

# Analytical Study on The Dual Axis Solar Panel

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**Abstract**— The use of solar power is within the upswing thanks to its environmental friendliness and abundance. That notwithstanding, efficiency remains a serious problem in many of the applications. Mitigation is generally within the sort of tracking systems. This paper, therefore, investigates dual-axis solar tracking systems from two dimensions. Firstly, a review of extant literature was conducted to draw up a trajectory of where we are within the efficiency map, therefore it had been found that this efficiency of dual-axis tracking configuration is about 35-43% [1]. Secondly, from the above review, a generic functional model of how an efficient and effective tracking system should be is presented. The two components, co-evolving, shall be wont to inform the planning and development of an efficient solar tracker.

## I. INTRODUCTION

Catch of the sunbeams upon the sun-powered boards, which progressively Expands the yield of power. There are two potential approaches to build up yield power from elective energy-based frameworks. It is possible that one can utilize a proficient material inside the assembling of the photograph essential cell or utilize a sun-oriented tracker to follow the sun. For what reason is it for all intents and purposes conceivable to be placed in a sun-powered battery in India? The world is a committed circle, implying that it's a circle that is straightened at the shafts and lumps around the equator. For sunlight-based energy computations, it's adequate to consider the world a clear circle with a breadth of generally 12800km. Points on the Earth's surface are characterized as far as longitude and scope. The planet pivots around its hubs like clockwork and circles the sun every 365.25 days (Approximately). The hub of revolution is shifted at a point of 23.45° regarding the plane of the circle around

the Sun. The pivot is orientated all together that it generally focuses towards the Pole Star.

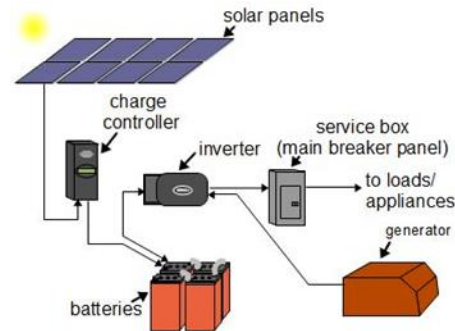


Fig. 1: Circuit Diagram

This records for the seasons and changes inside the length of the day consistently. The point between a line joining the focuses of the Sun and the Earth and Apparent day by day way of the sun across the sky from dawn to nightfall the central plane is named the declination point ( $\delta$ ). Since the pivot of the Earth's turn is typically highlighting the Pole Star the declination point changes because the Earth circles the Sun [4]. India exists in the Tropic of malignancy locale. This makes it workable for carrying out a sun-oriented battery in our nation contrasted with the nations found beyond 23.45°. The double hub sun-based tracker tracks the precise tallness position of the sun furthermore following the sun's east-west development. The double hub works practically like a single pivot however it catches the elective energy all the more successfully by turning its hub along with the vertical and flat hub [1].

## II. DESCRIPTION

The projected framework consolidates a stepper engine that offers a lot of twists at low rates and gives higher the executives for twin hub following reason.

In PIC microcontroller is acquiring utilized for prevailing the PV panel. In star global positioning frameworks, sunlight-based boards are mounted on construction which moves to follow the development of the sun for the day. There are 3 different ways of following viz dynamic, and composed record following. These techniques will then, at that point be authorized either in single hub or double hub sunlight-based trackers. In the dynamic following, the situation of the sun inside the sky all through the day is continuously dictated by sensors.

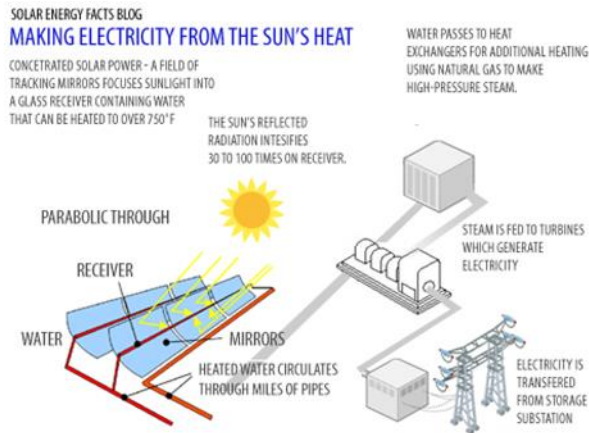


Fig. 2: Conversion

The sensors can trigger the engine or instrument to move the mounting framework so that the starboards will constantly point toward the sun for the day. An aloof tracker moves in light of Associate in Nursing awkwardness in pressure between 2 purposes. The lopsidedness might be an aftereffect of the sunlight-based warmth making tension on a low edge of boiling over gas-liquid that then, at that point moves the design as needs are. Notwithstanding, this strategy of sun-following isn't exact. A composed record tracker could likewise be a clock-based global positioning framework. The construction is riveted at an extreme and speedy rate for the day. The engine or instrument is modified to endlessly turn at a mean pace of one transformation each day (15 degrees per hour). This strategy of sun-following is very exact. Nonetheless, the persistent pivot of the engine implies that a great deal of force utilization and following the sun on a frightfully overcast day is silly.

### III. WORKING

The arranged pursue framework tracks sunlight a lot of adequately by giving PV board pivot on an inside and out all very surprising hub. Orion comprises 4 LDR sensors, 2 stepper engines, and a PIC microcontroller. A combination of sensors and one engine is utilized to shift the prepared specialist sun's east-west way and to boot the choice consolidate of sensors and the engine that's mounted at the lower part of the tracker is utilized to shift the tracker inside the sun's north-south course. A couple of stepper engines are dead use all through this framework. Higher board holder stepper engine tracks the sun straightly and base stepper engine tracks the illustrative relocation of the sun. These stepper engines and sensors are interfaced with a microcontroller the microcontroller offers the order to the engines on the reason of the sensor's information. LDR sensors sense the daylight and convey a message to the microcontroller. The microcontroller will the correlation of signs got from LDR sensors and on the idea of a more grounded signal, it's choosing turn bearing of stepper engines. A microcontroller is a partner astute gadget that capacities on the reason of info that it gets from the locator subsequently initiating engine driver circuit. The regulator initiates driver circuits and moves stepper engines to new positions any place light-weight falling on gadget sets is the same. On the off chance that qualification emerges, the engine moves the board till the daylight falling on the locator is the same. The rule takes data from the sensors. Simple signs from sensors are recovered to advanced signs follow simple to the computerized gadget (ADC)

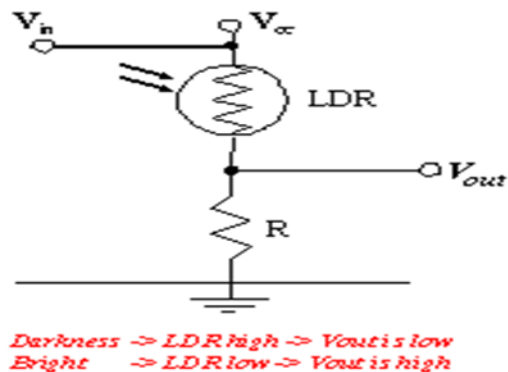


Fig. 3: Input

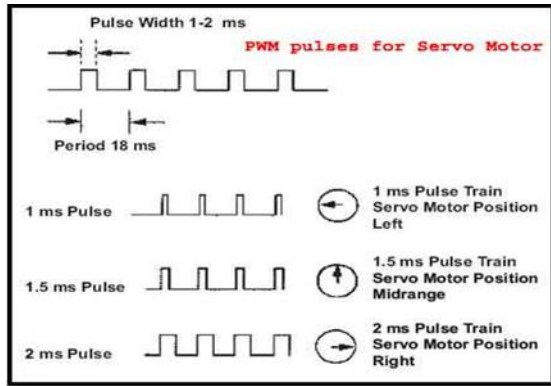


Fig. 4: Output



Fig. 5: Prototype

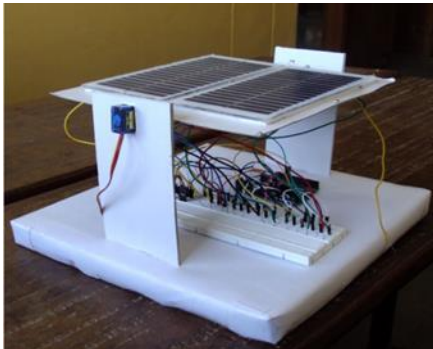


Fig. 6: Ready Model

This ADC module should be gift inside the microcontroller or must be a ton of remotely. Digitized signals are sent to the microcontroller. The progression point and development bearing of stepper engines is determined once the digitized signal is gotten [2].

#### IV. RESULT

The examination was directed in 20.07.2021, in the directions of 28°35'25" N 72°21'51" E. In the 7.00a.m.- I II I II 18.30p.m.Of time span, from both

PV modules have been acquired upsides of current and voltage. As per got values was assembled a similar diagram of forces.

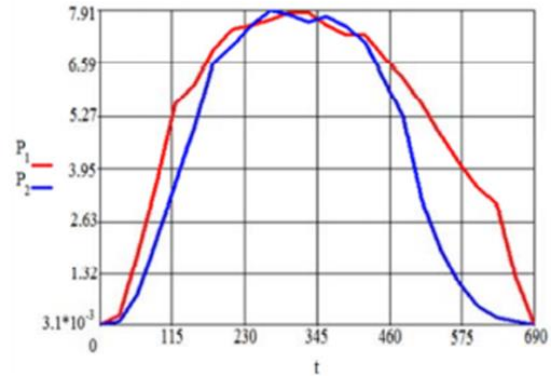


Fig. 7: Graph of the PV cell power for fixed and tracking systems. P1- dual-axis, P2- stationary, t- time

#### CONCLUSION

Double pivot tracker impeccably lines up with the sun bearing and tracks the sun development more proficiently and has a colossal execution improvement. The proposed the framework is savvy likewise as a little alteration in single-pivot tracker gave unmistakable force ascends in the framework.

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