

# Increasing Power Efficiency in Solar Cells using Fresnel Lens

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**Abstract:- Sun powered vitality frameworks have developed as wellspring of sustainable power source in the course of the last a few decades, and are presently broadly utilized for an assortment of modern and residential applications. Such frameworks depend on a sunlight based gatherer, intended to gather the sun's vitality and change over it into either electrical or warm vitality. All in all, the power created in such applications depends in a general sense upon electrical power the measure of sunlight based vitality caught by the authority and along these lines the issue of creating following plans fit for following the direction of the sun over the span of the day on a year. The point of this paper is to acquaint the SOLAR TRACKING with the current settled sun oriented boards, by the way it is keeping up the steady most extreme power yield. Along these lines by utilizing this following framework the transformation proficiency of the sun oriented electric power age can be expanded [9]&[10]. Fresnel focal point is utilized for expanding the sunlight based board control by reflections.**

## I. INTRODUCTION

Sun based vitality is the vitality extricated from the beams issued from the sun as warmth and power. This vitality is basic for all life on Earth. It is an inexhaustible asset which is spotless, sparing, and less contamination contrasted with different assets and vitality. In this manner, sun based vitality is quickly picking up reputation as an imperative methods for growing sustainable power source assets [1-4]. All things considered, it assumes an essential part in building field comprehend the advances related with this area. In this paper, the sun powered vitality for age of electrical vitality is accomplished by utilizing the Solar cells. The sunlight based cells get the sun powered vitality. The sunlight based cells work on the photograph electric vitality by utilizing sun oriented cells standard. The vitality from the cells is utilized to switch ON the lights. At exhibit sun powered electric power age frameworks are having settled sun oriented boards whose effectiveness of age is less. This issue can be corrected by utilizing sun oriented following framework and Fresnel focal point, and subsequently most extreme power yield can be achieved. The ARM processor is utilized to control the stepper motor[12]. The ARM processor likewise does the activity of getting the contribution from the sensor and offers charge to the engine to run in request to handle the Change in the situation of the board. And also ARDUINO processor is utilized to control the DC equip motor.[13] Describes the sun oriented following framework with LDR which will keep them.

Sunlight based boards lined up with the sun to amplify effectiveness. In this paper the above element is additionally connected .In the prior stage the settled sunlight based board

which can't move towards more transmitted locale, the yield of the board is medium level. Above draw back can be maintained a strategic distance from by using Fresnel focal point. It backings to expand the greatest power yield. This yield control is more noteworthy than the power yield of settled sun powered following.

## II. DESCRIPTION OF COMPONENTS

Following major components are used for increasing power efficiency in solar cells using Fresnel lens. Such as,

- Fresnel lens
- Solar panel
- Light Dependent Resistor
- Arduino UNO
- DC gear motor

### A. Fresnel Lens



Fig 1:- Fresnel lens

It is utilized for reflecting reason. A Fresnel focal point can be made substantially more slender than an equivalent traditional focal point, at times it appears as a level sheet, it has long gap and little central length. Compared to prior focal points, the Fresnel focal point is significantly more slender, hence passing more light and enabling beacons to be noticeable over any longer separations. The rule of task is sufficiently direct: given that the refractive energy of a focal

point is contained just at the optical interfaces (i.e. the focal point surfaces), expel however much of the optical material as could reasonably be expected while as yet keeping up the surface arch.

*B. Solar Panel*



Fig 2:- Solar panel

A photovoltaic module or photovoltaic board is a bundled interconnected get together of photovoltaic cells. A photovoltaic cell is a particular semiconductor that believes obvious light into coordinate current. Some PV cells can deliver DC power from infrared or bright radiation. Photovoltaic cells are a fundamental piece of sun powered electric vitality frameworks, which are ending up progressively critical as elective wellsprings of energy utility. The age of DC power from light, which is utilized as a part of numerous applications, for example, charging batteries, controlling hardware, and so on. In this paper the photovoltaic cell is connected for producing power from sun beams.

*C. Light Dependent Resistor*



Fig 3:- LDR

It works in light of the change of protection esteem, which under goes to diminish or expanding the episode light force. It is likewise used to recognize the light power. It goes about as a light detecting circuit. It is utilized as a part of sun powered road lights.

*D. Arduino UNO*



Fig 4:-Arduino UNO

It gives set of computerized and simple I/O sticks that can be interfaced to different extension sheets and different circuits, the board incorporates serial correspondence interfaces, USB on a few models, for stacking programs from PCs. The principal Arduino was presented in 2005, meaning to give a cheap and simple route tell the experts to make gadgets that interface with their condition utilizing sensors and actuators. Basic cases of such gadgets expected for amateur specialists incorporate straightforward robots, indoor regulators, and movement identifiers.

*E. Dc Gear Motor*



Fig 5:- DC gear motor

The size of the motor varies based on the size of panel. It is used to rotate the panel towards more radiated region with the help of LDR.

**III. BLOCK DIAGRAM**

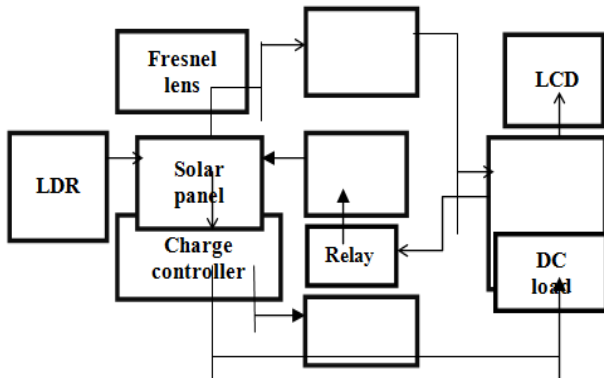


Fig 6:- Block Diagram

At first the sun beams fall on the sun powered board. Around then Light Dependent Resistor (LDR) is set in ON position. The light ward resistors esteem increments or reductions as per the force of light. This variety in the Arduino controller makes to turn the dc adapt engine. The dc outfit engine is appended with the sun powered board and subsequently the board moves. Fresnel focal point is appended on two sides of the sun powered board for expanding the power age. The yield voltage of sun based board is shown on the shown and further expanded power is figured and contrasted and the yield energy of the sunlight based board perusing without Fresnel. The yield control perusing with Fresnel focal point is more prominent than the typical sunlight based board perusing.

**IV. ALGORITHM**

- Stage 1  
Introduce the little PV Panel.
- Stage 2  
V in beginning position (0,0).
- Stage 3  
Locate the most extreme daylight utilizing the photograph resistors, and spare the situation of the PV
- Stage 4  
Measure the voltage (V)
- Stage 5  
On the off chance that  $V < \text{edge esteem (least voltage)}$  for 30 minutes and go to stage 3, generally go to following stage.
- Stage 6  
Turn PV upwards, measure the voltage on the off chance that it is more prominent than the past voltage esteem keep turning upwards until finding the greatest Voltage in x and y pivot.
- Stage 7  
Send the directions (x,y) of the sun based board to the processor.
- Stage 8  
Go to stage 3

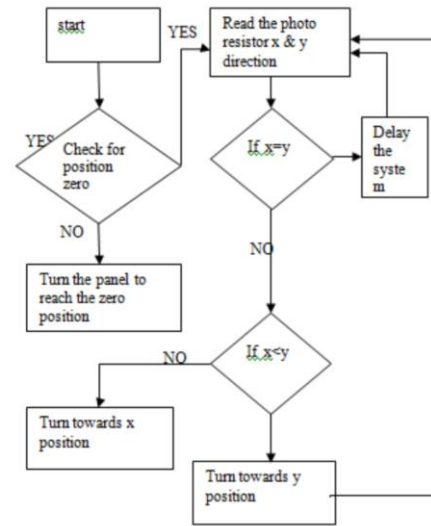


Fig 7:- Flow Chart

**V. PRILIMINARY RESULTS**

Generally the yield power, unwavering quality and the cost rate assume an imperative part in cost of both framework, for example, settled sun oriented board following framework and our framework "Expanded power proficiency of sunlight based board by utilizing Fresnel focal point" is differed, their outcomes and nature which is alluded in two noteworthy classes, for example.

**A. COST**

s. no	Component name	Rate
1	ARDUINO	600
2	LDR	30
3	DC GEAR MOTOR	50
4	Tracking table	100
5	Fresnel lens	120
	<b>Total</b>	<b>900</b>

Table 1. Cost

**B. Output Power (in terms of voltage)**

The above table demonstrates that the examination of the typical settled Photovoltaic cell and our paper, for example, "Expanding power effectiveness sun based cell by utilizing Fresnel focal point". The arrangement shows simple comprehension about the proficiency of sun based board. The yield control is greatest in this framework. Subsequently the use of Fresnel focal point nearby planetary group will expand the power level and productivity of sun oriented board.

**VI. ADVANTAGES**

- Long powerful life.
- Highly dependable.
- Output of the board is more.
- Pollution free.
- Less working expense.

## VII. DISADVANTAGE

A Fresnel focal point is utilized for concentrating sun powered vitality high proficient sun based boards are to be utilized henceforth it expands the underlying expense.

## VIII. APPLICATIONS

- They are utilized as a part of road lights.
- The DC yield got from the sunlight based clusters is helped up and can be transmitted to the framework.
- They are utilized water system framework.

## IX. CONCLUSION

This paper reports Fresnel point of convergence based improved structure of sun based tracker. The Monitoring controller in perspective of the close circle count is plot and executed with ARDUINO processor. Trial work has been done intentionally. By using this paper most extraordinary yield can be procured from sun arranged board. Sun arranged trackers are used to arrange photovoltaic sheets, reflectors, central focuses or other optical devices towards the sun. Since the sun's circumstance in the sky changes with the seasons and the period of day, trackers are used for modifying the social occasion structure to enhance imperativeness creation. Working cost, upkeep costs are slightest when appeared differently in relation to the next kind of vitality age systems. Pollution free climatic condition as a result of the nonattendance of smokes. They have long practical life and is significantly reliable. They have a high power.

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