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Single Axis Solar Tracking Using Arduino

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ABSTRACT:A plan discusses on is growth of a single horizontal axis solar tracker using Arduino UNO which is low & small complex & can still reached is the required efficiency. For the magnification of horizontal single axis solar tracking system, five light dependent on a resistors (LDR) has been utilized for sunlight optical discernment & is catch the maximum intensity light. A servo motor is appropriate to rotate the solar panel to the maximum light source sensing by the light dependent resistor (LDR) in order to magnification the efficiency of the solar panel & engender the maximum free energy. The efficiency of the system has been check & compared with the static solar panel on several time intervals. A little archetype of horizontal single axis solar tracking system will be concocted to implement the design methodology presented here. As a result of solar tracking system, solar panel will engender.

KEYWORDS: Arduino, Magnification, Solar, Resistor, Optical discernment, Engender, Concocted.

I. INTRODUCTION

In this day, renewable resource is one of the major concerns because of increasing more power demand but the quality and availability of conventional energy sources are not enough. Energy is essential factor for the development of any nations of all over the world. Most of the energy production depends on fossil fuel. The resources of the fossil fuels are limited, so that there are growing demand for energy from renewable resources like solar, geothermal and ocean tidal wave. Among all renewable systems, photovoltaic system is the one which has great chance to replace the conventional energy resources. To enhance the performance of solar panel the only way is to increase the intensity of light falling on it. Solar tracker is the best technology to increase the efficiency of solar panel by keeping panel aligned with the suns position. The advantage of using solar power for small power generation is its probability; it can be carried whenever or wherever small power generation is required.

II. LITERATURE SURVEY

Advanced design and construction of uni-directional solar tracking system. The tracker is constructed Using two segments electrical and mechanical part. Electrical part consists of PV sensor, comparator and battery whereas mechanical system consists of dc motors and gears. Design and construction of a prototype for solar tracking system detected the sunlight using Light dependent Resistors (LDR), is talk over in this work. The control circuit for the solar tracking system is build on Arduino Uno. This is programmed to detect the sunlight through the LDRs and then actuate the stepper motor to position the solar panel where it receives utmost sunlight. Compared with any other type of motor, the stepper motor is more controllable, more energy efficient, steadier and having high tracking accuracy and suffering little environmental effect. The cause of this is to develop a tracking system that control and monitor the movement of solar panel based on the intensity of the light, to measure output voltage, current and power, P=IV and to differentiate the efficiency increase of a solar system between fixed solar system and solar tracking system

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III. PROPOSED SYSTEM DEVELOPEMENT

A. Single Axis Solar Tracker:

A solar tracker is a contrivance that orients a payload towards the Sun. This was initially designed to work like Venetian visually impairs with panel rows moving in unison throughout the day Single Axis Solar Tracker will focus on the hardware approach in designing and implementing. It tracks the sun east to west, rotating on a single point, moving either in unison, by panel row or by sections. It will gather less energy per unit as compared to the dual-axis trackers, but with shorter racking height, single axis solar track will require less space to install, creating a more concentrated system footprint and a more facile model for operations and maintenance.

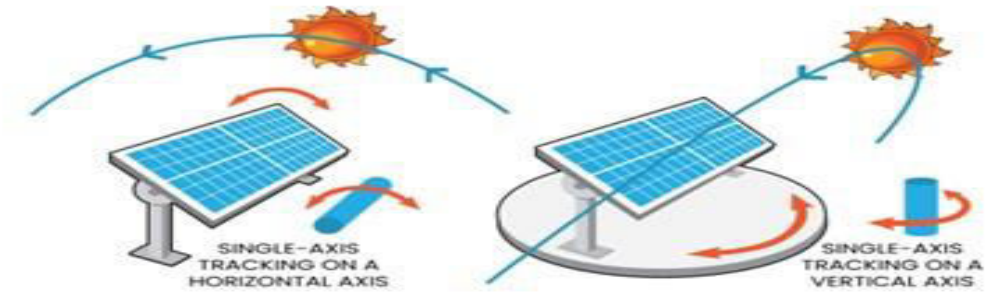

Fig 3.1 Single Axis Tracking on vertical and horizontal Axis

B. Arduino UNO:

The Arduino UNO is a micro-controller board premise on . It has fourteen digital input/output pins (of which six of it can be apply as PWM outputs), six analog inputs, a 16 MHz crystal oscillator, a USB parallel, a puissance jack, an ICSP header, and a reset button. It contains everything needed to fortify the micro- controller; it can solely connect to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

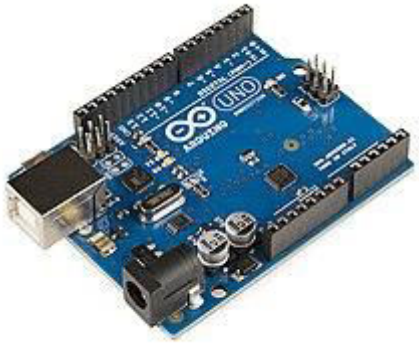

Fig 3.2Arduino UNO

C. Servo Motor:

A servo motor can be employed with power supply from 4.8V to 6V. Customarily voltage of V with operating frequency, f =4 is use. Servo motor is utilized to give precise angle control such as 45 degrees, 90 degrees. The angle can be hold permanent. It can rotate from 0 degree to 180 degrees when the pulse obligation ration transform.

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Fig 3.3 Servo Motor

D. Solar Plate:

Electricity by the photo-voltaic effect, which is a physical & chemical occurrence Solar cell is a contrivance whose electrical Characteristics such as current, voltage and resistance vary when exposed to the sunlight. Poly-crystalline solar plate are utilized in this research. The designations of poly-crystalline.

Fig 3.4 Solar Plate

Workingofthesystem:

solar tracker, a system that positions an object at an angle relative to the Sun. The most-common applications for solar trackers are positioning photovoltaic (PV) panels solar panels so that they remain perpendicular to the Sun's rays and positioning space telescopes so that they can determine the Sun's direction. PV solar trackers adjust the direction that a solar panel is facing according to the position of the Sun in the sky. By keeping the panel perpendicular to the Sun, more sunlight strikes the solar panel, less light is reflected, and more energy is absorbed. That energy can be converted into power.PV solar trackers adjust the direction that a solar panel is facing according to the position of the Sun in the sky. By keeping the panel perpendicular to the Sun, more sunlight strikes the solar panel, less light is reflected, and more energy is absorbed. That energy can be converted into power.

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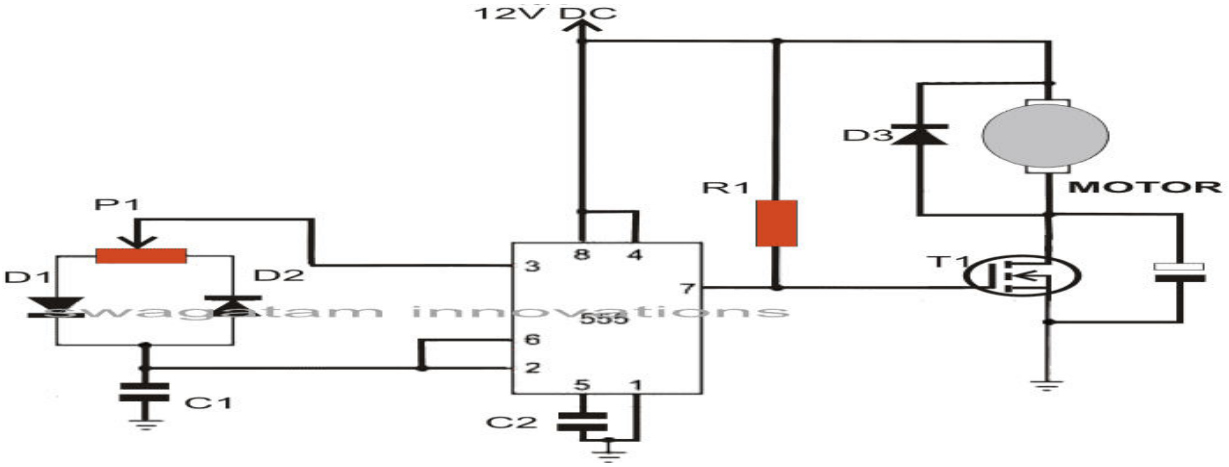

Fig 3.5 circuit diagram

IV.CONCLUSION

An application of solar tracker utilizing Arduino approach has been presented in this study. As a conclusion, firstly the development of tracking system to control and monitor the kineticist of solar panel predicated on the intensity of the light is achieved. The solar panel will face the sun perpendicularly to absorb more solar energy. Secondly, solar tracking systems generate more output during the hours while fixed solar panel installation generates least power. However, shading effect give a slightly impact for solar panel to produce the output value.

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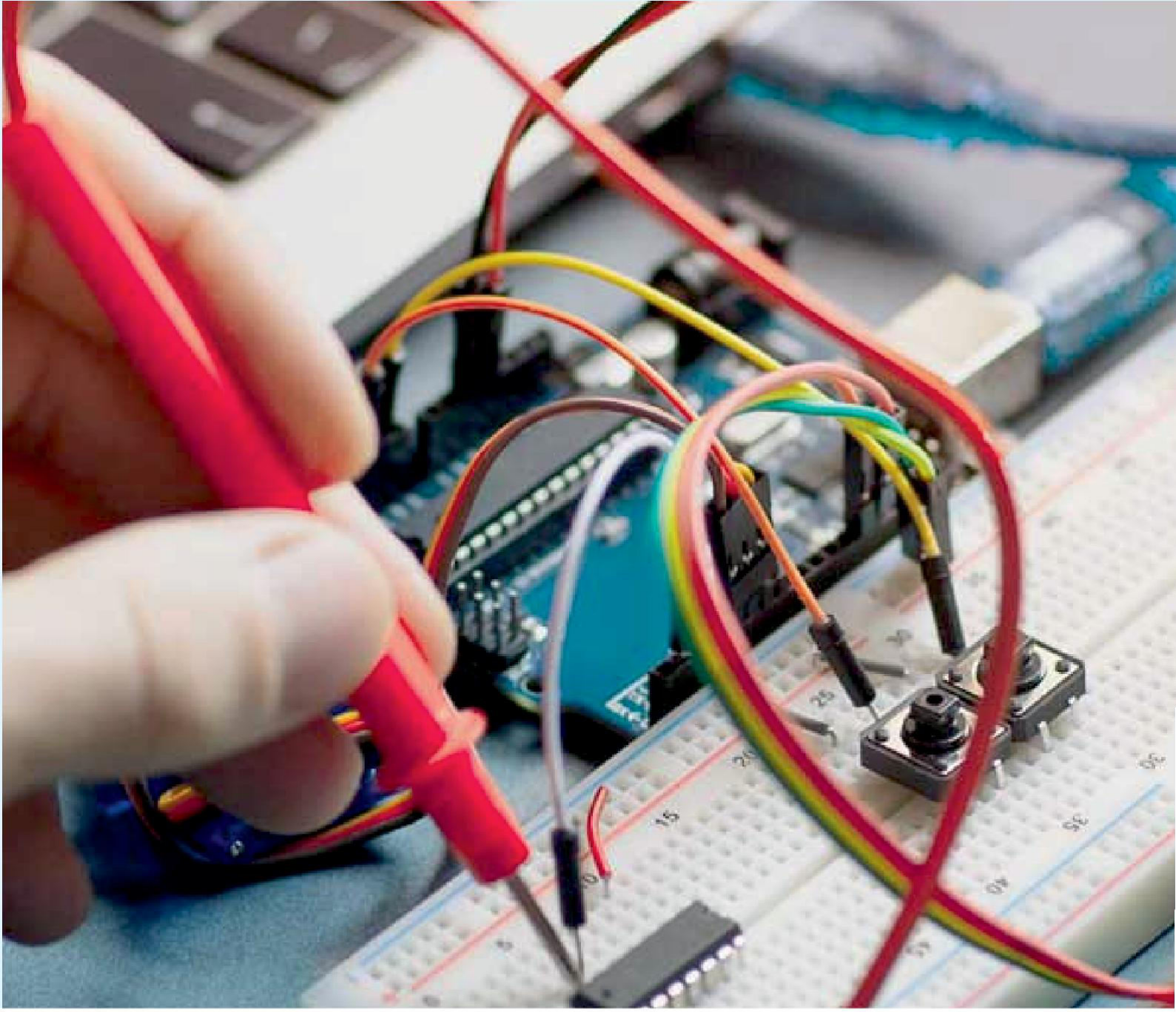

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