Auto Tunning Of Solar Tracking One Degree Freedom Using Labview

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Abstract- *Here we took the project as energy generation with rectangle solar panel tracking with single axis. Finding energy sources to satisfy the world's growing demand is one of society's foremost challenges for the next half-century. The challenge is converting sunlight to electricity via photovoltaic solar cell. In this context the sun tracker is a device used for efficiency improvement. In our project we track the solar panel with reference of LDR. We want to design one axis tracker. The panel initially focuses as east. When sun falls from east to west,with the help of LDR as reference we track the solar panel proportional to sun. By using the single axis tracker,the outcome of this project is to improve efficiency and absorb high amount of heat radiation to produce high power.*

Keywords- photovoltaic cell, solar tracking, LDR, stepper motor, labview software, myRIO

I. INTRODUCTION

The solar energy is the renewable and cheapest energy source. Solar energy generation helps in reducing gases emission and controls the pollution of the atmosphere. Solar energy is free from harmful production to the environment compare with other energy resources. When the intensity of the sunlight is decreasing, the system automatically changes its direction to get maximum intensity of light. For rotating the appropriate position of the panel, a stepper motor is used. Now a days, solar trackers are get popularized due to its harness solar energy in most efficient way. Maximizing power output from a solar system is desirable to increase efficiency. In order to maximize power output from the solar panels, one needis to keep the panel aligned with the sun, means that the tracking of the sun is required.The main objective of this paper is to design the sun tracking solar system model which is a device that follow movement of the sun regardless of motor speed and also it is to improve the overall electricity generation using single axis sun tracking system.

II. THE PROPOSED METHOD

The solar tracking system which we used here is completely automatic, the panel tracks the sun until it is visible. The main advantage of this system is taking sun as the guiding source instead of earth as a reference. During the cloudy seasons i.e. in case of sun vanishes, the LDR sensor detect the sun at minimum range. After a sometime when the cloud vanishes, it will scan the sun and it will aligned vertically to face the sun. By this method the maximum efficiency can get throughout the whole day. The main hardware used in this system is solar panel. It is made from semiconductor materials. Si is one of the major component used in solar panel. The maximum efficiency of the solar panel is 24.5%. Stepper motor is used to tilt the solar panel, according to the movement of the sun with the use of LDR sensor.Visual diagram of a solar panel is given below in the diagram 1.

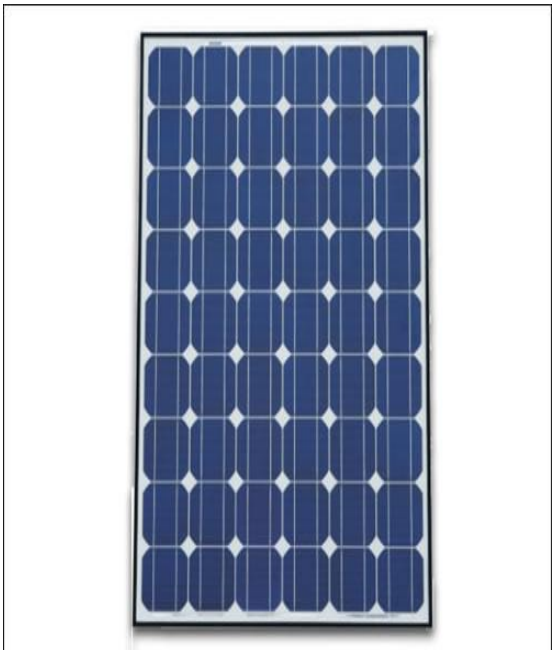


Fig 1 Solar panel

II. RESEARCH METHOD

This system is divided into two divisions. Hardware and software development. The block diagram of a stepper motor is shown in the diagram 2.

Fig 2 Stepper motor

3.1 Hardware operation:

The hardware operation is based on stepper motor andmyRIO.Stepper motor is used to tilt the solar panel. Thesupply for stepper motor is 24v individually given by regulated power supply. myRIOis act as an interface between the software and hardware.It also act as a controller to convert the analog photovoltaic cell power to digital domain and it generate four output signal to control the rotation of the DC stepper motor. The main hardware used in this system is solar panel. It is made from semiconductor materials. Si is one of the major component used in solar panel (maximum efficiency of the solar panel is 24.5%). Solar trackers is the most approximate and proven technology to increase the efficiency of the solar panel through keeping the panels aligned with the sun's position.

An LDR is a component that has a resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

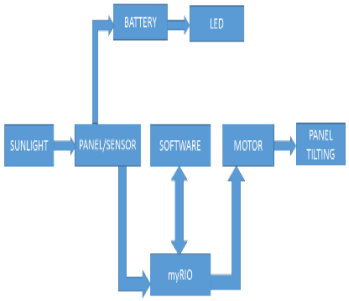
3.1.a Driver circuit:

Driver circuit is an electrical circuit or electrical component which is used to control another circuit or component such as motors. Driver circuit are generally used for the regulation of current flowing through a circuit. Here we use L293D driver circuit, myRIO gives only 10v supply to drive into 24v we use this driver circuit.

3.2 Software operation

This system is implemented by using LabVIEW(Laboratory Virtual Instrumentation Electronic Workbench) software. LabVIEW uses dataflow programming, the flow of data through the nodes on the block diagram determines the execution order of the virtual instrumentation and functions. Here the user interface is knownas the front panel. The block diagram somewhat resembles the flowchart. The code used here is G-code (Graphical code). The digital output from the MyRIO is feed to the stepper motor according to the movement of the stepper motor the panel gets move. With NI LabVIEW software, you can take full advantage of both the processor and FPGA on NI myRIO software bundle web-based installer. You can use this bundle to install all the required and optional software for programming myRIO. Earlier versions of the myRIO software are the LabVIEW 2014 myRIO software bundle and the LabVIEW 2013 myRIO windows after installing the required software for myRIO, start by following a customized getting started experience designed to ensure your success with NI myRIO and access to NI myRIO resources directly from the LabVIEW getting started.

BlockDiagram:



IV. CONCLUSION

Thus, the auto tuning of solar panel with Single axis has been developed using LabVIEW. The system able to track and follow the intensity of the sun in order to get maximum output regardless of stepper motor. Beside, low speed stepper motor is used for avoiding high speed parameter

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