



# Designing of Flower Shape Solar Panel for Agriculture Purpose

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## Abstract:

The system was designed and applied to produce electricity by capturing maximum amount of solar radiation. Most of the solar system present do not produce required amount of electricity to desire amount, so in this project work base solar panels system is develop such that when it is active it can track solar radiations coming from sun sensed by Light dependent resistor (LDR). Currently solar panels are equipped with tracking devices which maximize the efficiency of the solar panels. Most popular include dual axis sun tracking panels all these systems employ different types of sensors to constantly monitor the sun rays with the panels. A flower shape solar panel system is provided with petals in flower shape which can open and close in circular shape in 360 degrees, the microcontroller is used to control the movement of panels.

**Keyword's:** solar radiation, tracking, LDR,

## Introduction:

The electricity is always given the highest importance in day to day life of peoples there are many ways of producing electricity but most of the world is now moving towards green energy so it is creating more and more popularity in the field of energy. Now most of the devices work on electricity. it has become common need for day-day life for industries and residential areas electricity plays important role in agriculture areas for pumping water from 'well' by using solar photovoltaic pump for irrigation purpose. Most of the villages do not get sufficient amount of electricity for agriculture purpose or even there is not electricity connection so they use to use diesel or propane base water pumping system the main drawback of this was noise, air pollution and high maintenance cost in this situation solar panels makes big impact. so, the farmers are moving towards solar panels to produce green energy for agriculture usage. The flow rate of pumped water depends on incident solar radiation and size of PV array. The solar panels in the market are of rectangular shape which stores energy in the battery's and further it is used to run the motor. These types of panels require large area for installation and can get damage due to "heavy wind storm or freezing rain" also gives less output when there are dust particles present on panels. So, we have come with the idea of flower shape solar panel as it requires less area compare to other for installation and do not get damage in any bad weather condition and also has self-cleaning process. Because of its flower like shape it can be folded and has higher efficiency than other solar panels because it tracks the sun light and moves according to it to obtain grate efficiency.

### Literature Review:

In recent year, the solar energy is gaining more popularity for homes and business. Ever since scientists discovered material that can generate electricity by just exposed to sun light. Due to which people are getting attracted towards it, known as photovoltaic cells (PV) in 1839 by French physicist A.E. Becquerel's farther it found its way in various fields. Yet it was not sufficient for various applications. Over the years researchers and companies increased efficiency and reduce the cost by their efforts. Visiting number of workshops, fields where solar panels were installed going through detail study of solar panel system from various sources such as internet, books and understanding each component of solar panels. taking feedback from owners those who have installed solar panel, maintenance staff. They told us that it is not much efficient for generating electricity in vast quantity and also danger of getting damage in bad weather, hard cleaning of panels. So, we decided to make such solar panels that are more efficient than other solar panels, which can get protected in bad weather and has self-cleaning process. The gadgets used to track sun light which is used in our panels are of low price then also many other solar panels do not have that system. In our project we are using petal shape panels, LDR and microcontroller with which system can track sun during day time and can be folded in bad weather.

### Methodology:

A flower shape solar panels have petal shape solar panels which are attached in circular manner which can be folded automatically in bad weather, at night or manually it has sun light tracking ability they convert most of the visible energy coming from the sun into electricity and also some infrared energy. LDR are connected to the panels which sends the signals to microcontroller to which microcontroller respond by moving solar panels in the direction with the sun light. the microcontroller is also used to give instructions to "servo motor" which is connected to solar panels for folding panels in bad weather for safety purpose.

### TRACKING METHODS:

Based on the control unit, Sun tracking are divided into two types, passive and active system. Mostly, in passive frameworks gas liquid is utilized at low breaking point, which moves starting with one bearing then onto the next to turn the following framework. It works, in light of the varieties of gas weight caused by sun-based warmth. It is not used mostly due to its poor tracking mechanism. This system required viscous dampers to avoid additional movement cause by air. There are three methods of tracking based on degrees of freedom. First method is, Fixed system; in this solar panels are fixed in one direction without any movement. It does not depend in the sun's direction. Other one, Single-axis system; in this tracking system, it has one degree of freedom. Based on the suns east-west direction it moves along to that for better output. And the final one is, Dual-axis system; it is advanced and accurate tracking to increase output better than other two systems. This tracking system moves, according to the direction in east-west and north-south directions. In active system we can get more accuracy of panel and high output than passive systems. Active systems are further divided into different types based on sensor combination and time/date. On one hand, tracking system is done by using sensor like LDR, based on the light intensity detected by the sensor the panel will move according to their degree of freedom for improvement of output energy. On other hand, the combination of sensors and time/date, in this type tracking system is done as explained above. Additional to that, it will depend on time; whether it is day or night, date; seasons like summer, winter etc. based on all these this tracking system works. The main disadvantage of this is expensive.

### PROCESSOR (ARDUINO UNO)

The Arduino Uno is a microcontroller board It contains everything needed to support the microcontroller it contains all the information that is required to run all system simply connect it to a computer with a USB cable and upload the code. power with AC-to-DC adapter or battery to get it started.

Microcontroller ATmega328

Operating Voltage 5V

Input Voltage (recommended) 7-12V

Input Voltage (limits) 6-20V

Digital I/O Pins 14 of which 6 provide PWM output.

Analog Input Pins 6

DC Current per I/O Pin 40 Ma.

DC Current for 3.3V Pin 50 mA.

Flash Memory 32 KB (ATmega328) of which 0.5 KB used by boot loader.

SRAM 2 KB (ATmega328)

EEPROM 1 KB (ATmega328)

Clock Speed 16 MHz

Length 68.6 mm

Width 53.4 mm

Weight 25gm



Fig. 3.1 Arduino Uno

### SERVO MOTOR:

A servo motor is an electromechanical device that produces torque and velocity based on the supplied current and voltage. It is rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. they rotates at the angle of 180 degrees so this type of motors have different type of mechanism than regular motors.



Fig. 3.2 Servo motor

**LDR:**

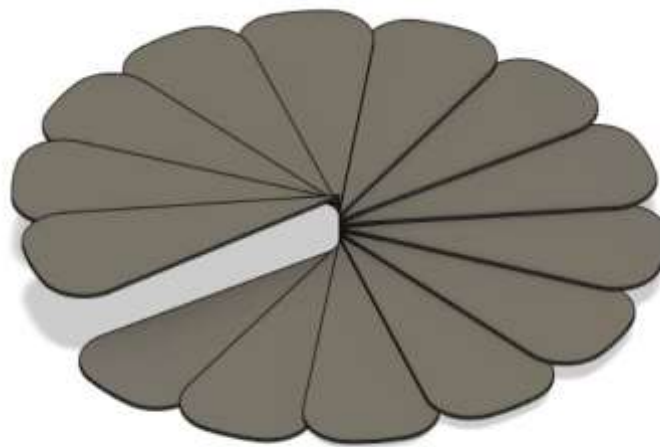
Photoresistors, also known as light dependent resistors (LDR), are light sensitive devices most often used to indicate the presence or absence of light, or to measure the light intensity. These devices depend on the light, when light falls on the LDR then the resistance decreases, and increases in the dark. When an LDR is kept in the dark place, its resistance is high and, when the LDR is kept in the light its resistance will decrease. it is a passive type sensor.



Fig. 3.3 LDR sensor

**Flower shape solar panels:**

The concept of smart flower was motivated by the sight of a sunflower that turns to sun and follows it throughout the day. The panels are designed in a "Petal" like shape it can be folded at night and bloomed like flower at day light they are 40% more efficient than regular type of solar due to their tracking ability. The "FSSP" has two unique features that distinguish it from other solar panels It contains a dual axis tracker that makes it possible for its petal to follow the sun across the sky throughout the day. And have self-cleaning process takes place at the time of petal folding this feature makes it different from other panels.

**Storing and erecting:**

Storing of batteries and other main components was difficult task as all components should be placed in a proper place for easy operation and easy to access for maintenance. It is designed in such a manner that it can hold the weight of solar panels and can fit in a design as shown in figure, and which can be easy to install in place also possible to carry to other locations when required. batteries are placed inside of it with other microcontroller processors the body of storage box is made of stainless steel due to which its weight is low.



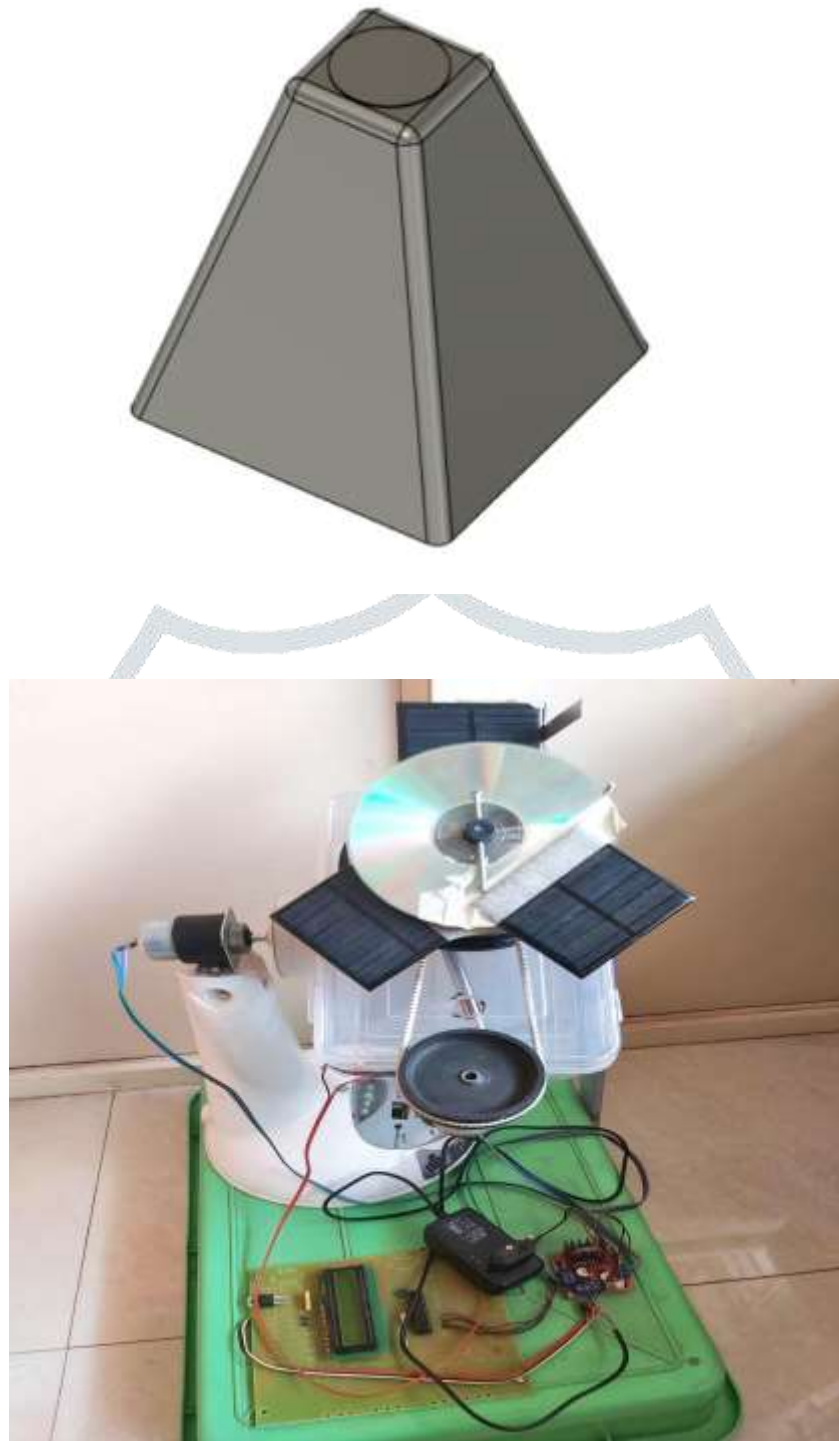


Fig. 3.4 Actual image of system

#### Advantages:

- Capture maximum number of solar rays.
- Easy to transport from one place to another place.
- Has tracking mechanism.
- Self-cleaning process for cleaning solar panels.
- Attractive structure.
- Require less space compare to other.
- Does not get damage by heavy storms as wells as by freeze rain.
- It has foldable structure.

#### Disadvantage:

- High cost installation.

- More maintenance requires than a traditional solar panel.
- Tracker are a more complex system than fixed panels.

### Conclusion:

In this report the innovative idea of implementing flower shape solar panels is discussed and thereby analyzed its various parameters for regular realistic application. It is one of the smart options which can be implemented in various applications for generating electric energy without any damage to environment. The study focuses on update on solar water pumping technology. Applications basically depend upon effectiveness of LDR and servo motor. A light dependent resistor (LDR) which is cheap and easily available in market is used, rotating mechanism is used to rotate panels from east-west direction this both mechanisms are used track sun rays or light to maximum extent. this system can detect danger form storm or freezing rain so this system can protect itself by folding panels. This system can help in improving and capturing maximum amount of energy and protect panels from getting damage.

We have studied previous work on dual axis solar tracking panels and used that to overcome light tracking problem and has self-cleaning process which is used to clean dust particles present on solar panels which reduces the efficiency of panels by reflecting solar radiations back to environment through which we develop flower shape solar panels. The conclusion and approaches we have given are need to be studied further for better understanding and to achieve advancing in these technologies.

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