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# Solar Tracker using IOT

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**ABSTRACT:** The recommended system is a sophisticated weather monitoring solution that uses IoT to make its real-time data publicly accessible over a wide area. All students must complete a senior design project that lasts for two semesters and carries four credits. A sun tracking solar power system was developed and put into operation by the senior design project team, which was made up of three electrical engineering technology undergraduate students. Since most solar panels now in use are fixed, they cannot generate the full amount of energy they are capable of..

## I.INTRODUCTION

Modern civilisation functions via the vein of bustling civilization. Every day, energy is used to the fullest extent possible to meet the aspirations and ambitions of the general populace. Every aspect of our lives is constrained by several levels of obstruction, and in response, energy is emerging as a crucial component. As a result, the energy supply must be limitless or permanent in order to support this enormous population. The finest creation of nature, humans are evolutionary creatures that constantly strive to envision the potential and existing pleasures and advantages from every viewpoint in this dangerous planet. The evidentiary matrix makes clear which solutions, in a dichotomy of opposing viewpoints, can best hasten the energy shortage in a society as diverse as ours. Our company's mission statement is to advance the noble cause of energy conservation.

Looking at the current situation, it is clear that traditional energy sources like coal, natural gas, oil, etc. are on the verge of extinction. Because we are in a constant struggle with time itself to meet all of our energy needs, demand for these resources has reached an all-time high. The environment is being damaged by traditional energy consumption because fossil fuels like coal, oil, and natural gas are used. Therefore, the current project is designed with elements like LDR modules, DC motors, photovoltaic arrays, etc. that, when functioning, would not emit any pollution and instead act as a reservoir of energy drawn from the Sun itself, in contrast to other uses of conventional energies. No other energy is more plentiful than solar energy in terms of availability and freedom, usage, along with the rest of the fact that it is converted into electrical energy.

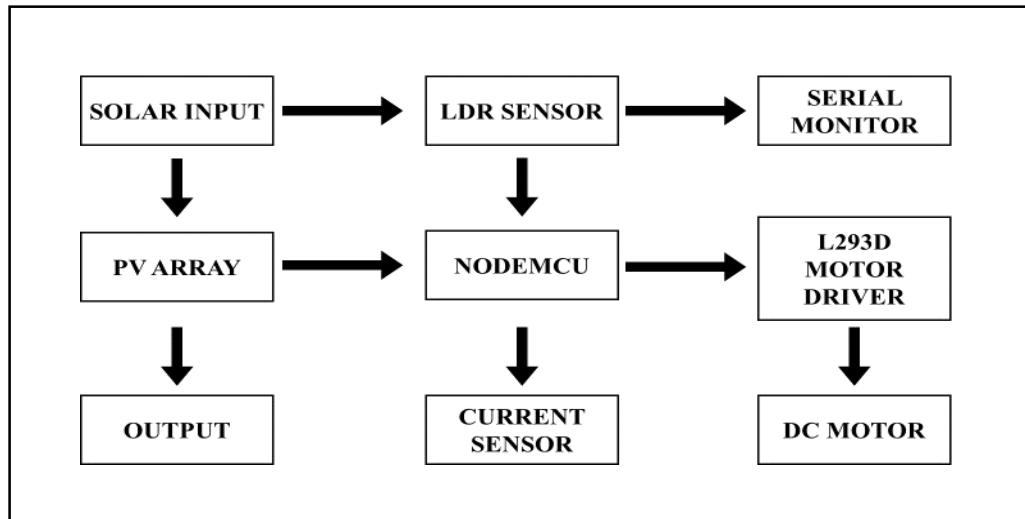
## II.LITERATURE SURVEY

There are so many more options for producing power nowadays. Due to the scarcity of resources, modern society is obliged to find ways to satisfy the latter's expectations. As civilization has grown, the depletion of conventional fuels as a result of human behaviour has raised concerns about sustainable development. The lack of energy and the knowledge of its source led us to adopt the positive strategy of using the complementary resources given to humanity—solar, tidal, etc.

The Sun has always been regarded as a vital source of energy. In comparison to other energy sources, solar energy is more environmentally benign. The development of technology has paved the way for methods to put this energy to good use. Be it for fuel generation, power, thermal energy, or any other reason. To convert the solar energy that the earth has appropriated into electricity, photovoltaic or concentrated solar power (CSP) technologies are used. Through the use of photovoltaic arrays, an aligned scaffolding of photovoltaic/solar cells, solar tracking devices make use of this stolen solar energy..

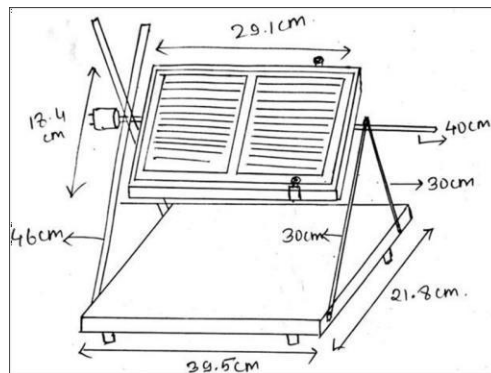
## III.BLOCK DIAGRAM

Three distinct phases are individually engineered before being combined into one system. This strategy, which is comparable to incremental refinement in modular programming, has been used because it ensures an accurate and logical strategy that is simple and easy to comprehend. Additionally, this guarantees that any faults are taken into account separately and fixed.



Circuit 1: Block diagram of Solar tracker.

#### IV.WORKING PRINCIPLE



For maximum power generation, solar power plants need to be closely watched. This aids in recovering effective power output from power plants while keeping an eye out for defective solar panels, connections, dust buildup reducing output, and other similar problems impacting solar performance. The automated solar power monitoring solution that we suggest here is based on the Internet of Things and enables automatic solar power monitoring from anywhere over the internet. To track the characteristics of a 10Watt solar panel, we utilise an Arduino-based system. Our technology continuously checks the solar panel's output and sends data through the internet to an IOT system. Here, we utilise IOT Gecko to send solar power parameters to the IOT Gecko server over the internet. It now shows the user these settings via an efficient GUI and also alerts user when the output falls below specific limits. This makes remotely monitoring of solar plants very easy and ensure best power output.

The "Automatic Solar Tracking System" project is created by installing various small-scale components, including a solar panel that outputs 12 volts, an MCU called NodeMCU, a motor driver with the IC L293D, two LDR sensor modules, a simple DC motor with a 10 rpm, a current sensor, and a 9 V battery.

The construction of the aforementioned project is made of a wooden foundation that is anchored to the ground and secured with iron rods on both sides in a cross-shaped manner. A hollow cylindrical rod connects the two ends, and a DC motor is attached to one edge of the rod. The solar tracking system's circuit is separated into three portions. the starting point features two LDR modules that are arranged in such a way to create a voltage divider circuit. The microcontroller is

programmed using the Arduino IDE software, which is installed in the system. Finally, the driving circuit, which has the DC motor, aids in spinning the solar panel.

#### V.METHODOLOGY

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#### VI.HARDWARE SPECIFICATIONS

1. L293dmotordriveric
2. ArudinoUNO
3. Espwi-fimodule
4. DHT11
5. LDR
6. 7812VoltageRegulator
7. 10wSolarPanel
8. Battery12v4A

#### VIII.ADVANTAGES

- It can consume 45% more energy than normal solar panel.
- It can move 90 degree.
- It is safe and don't harmful to nature.
- It can also do weather forecasting.

#### VIII.LIMITATIONS OF THE SYSTEM

The Cloudy weather cannot generate more energy as compare to non-cloudy weather.

#### IX.FUTURE DEVELOPMENT

The project's objectives were purposefully limited to what was thought to be feasible within the allocated time frame. As a result, the original solar tracker architecture is capable of receiving several advanced enhancements. This design is said to be an example of a working scale model that might be applied to a much greater size. The suggestions listed below are offered as potential directions for this project's future growth. • Wood and other locally obtainable materials might be used in place of mild steel to further save costs. • To prevent abrupt jerks, a spring of the proper stiffness might be built. • Measures to protect solar panels from the elements. • More precision may be attained by implementing wind vibration



prevention techniques.

The solar tracker market will likely expand on a worldwide scale. from \$6.73 billion in 2021 to \$7.72 billion in 2022 at a compound annual growth rate (CAGR) of 14.69%. The solar tracker market is expected to grow to

#### X APPLICATIONS

- It can use in home applications.
- It can use to charge mobile.
- It can use to play T.V.
- Light bill can be reduced.
- It can used in big projects where much electricity is needed.

#### XI. CONCLUSION

Today, in a world of exploding production, energy is the primary resource on which the entire society is built. As it is stated that energy cannot be generated or destroyed, this reaction might imply that energy can somehow be stored. With the intention of achieving this aim, our initiative has made an effort to elucidate the route to such objectivity. Constant energy use inevitably leads to a lack of resources when it comes to the planet's natural resources, which is only normal. The primary and mother source of all life is the sun, which is the highest source in the cosmos and has been spiking over for aeons from the universe's beginning energies. Considering the very fundamental from the viewpoint of storing such energy, the project has been unravelled. Energies other than from the Sun, are the process from which such are been produced through the burning of various materials, involving emission of a large amount of pollution, causing the environment and the atmosphere sick day by day.

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