voltage sign which the Arduino understands. The servo is managed via one of the Arduino's PWM outputs .If you'll be putting in the sun tracker completely then you can need to solder the resistors and LDRs collectively in order that they can not come loose. If you're absolutely attempting this assignment for a laugh then a breadboard is perfect. The simple circuit for the relationship of the LDRs and servo to the Arduino is proven with inside the connected image. The resistors R1 and R2 are every four .7K, the PR1 and PR2 are the 2 LDRs and the servo may be any PWM interest servo. If you're the use of a servo large than nine grams then the Arduino will in all likelihood now no longer be capable of deliver it sufficient energy to acquire its complete torque capability, you may want to deliver the servo without delay with its personal 5V energy source. If you're making this a everlasting installation, then it's miles first-rate to solder the resistors proper up close to the LDRs at the panel. This manner you may run a unmarried four middle cord from the manage field as much as the sensors at the panel, the 4 cores may be 5V, Ground after which sign 1 and a pair of from the LDRs. Once your LDRs and resistors had been soldered collectively, you may mount them to your sun panel. Mount the LDRs at the east and west (left and proper) facets of the panel going through closer to the sun. Make certain that they're now no longer shaded in any manner via way of means of the body and feature an unobstructed view of the sun. A breadboard has been used on this assignment in simple terms to distribute the Arduino` s 5V energy deliver to each the resistors and the servo. The servo wishes to be sized in step with the scale of your sun panel. The panel utilized in this situation is small and comparatively mild; a small servo become consequently used and is powered via way of means of the Arduino. For a bigger servo (whatever above nine grams), you may want to energy the servo externally because the Arduino doesn` t have enough ability for it. Make certain which you join the outside energy re assets floor to the Arduinos GND as properly in any other case the PWM manage sign to the servo will now no longer work

## II. EXPERIMENTAL RESULTS

The sun panel mechanism controlled to observe mild re-assets starting from flash lighting fixtures to the solar with correct precision. It laboured at some stage in gently cloudy days, however had a piece of problem locating the solar` s function whilst it became very cloudy. In this Single Axis Solar Tracking System , whilst supply mild falls at the panel, the panel adjusts its function in step with most depth of mild falling perpendicular to it. The goal of the venture is completed. This became executed thru the use of mild sensors which might be capable of come across the quantity of daylight that reaches the sun panel. The values acquired through the LDRs are in comparison and if there may be any tremendous difference, there may be actuation of the panel the use of a servo motor to the factor wherein it's far nearly perpendicular to the rays of the solar. The LDRs have been discovered to be maximum appropriate for this venture due to the fact their resistance varies with mild. They are without problems to be had and are price effective. Temperature sensors as an example could be costly. The manage level has a Arduino that gets voltages from the LDRs and determines the motion to be performed. The Arduino is programmed to make sure it sends a sign to the servo motor that actions according with the generated error. The very last level became the using circuitry that consisted specially of the servo motor. The servo motor had sufficient torque to force the panel. Servo cars are noise free and are affordable, making them the first-rate desire for the venture.





## II. CONCLUSION

The invention of Solar Tracking System enables us enhance the overall performance of PV sun gadget in an easy way. Used relative technique of daylight strength. Established a version of automated monitoring gadget to preserve vertical touch among sun panels and daylight. The modern undertaking is primarily based totally on monitoring sun panels. These panels alternate their orientation when it comes to sun radiation to boom the performance and effects in most manufacturing of power and enables in getting complete gain of premier perspective among sun panels and sun radiations. The execution of sun monitoring gadget turned into made clean due to our enough studies and preplanning of our desires and objectives. The major time table of this undertaking turned into to make easy equipment on low price basis. Trial and blunders technique assist us in reaching our goal. We made use of our engineering understanding on this undertaking and had been a success in growing and designing low price sun monitoring gadget. With the assist of this undertaking we succeeded in enhance the usage price of sun power and performance of photovoltaic electricity era gadget.

## REFERENCES

- [1] O. Bingol, A. Altinta, and Y. Oner, "Microcontroller based solar tracking system and its implementation," *Journal of Engineering Sciences*, vol. 12, pp. 243–248, 2006.
- [2] Lipika Nanda, Prof. A. Dasgupta, and Dr. U.K. Rout, "Smart Solar Tracking System For Optimal Power Generation", Published in: 3rd IEEE International Conference on "Computational Intelligence and Communication Technology" (IEEE-CICT), In 2017.
- [3] S. Whavale and M. Dhavalikar, "A review of Adaptive solar tracking for performance enhancement of solar power plant," 2018 International Conference on Smart City and Emerging Technology (ICSCET), 2018, pp. 1-8, doi: 10.1109/ICSCET.2018.8537352
- [4] P. Rani, O. Singh and S. Pandey, "An Analysis on Arduino based Single Axis Solar Tracker," 2018 5th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON), 2018, pp. 1-5, doi: 10.1109/UPCON.2018.8596874.
- [5] P. Rani, O. Singh and S. Pandey, "An Analysis on Arduino based Single Axis Solar Tracker," 2018 5th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON), 2018, pp. 1-5, doi: 10.1109/UPCON.2018.8596874.
- [6] B. Koyuncu and K. Balasubramanian, "A microprocessor controlled automatic sun tracker," *IEEE Transactions on Consumer Electronics*, vol. 37, no. 4, pp. 913-917, 1991.



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