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IMPLEMENTATION IN SMART-FLOWER SOLAR TRACKING SYSTEM FOR MAXIMUM RENEWABLE ENERGY GENERATION

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ABSTRACT: - A new approach called Smart Sunflower promotes a portable, auxiliary photovoltaic power system based on a foldable scissors mechanism. This system includes a photovoltaic power generation module and electricity transfer module along with considers an intelligent automated solar tracking control system designed to increase the efficiency of solar energy production. The proposed By adjusting the solar panel's orientation, the device can instantly adjust to different weather conditions tha nks to its cloudiness detection technique.It is well known that panels placed horizontally are more effective when there is significant solar radiation dispersion during overcast weather.

Keywords: Smart-Flower, Solar Tracking, etc.

I. INTRODUCTION

Environmental pollution and climate change caused by the over use of fossil fuels forced human kind to look for renewable energy sources. Nowadays, more and more energy regenerative technologies are proposed to harvest ambient energy, such as kinetic energy, solar energy, and sound energy etc. Among all renewable energy resources, solar energy is best source of green and sustainable energy with the advantage of limited environments impacts. Large scale Conventional Photovoltaic (PV) require a huge area of land which results in their direct competition with global surface area, such as land for agriculture Vs PV installation plant. “Smart sunflower” is an approach for generating electricity from PV technology. The designed system consists of two main parts: A “Photovoltaic Power Generation Module” (PVPGM) as well as a module for transferring power.

The auxiliary power system's power generator, the foldable PVPGM, is outfitted with solar cells.The PVP GM is intended to increase portability and is based on a foldable scissor mechanism.In particular, the PVP GM can be folded to maximise space utilisation while it is not functioning and has a bigger area when it is unfurled.The second component is the electricity transfer module, which uses a supercapacitor to store the electricity produced by the PVPGM.

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1.1 Objectives: -

To develop automated based system and check the result about the production and incrimination. Humanless maintenance of agriculture. Simply to make life effortless. Save more money conserving the environment. Farming more profitable.

1.2 Literature Review: -

In this project, a new method for the optimal design of a Smart flower has been proposed. Based on the objectives namely maximum energy generation, maximum land availability and minimizing the PVs under shadow is proposed.

1 **Performance Evaluation of Solar Tracking System–2020 IEEE**

Theprojectconsidersanintelligentautomatedsolartrackingcontrolsystem.The proposed method of detecting cloudiness allows system to adapt to various weather conditions in real time by changing the angle of the solar panel.

2 **Automated Intelligent Solar Tracking Control System for Different Weather Conditions – 2019 IEEE Xplore**

We explore one more advantage over conventional PVs plant by designing a portable, auxiliary PV power system for energy generation based on foldable scissors mechanism.

3 **A Portable, Auxiliary Photovoltaic power system for Energy Generation Based on a Foldable Scissors Mechanism – KeAi Journals**

This paper is designed a portable, auxiliary photovoltaic power system. This study proposed the concept of using a portable auxiliary photovoltaic powering system for EV.

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II. METHODOLOGY

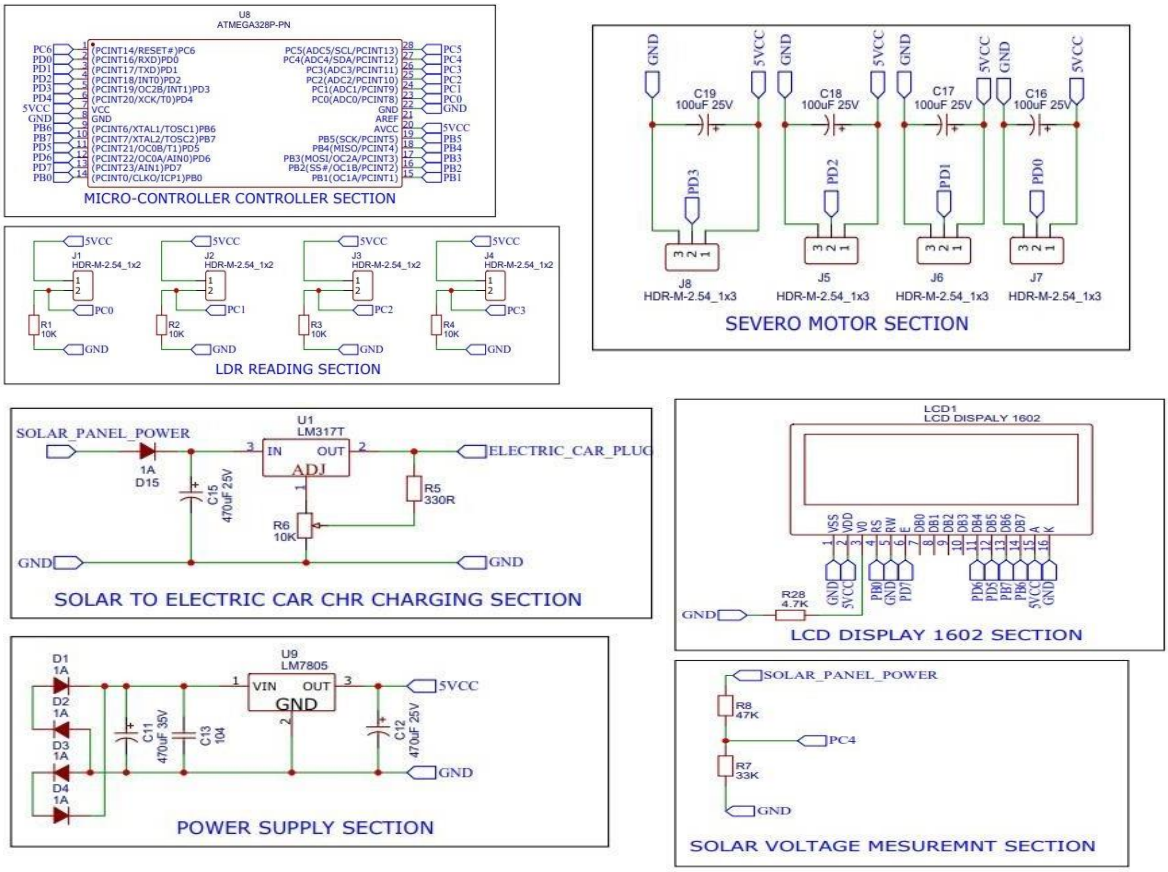

Fig 1: - Schematic diagram of smart flower solar tracking system for charging EV

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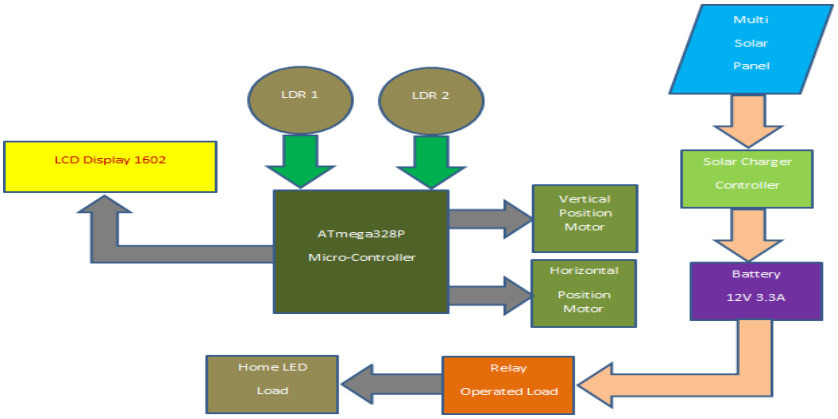

Fig 2: - Block Diagram of Implementation of Smart Flower Solar Tracking System for Charging EV

Materials: -

Components Name	Ratings / Specification	quantity
Solar Panel	5*5 cm, 5v	4
LM317	13.4v ,1A	1
ATmega 328p	5v, 25mA	1
LCD Display	1602, 5v,100mA	1
Servo motors	12v ,500mA	4
Battery	Li-ion, 12v,	1
LDR	-	4

III. WORKING OF THE PROPOSED SYSTEM

Smart flower solar tracker a Dual axis sun-tracker: This smart flower sun tracker will be reliable and accurate. Smart flower sun tracker maximizes the output to static and single axis tracing system. This system contains four LDR's, three servo motors and a controller. These 4 LDR's located on at four separate directions. The Controller identifies the signal from LDR's, thus helps the motor to rotates the flower shape solar panel according to sun's path. In this paper, LCD display and ATmega-328P Controller is connected. This controller consists of 28 pins. Among them, all can be as utilized as inputs or of pins.
In below figure we see that output of the ATmega-328P is connected to the LCD display unit.

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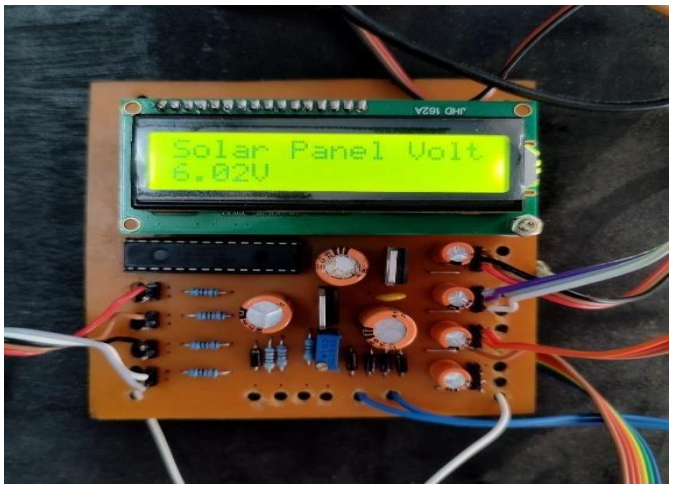

Fig3 (a): - PCB of Smart Flower Solar Tracker System

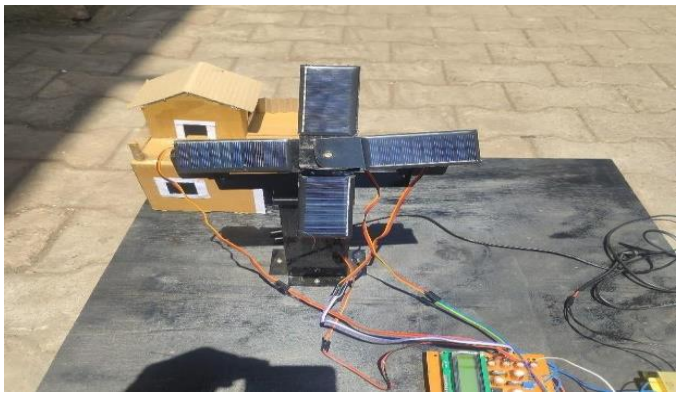

Fig3 (b): Actual Image of Smart Flower Solar Tracker System

Here is 4 LDR’s used. This all LDR detects Light and provide signal to Controller. This LDR's will get 5 volts. Here Ceramic capacitor-104 is used for avoiding spikes and noise. Battery voltage is entering the 7805-voltage regulator through diode output is given 5 volts. There are three stepper motors both end of panel structure and one stepper motor is mounted on center beam. Middle stepper motor is used to rotate smart flower panel as per the LOR's light detection level. The positive and negative point of the panel will go the battery through transistors.

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3.1 **Circuit Diagram: -**

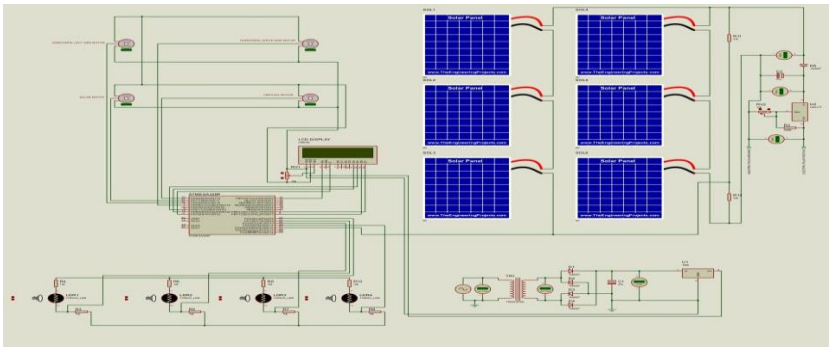

Fig 4: - Circuit Diagram of Design of smart flower solar tracking system for charging EV

3.2 Advantages, Disadvantages, Applications:

1. **Advantage: -**

- Increased Energy Production.
- Improved Efficiency of Solar Power System.
- Installation Area Is Reduced.
- Longer Operational Hours.
- Carbon Emission Reduction.
- Dual-Axis Tracking Capabilities.

2. **Disadvantages: -**

- High initial cost.
- More maintenance required.
- Weather dependent.

3. **Application: -**

- Commercial load
- Home Load
- Charging Electric Bike
- Motors

IV RESULT

The PV panels that are being used that are small scale re-presentation of PV array. In terms of solar tracking system there is one major theory use to trace the sun; which are by using sensors generally (LDR) to get sun paths. Using sensors are very precise.

Time	**Angle** (Degree)
10.00 AM	47°
11.30 AM	68°
1.00 PM	88.6°
3.00 PM	70.5°
5.00 PM	46.5°

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In this paper we designing a smart flower solar tracker which is vary with respect to solar radiation variations. By designing this smart flower solar tracker, we maximize on Solar energy collection as well. Equation used to find maximum power.

Pmax = Voc* Isc* Ff

Here Voc stands for open circuit voltage, Isc stands for short circuit current, and Ff stands for fill factor. Pmax denotes highest energy output.

The result of this system would be the development and implementation of the system that utilizes solar tracking technology to optimize the generation of solar power for charging electric vehicles. This system would involve a mechanism for the solar to dynamically adjust their orientation throughout the day to maximize exposure to sunlight, thus increasing energy efficiency and potentially reducing the charging times for EVs. Additionally, the project includes components such as energy storage solutions and smart charging algorithms to further optimize the charging process.

Overall, the result is sustainable and efficient method for charging EVs using the solar energy.

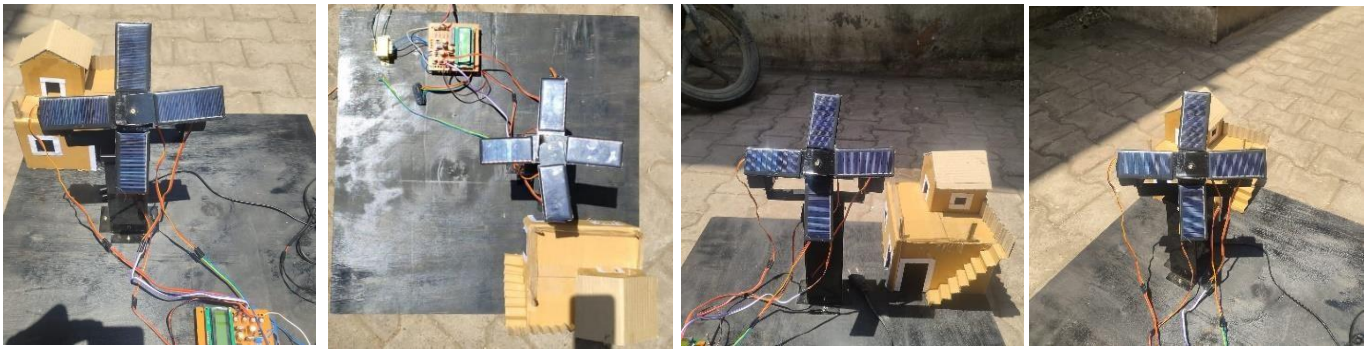

Fig5 : Different Angle of Smart Flower Solar Power System

V. 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 market is used, rotating.

Panels are rotated from east to west by a mechanism; both mechanisms follow light or sun rays as close ly as possible.This device can recognise when a storm or freezing rain is approaching, and it can defend its elf by folding its panels.This method can assist in optimising and capturing the most energy possible while shielding panels from harm.

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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