International Journal of Advance Research in Science and Engineering
Volume No. 10, Issue No. 07, July 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

DUAL AXIS SOLAR TRACKING SYSTEM

Ashwanee Kumar[1], Anup Kumar [2], Chandra Shekhar [3], Ashish Singh [4]

S.N Jaiswal (Assistant Professor) [5]

Department of Electronics and Communication Engineering [1,2,3,4]

Department of Mechnical Engineering [5]

Buddha Institute ofTechnology, Gida, Gorakhpur U.P., 273209

Dr. A.P.J. Abdul Kalam Technical University Lucknow U.P., 226031

Abstact

There is a lot of need of electricity in today's generation, to fulfill which we want to use such energy which is unlimited. Renewable energy is energy which comes from natural resources such as rain sunlight thermal heat wind tides which are 19 % of electricity generates by renewable energy in worldwide. Solar energy is a sustainable energy resources for countries around the world dual axis solar tracking system can improve the collection of solar energy by reducing the solar incidence angle. Nowadays there are many types of solar tracker invented but it has two basic categories of tracker that is single axis and dual axis single axis tracker can move only e horizontal or vertical axis while dual tracker have both vertical and horizontal axis moment which can increase the gathering of sunlight on the solar panel. Dual axis solar tracker contains three parts that is input controller and output the input watch from LDR microcontroller and the servo motor at the output. This dual axis solar tracking system has the calculated power gain of 52.5 72% as compared to single axis solar tracking system.

Keywords:*Arduino UNO,IR sensor,LDR,motor,L293D Motor driver,Solar Panal,capacitor,7805 voltage regulator IC*

I. INTRODUCTION

Solar energy is universally accepted renewable energy source which can be reduced the energy crisis among the world.Earlier we used to use a fixed solar panel for solar tracking which was very less efficient. After that single axis solar tracker beat which efficiency increased to some extent . Single Axis Solar Tracking System Only this to Vertical Axis Py or Horizontal Axis Py Single Axis Solar Tracking System only this to vertical axis instead of horizontal axis. This increased the gathering of sunlight. Our aim is to design a dual axis solar tracking system which will automatically track the sun's position and accordingly change the direction of solar panel to get the

maximum output from solar cell.A dual-axis tracking panel produces higher power output than fixed panal and single axis solar system. During this time, the average efficiency of tracking panel was about 80% and fixed panel was 39.96% .This dual axis solar tracking system has the calculated power gain of 52.5 72% as compared to single axis solar tracking system.. Dual axis solar tracker contains three parts that is input controller and output the input watch from LDR microcontroller and the servo motor at the output.

Figure 1 –DUAL AXIS SOLAR TRACKING SYSTEM

II. COMPONENTS

1. Aurduinouno:-

An Arduino Uno with Atmega328P controller is required for this purpose. The microcontroller will be associated with the greater part different equipment units in the module. The board equipped with sets of digital and analog input/output pinsthat may be interfaced to various expansion boards and other circuits .This module takes simple parameters from those sensors joined will patient, methodology it and change over them to advanced yield. This module Additionally holds Wifi connectivity gadget which sends the sensors changed over information of the advanced mobiletelephone.

International Journal of Advance Research in Science and Engineering
Volume No. 10, Issue No. 07, July 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

Figure 3- Arduino UNO

2. Solar Panal

Solar panels are those devices which are used to absorb the sun's rays and convert them into electricity or heat. A solar panel is actually a collection of solar (or photovoltaic) cells, which can be used to generate electricity through photovoltaic effect. These cells are arranged in a grid-like pattern on the surface of solar panels. Thus, it may also be described as a set of photovoltaic modules, mounted on a structure supporting it. A photovoltaic (PV) module is a packaged and connected assembly of 6×10 solar cells. When it comes to wear-and-tear, these panels are very hardy. Solar panels wear out extremely slow..

Figure 4- Solar Panal

3. IR sensor

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. IR is invisible to the human eye, as its wavelength is longer than that of visible light (though it is still on the same electromagnetic spectrum).

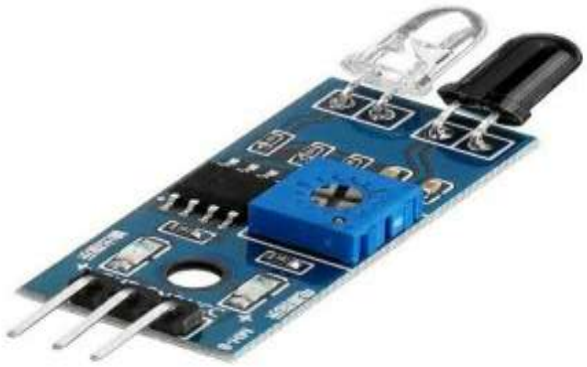


Figure 5- IR sensor

4. LDR

Light Dependent Resistors. A Light Dependent Resistor (LDR) is also called a photoresistor or a cadmium sulfide (CdS) cell. It is also called a photoconductor. ... This optoelectronic device is mostly used in light varying sensor circuit, and light and dark activated switching circuits.

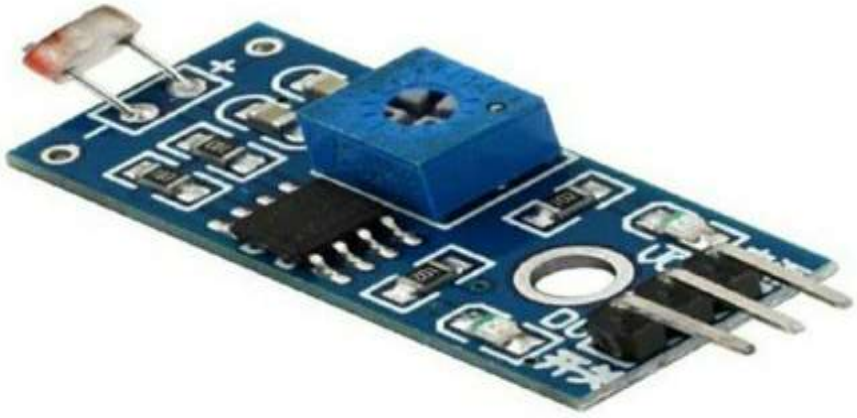


Figure 6- LDR

III. LITERATURE SURVEY

In[1]this paper proposes the design and implementation of a low-cost automatic dual-axis solar tracker system. The tracking system is designed as a closed-loop control based active tracking system, employing Light Dependent Resistor (LDR) sensors as the inputs of the system. The tracking strategy utilizes a digital logic

design of the sensors' participation implemented in a pseudo-azimuthal system to simply rotate around the primary (north-south) axis and the secondary (east-west) axis.

In[2] A simple but accurate solar position measurement system is essential for maximizing the output power from a solar panel in order to increase the panel efficiency while minimizing the system cost. Solar position can be measured either by a sensor (active/passive) or through the sun position monitoring algorithm

In[3]This paper presents fabrication and installation of a solar panel mount with a dual-axis solar tracking controller. This is done so that rays from the sun fall perpendicularly unto the solar panels to maximize the capture of the rays by pointing the solar panels towards the sun and following its path across the sky. Thus electricity and efficiency increased.

In[4]This paper describes the design and development of a Microcontroller based solar tracking system, based on solar maps, which can predict the exact apparent position of the Sun, by the latitude's location, it also covers the solar tracking mechanical structure together with the associated electronic circuits.

In[5]This research presents a performance analysis of the dual axis solar tracking system using Arduino. The main objective of this research is whether a static solar panel is better than solar tracker or not. This work is divided into two parts hardware and software system. In hardware part, four light dependent resistors (LDR) is used to detect the utmost light source from the sun.

[6] This work designed, implemented and evaluated the performance of a dual axis solar tracking system (DATS) using light dependent resistor (LDR) sensors, direct current (DC) motors and microcontroller to make it capable of uninterruptible electricity supply for rural applications.

IV. METHODOLOGY

Dual Axis Solar Tracker consists of 4 LDR sensors which are connected to audino.When the sunlight falls on the panel, the solar panel now does the job of the light. Its main function is that when the position of the sun changes, it rotates the panel in the direction of sunlight by changing the light.When the sunlight falls on the panel, the solar panel now does the job of the light. Its main function is that when the position of the sun changes, it rotates the panel in the direction of the sunlight by changing the light.It has two motors, with the help of which the solar panel rotates.Block diagram of Dual axis solar tracking system is shown in below figure using all components-

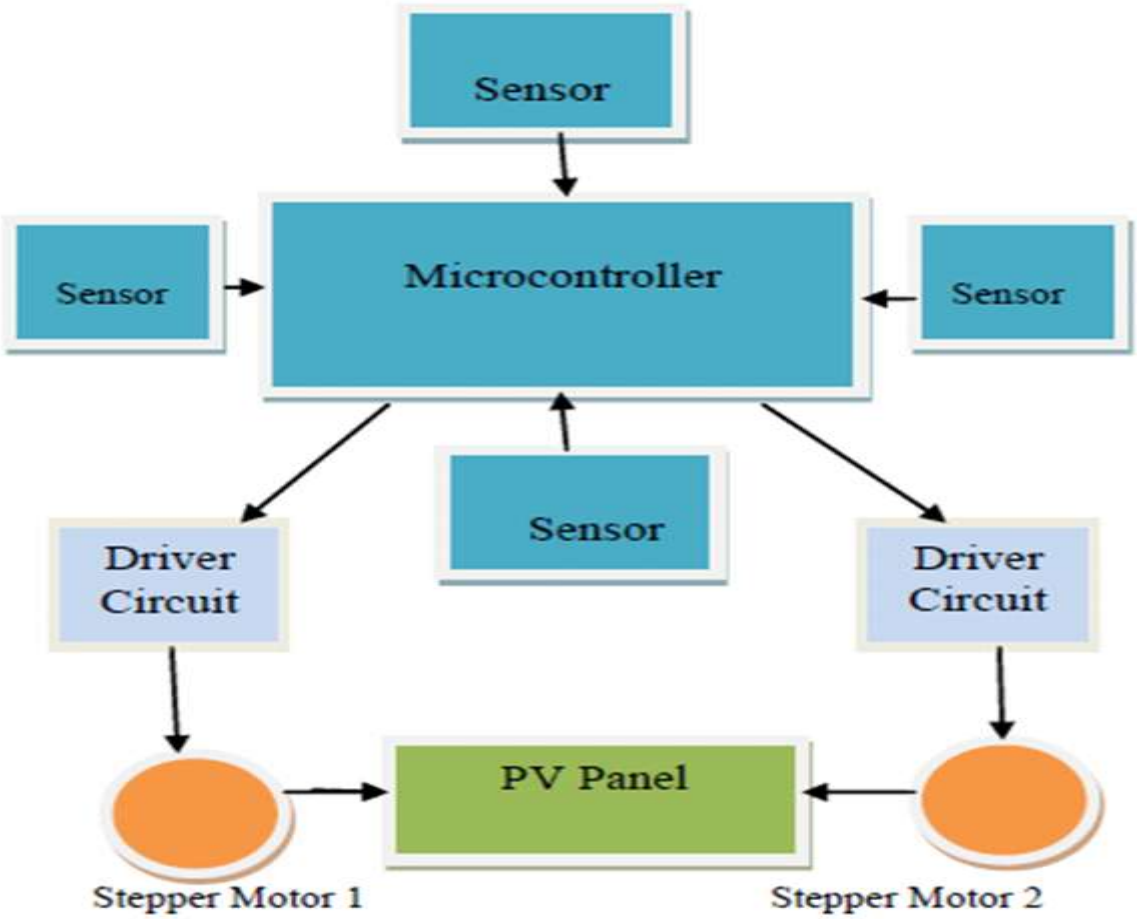


Figure2- PROPOSED BLOCK DIAGRAM OF DUAL AXIS SOLAR TRACKING SYSTEM

V. ADVANTAGES AND SOCIAL BENIFITS

a) Dual-axis trackers tacks the Sun lightcontinually and provide efficient output power throughout the day.

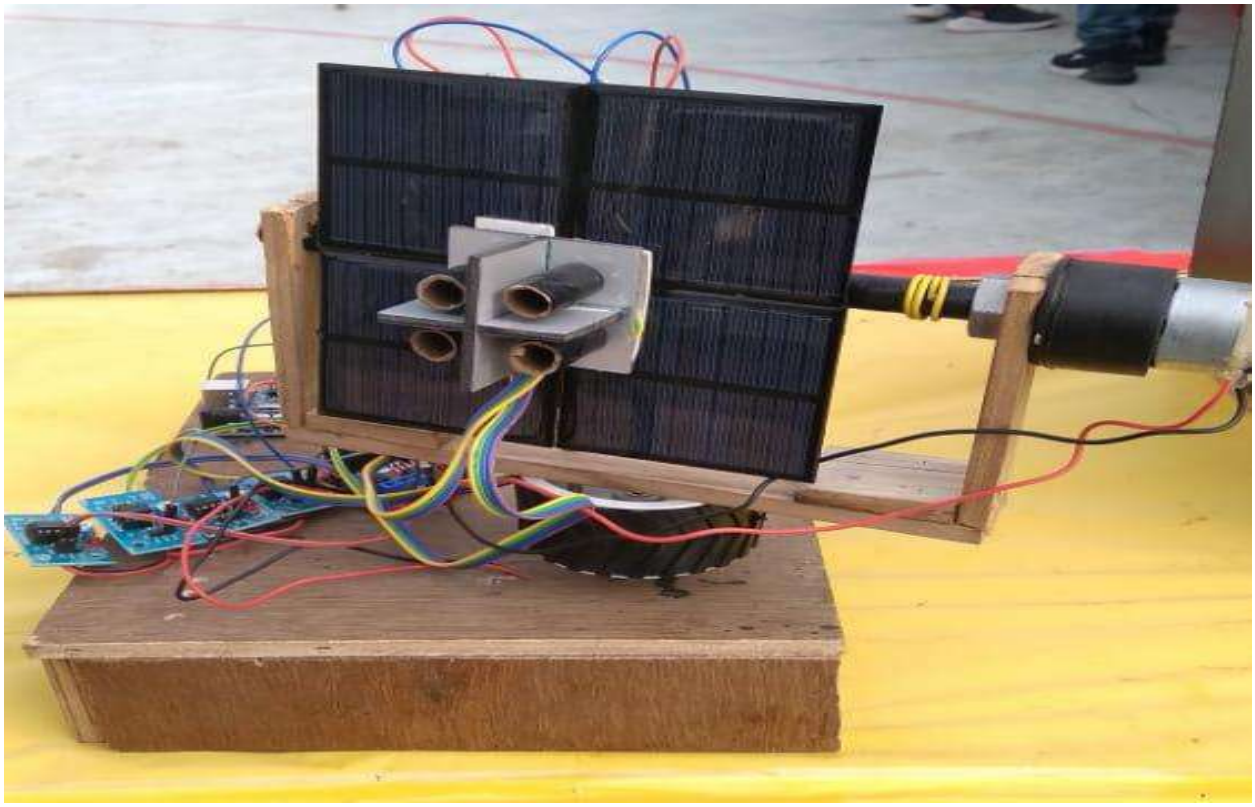
b) Dual axis solar trackers provide a reasonable solution in cases of the limited power capacity of the connection to the grid.

c) Dual-axis cover smaller place and easy to use the remaining area around for different additional purposes such as car parking, gardening, and others.

d) These trackers generate 45-50% higher power output per year, as compared to fixed solar tracker and single axis solar tracker

e) It is pollution free and clean.

VI. RESULT



VII. OUTCOMES

a) In future, it will be our endeavor to use different types of weather sensors in Dual axis Solar Tracker so that we can get weather information.

b) Efforts will be made to reduce its cost as much as possible.

CONCLUSION

In today's run-of-the-mill life, we are using energy so much that we need more energy, through renewable energy.We collect more sunlight with the help of two alexis solar trackers.We collect more sunlight with the help of two alexis solar trackers. As the sun changes its position, the solar panel rotates. More focus falls on the solar panel and the maximum light is gathered. which we convert into electricity and more efficient.

REFERENCES

[1] ChaowananJamroen, PreechaKomkum, SompolKohsri, WuttinanHimananto, SiriwatPanupintu, SorawitUnkat
https://scholar.google.com/scholar?as_ylo=2017&q=dual+axis+solar+tracking+system&hl=en&as_sdt=0,5#d=gs_qabs&u=%23p%3DV0SpFeyPT3YJ

[2] Muhammad EH Chowdhury, AmithKhandakar, Belayat Hossain, RayaanAbouhasera
https://scholar.google.com/scholar?as_ylo=2017&q=dual+axis+solar+tracking+system&hl=en&as_sdt=0,5#d=gs_qabs&u=%23p%3DUiYovTN8twkJ

[3] Nader Barsoum
https://scholar.google.com/scholar?q=dual+axis+solar+tracking+system&hl=en&as_sdt=0,5#d=gs_qabs&u=%23p%3DMnTprmESD_kJ

[4] SB Elagib, NH Osman
https://scholar.google.com/scholar?start=10&q=dual+axis+solar+tracking+system&hl=en&as_sdt=0,5#d=gs_qabs&u=%23p%3DUzDY2zA3-AkJ

[5] Amit Chakraborty Chhoton, Narayan Ranjan Chakraborty
https://scholar.google.com/scholar?start=10&q=dual+axis+solar+tracking+system&hl=en&as_sdt=0,5#d=gs_qabs&u=%23p%3DL0BHpJtvjcAJ

[6]HachimenumNyebuchiAmadi, Sebastián Gutiérrez
https://scholar.google.com/scholar?start=20&q=dual+axis+solar+tracking+system&hl=en&as_sdt=0,5#d=gs_qabs&u=%23p%3DrkyH-miONI8J