"Dual Axis Solar Tracker"

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Abstract: Energy emergency is one of the excellent issues in the third world non-industrial nation like Bangladesh. There is a huge hole among age and request of electrical energy. Almost half populace of the nation is very secluded from this favoring. Sustainable power is the main solution to address this issue. Sun based energy is perhaps the best asset of the sustainable power which could assume a critical part to address this emergency. This exploration presents an exhibition investigation of the double hub sun based global positioning framework utilizing Arduino. The primary target of this exploration is whether a static sunlight powered charger is better compared to sun based tracker or not. This work is isolated into two sections equipment and programming framework. In equipment section, four light ward resistors (LDR) is utilized to distinguish the greatest amount of light source from the sun. Two servo engines conjointly used to move the sun powered charger to greatest light source area saw by the LDRs. In programming part, the code is composed by utilizing C programming language and has focused on to the Arduino UNO regulator. The result of the sun based tracker framework has broke down and looked at with the fixed or static sun powered charger tracked down better execution in terms of voltage, current and power. Accordingly, the sun oriented tracker is demonstrated more viable for catching the most extreme daylight supply for star reaping applications. The outcome showed double hub sunlight based global positioning framework created extra 10.53-watt power contrasted and fixed and single hub sun based global positioning framework.

Keywords: Sun tracking system, Photo module, Microcontroller, Solar energy Technology Stationary.

INTRODUCTION

Presently a day's our socio-monetary development relies upon a ton of electrical energy. Nonetheless, in rising nations, this electrical energy is weakly made due. So we can tackle this issue by utilizing environmentally friendly power. Sunlight based, wind, gas, biomass, water and so forth. wellsprings of environmentally friendly power. Among this sun based power is being overflowing inferable from its non-polluted resources. This sun oriented power is recovered into power for beneficial use. This unrest is finished by double-dealing photograph voltaic switch. Sunlight based chargers are used in imprison the sun powered irradiance. Anyway sunlight based tracker is best than the board since it detects the spot of the world pivots by its tomahawks following the formatter should make these parts, consolidating the material measures that follow. Sun based energy is the primary outfit wellspring of all energy delivered by daylight. The energy of the sun comes to on earth with altogether various beams. An enormous measure of energy is communicated from the sun consistently; inside the earth, we get a small extent of it. The bigger piece of the sun based energy is lost inside the world. It shimmering and exculpate to the whole and that we can never confront the deficiency of sun powered energy like in excess of at least a couple energy. During this work double pivot, sun powered tracker is the principal concentration to discuss. This paper additionally exhibits the sustainable power condition of dealings, completely unique light sensors, some normal worth of sun oriented tracker and so forth. We are going to end with the planned stunts which may be utilitarian for up the sun based energy.

LITERATURE SURVEY

Hossein Mousazadeh et Al., (2011), Journal of Solar Energy Engineering studied and investigated maximization of collected energy from an on-board PV array, on a solar assist plug-in hybrid electric tractor (SAPHT). Using four light dependent resistive sensors a sun-tracking system on a mobile structure was constructed and evaluated. The experimental tests using the sun-tracking system showed that 30% more energy was collected in comparison to that of the horizontally fixed mode.. Four LDR sensors were used to sense the direct beams of sun. Each pair of LDRs was separated by an obstruction as a shading device.

K.S. Madhu et al., (2012) International Journal of Scientific & Engineering Research states that a single axis tracker tracks the sun east to west, and a two-axis tracker tracks the daily east to west movement of the sun and the seasonal declination movement of the sun. Concentrates solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. PV converts light into electric current using the photoelectric effect. Solar

power is the conversion of sunlight into electricity. Test results indicate that the increase in power efficiency of tracking solar plate in normal days is 26 to 38% compared to fixed plate. And during cloudy or rainy days it's varies at any level.

BLOCK DIAGRAM
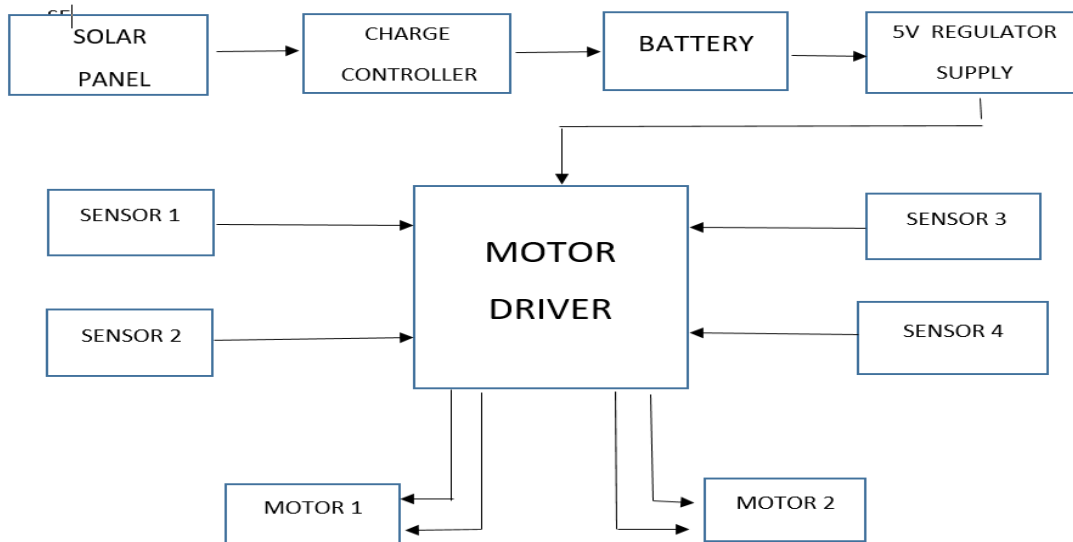
As we see in the block diagram, there are three Light Dependent Resistors (LDRs) which are placed on a common plate with solar panel. Light from a source strikes on them by different amounts. Due to their inherent property of decreasing resistance with increasing incident light intensity, i.e., photoconductivity, the value of resistances of all the LDRs is not always same.Each LDR sends equivalent signal of their respective resistance value to the. The values are compared with each other by considering a particular LDR value as reference.

One of the two dc servo motors is mechanically attached with the driving axle of the other one so that the former will move with rotation of the axle of latter one. The axle of the former servo motor is used to drive a solar panel. These two-servo motors are arranged in such a way that the solar panel can move along X-axis as well as Y-axis.

One servo motor is used for tracking along x-axis and the other is for y-axis tracking. In this way the solar tracking system is designed.

Working Principle

Resistance of LDR depends on intensity of the light and it varies according to it. The higher is the intensity of light, lower will be the LDR resistance and due to this the output voltage lowers and when the light intensity is low, higher will be the LDR resistance and thus higher output voltage is obtained.

A potential divider circuit is used to get the output voltage from the sensors (LDRs).The circuit is shown here.

The LDR senses the analogy input in voltages between 0 to 5 volts and provides a digital number at the output which generally ranges from 0 to 1023.

Now this will give feedback to the microcontroller using the arduinosoftware(IDE). The servo motor position can be controlled by this mechanism which is discussed later in the hardware model.

The tracker finally adjusts its position sensing the maximum intensity of light falling perpendicular to it and stays there till it notices any further change.

The sensitivity of the LDR depends on point source of light. It hardly shows any effect on diffuse lighting condition.

DUAL AXIS MOVEMENT OF SOLAR TRACKER

- · The double hub sun powered tracker is gadget which detects the light and positions towards the greatest force of light. It is made in such a manner to follow the light coming from any heading.
- · To mimic the overall situation of the Sun's development, the complete inclusion of the development of the tracker is considered as 120˚ in both the headings.
- · The underlying place of both the servo engines are picked at 90˚i.e, for east-west servo engine as well with respect to north-south servo engine.
- · The place of the tracker rises or drops just when the edge esteem is over as far as possible.
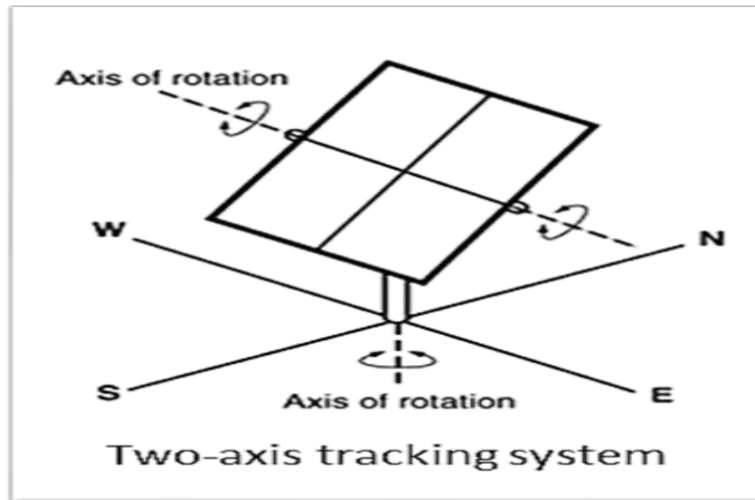
Relation between solar panel misalignment and direct power loss:
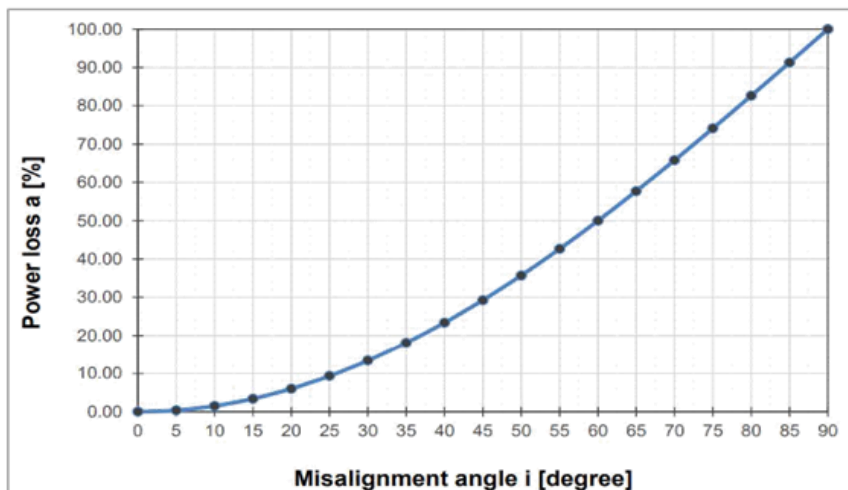
Approximation of power output (red line) compared to maximum output (blue line)for a fix mounted solar module:
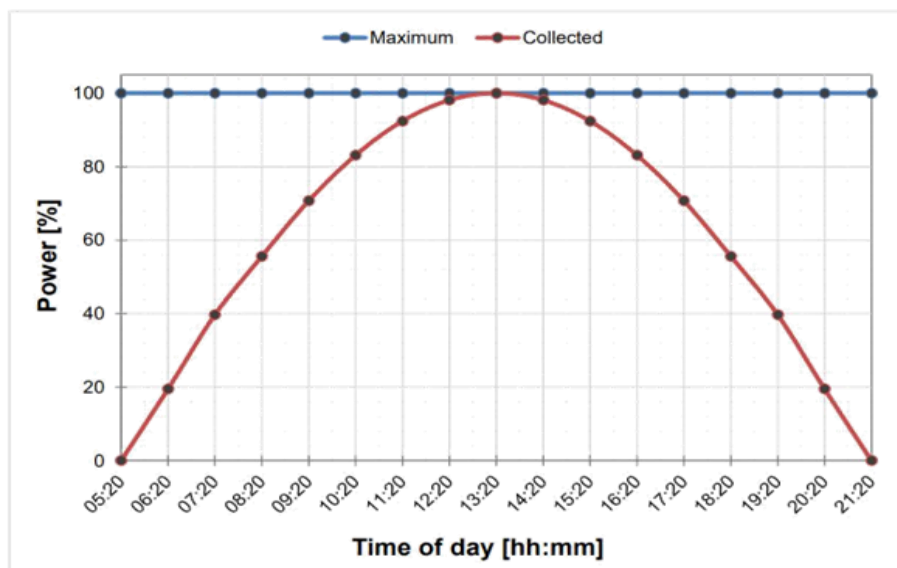
OBSERVATIONS AND RESULT

WHAT WE HAVE OBSERVED....
In this Dual Axis Solar Tracker, when source light falls on the board, the board changes its situation as indicated by most extreme force of light falling opposite to it.
The target of the task is finished. This was accomplished through utilizing light sensors that can distinguish how much daylight that arrives at the sun powered charger. The qualities got by the LDRs are thought about and on the off chance that there is any huge distinction, there is activation of the board utilizing a servo engine to the place where it is practically opposite to the beams of the sun.
This was accomplished utilizing a framework with three phases or subsystems. Each stage plays its own part. The stages were

· An info stage that was answerable for changing episode light over completely to a voltage.
· A control stage that was answerable for controlling activation and independent direction.
· A driver stage with the servo engine. It was answerable for genuine development of the board.

The information stage is planned with a voltage divider circuit so it gives wanted scope of enlightenment for brilliant brightening conditions or when there is faint lighting. The potentiometer was acclimated to cater for such changes. The LDRs were viewed as generally reasonable for this undertaking on the grounds that their obstruction fluctuates with light. They are promptly accessible and are practical. Temperature sensors for example would be expensive.

The last stage was the driving hardware that comprised fundamentally of the servo engine. The servo engine had sufficient force to drive the board. Servo engines are without clamor and are reasonable, settling on them the best decision for the task.

CONCLUSION

In this 21st 100 years, as we develop our innovation, populace and development, the energy utilization per capita increments dramatically, as well as our energy

assets (for example fossils powers) decline quickly. Thus, for reasonable turn of events, we need to think elective techniques (usage of environmentally friendly power sources) to satisfy our energy interest.

In this undertaking, Dual Axis Solar Tracker, we've fostered a demo model of sunlight based tracker to follow the greatest force point of light source so that the

voltage given by then by the sun powered charger is greatest. After a ton of preliminary

and errors we've successfully completed our project and we are proud to invest some effort furthermore, blunders we've effectively finished our venture and we are pleased to contribute some work for our general public. Presently, similar to each and every other investigation, this venture has two or three blemishes.

· Our board detects the light in a detecting zone, past which it neglects to answer.
· If numerous wellsprings of light (for example diffused light source) show up on board, it works out the vector amount of light sources and moves the board there.

This undertaking was executed with insignificant assets. The hardware was kept straightforward, justifiable and easy to use.

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