**ARDUINO BASED SUN TRACKING SOLAR PANEL**

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**At: Changa, Dist: Anand – 388421**

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**CERTIFICATE**

This is to certify that the report entitled “**ARDUINO BASED SUN TRACKING SOLAR PANEL**” is a Bonafede work carried out by **Miss. Dhwani Parekh (18IT074) & Miss. Krupa Patel (18IT090)** under the guidance and supervision of **Prof. Harsh Patel** for the subject **Software Group Project-I(IT244)** of **4th** Semester of Bachelor of Technology in **Information Technology** at Faculty of Technology & Engineering – CHARUSAT, Gujarat.

To the best of my knowledge and belief, this work embodies the work of candidate **herself**, has duly been completed and fulfils the requirement of the ordinance relating to the B.Tech. Degree of the University and is up to the standard in respect of content, presentation and language for being referred to the examiner.

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**ABSTRACT:**

The topic of our project is **ARDUINO BASED SUN TRACKING SOLAR PANEL.**

This system collects free energy from the sun and stores it in the battery and then converts this energy to the respective alternating current. We are going to make a Sun Tracking Solar Panel Using Arduino, which will sense the light and automatically rotate the solar panel in the direction of the sun light.

Aim of this project is to get the maximum amount of solar energy which can be use in all the day to day works which needs electricity by increasing the efficiency. Advantage of this project is that Solar panel will always follow the sun light and it will always face towards the sun to get charge all the time and can provide the maximum power.

**ACKNOWLEDGEMENT:**

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**CHAPTER 1: INTRODUCTION**

Solar energy is the energy obtained by capturing heat and light from the Sun. Energy from the Sun is referred to as solar energy. Technology has provided a number of ways to utilize this abundant resource. It is considered a green technology because it does not emit greenhouse gases. Solar energy is abundantly available and has been utilized since long both as electricity and as a source of heat.

You can find them for mobile charging in rural areas, as well as simple little side-walk path lights. Solar is easy to use, readily available, and inexpensive.

Every panel you see in your day to day life is in a fixed position.

**CHAPTER 2: SUN TRACKING SOLAR PANEL USING ARDUINO**

**2.1 Technical used of Arduino**

Arduino is an open source computer hardware and software company, project, and user community that designs and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License.

**2.2 Components required**

* Servo Motor (sg90)
* Solar panel
* Arduino Uno
* LDR’s X 2 (Light Dependent Resistor)
* 10K resistors X 2
* Battery (6 to 12V)

**2.3 How it works?**

* In this project, LDR’s are working as light detectors. LDR (Light Dependent Resistor) also known as photo resistor is the light sensitive device. Its resistance decrease when the light falls on it and that’s why it is frequently used in Dark or light detecting circuits.
* The two LDR’s are placed at the two sides of solar panel and the Servo Motor is used to rotate the solar panel. The servo will move the solar panel towards the LDR whose resistance will be low, mean towards the LDR on which light is falling, that way it will keep following the light.
* And if there is same amount of light falling on both the LDR, then servo will not rotate. The servo will try to move the solar panel in the position where both LDR’s will have the same resistance means where same amount of light will fall on both the resistors and if resistance of one of the LDR will change then it rotates towards lower resistance LDR.

**CHAPTER 3: CONSTRAINTS**

1. Though solar energy can be utilized to maximum extent this may create problems in rainy season.
2. Although solar energy can be saved to batteries, they are heavy and occupy more space and required to change time to time.
3. They are expensive.

**Advantages**

* Trackers generate more electricity than their stationary counterparts due to increased direct exposure to solar rays.
* Solar trackers generate more electricity in roughly the same amount of space needed for fixed-tilt systems, making them ideal for optimizing land usage.
* In certain states, some utilities offer Time of Use (TOU) rate plans for solar power, which means the utility will purchase the power generated during the peak time of the day at a higher rate. In this case, it is beneficial to generate a greater amount of electricity during these peak times of the day. Using a tracking system helps maximize the energy gains during these peak time periods.

**Disadvantages**

* Solar trackers are slightly more expensive than their stationary counterparts, due to the more complex technology and moving parts necessary for their operation.
* Even with the advancements in reliability, there is generally more maintenance required than a traditional fixed rack, though the quality of the solar tracker can play a role in how much and how often this maintenance is needed.
* Trackers are a more complex system than fixed racking. This means that typically more site preparation is needed, including additional trenching for wiring and some additional grading.

**CHAPTER 4: CONCLUSION**

An Arduino solar tracker was designed and constructed in the current work. LDR light sensors were used to sense the intensity of the solar light occurrence on the photo-voltaic cells panel. Conclusions of this project is summarized as, the existing tracking system successfully sketched the light source even it is a small torch light, in a dark room, or it is the sun light rays. The cost and reliability of this solar tracker creates it suitable for the rural usage. The purpose of renewable energy from this paper offered new and advanced idea to help the people.