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SOLAR TRACKING SYSTEM

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Abstract - *As we can see now effect of the global warming earth became a hot s here we can take an advantage from the effect of the global warming we can use energy as an electrical energy to operate an electrical appliance. The problem that we can see now is the most of the solar panel that had been used by a user just only in a one direction. If the solar panel located at east and the sun is located at west. The solar panel cannot be charged so the project that want to develop here is called solar tracking system. Solar tracking system is the project that used AVR microcontroller (atmega16) as a brain to control the whole system. The LDR (Light Dependent Resistor) had been used to sense the intensity of light at 30 degree each or 180 degree total and send a data to the AVR microcontroller. This AVR microcontroller will compare the data and rotate the servomotor in right/middle / left direction. The servomotor rotate the solar panel based on the highest intensity of light and display the output voltage on the LCD. This system is suitable to be used in home or small factories that want to save their budget for long term.*

Key Words: LDR, Solar panel, servomotor, AVR microcontroller.

1. INTRODUCTION

Sun is the essential source of energy. It is the renewable source of energy and it is free of cost. Now a days fossil fuels are limited. Fossil fuel are costly and they causes lots of pollution as compared to sun energy. As we know that sun energy is free of cost and does not cause any kind of pollution. To avoid this drawbacks of fossil fuel we use solar energy. Solar energy is becoming an important energy source as petroleum based resources become more expensive. Solar energy is now abundant and solar technology is growing as more and more people put solar energy to work.

Previous type of solar tracking system was fixed system. Solar panel which are used in this systems are only in one way direction. And this system generates low power at the output. As we can see there are many problem that occurs in the previous solar system. To overcome these drawbacks solar tracking system is used. Solar tracking system can detect a 180 degree of rotation so panel can generate high power at the output. It can store more energy.

This project use 3 sensors in a three direction to sense the direction of maximum intensity of light. Its sensor will face 30 degree so the total angle that the system can sense is 180 degree. This system will use AVR microcontroller as a brain to operate this system and servomotor to rotate the solar panel. And the angle/direction of solar panel will be shown on the LCD.

Sun light emits sun rays. Then LDR sensor detects the sun rays. And give the information to AVR microcontroller. Then AVR microcontroller compares the intensity of light. As if the {LDR1 > LDR2} then it rotates to right direction. And if {LDR2>LDR1} then it rotates to left direction. And it gives the command to servomotor. And as per the instructions servomotor moves the panel to left or right. The project output voltage is displayed on the LCD.

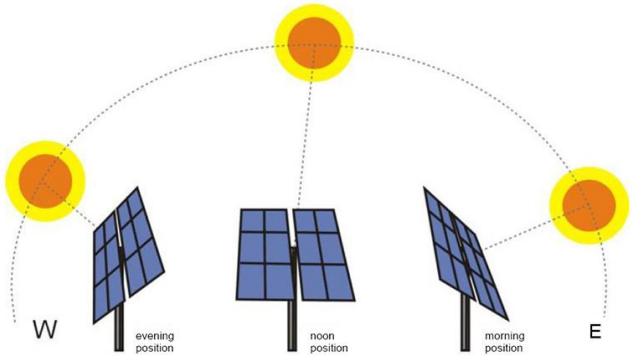

Fig -1: solar tracking system

1.2 Objective of Project:

The main objective of project is to rotate solar panel through the LDR by using servo motor. We have proposed solar panel to control the panel that it should face the sun till it is present in a day.

2. Analogy

Table below shows the parameter of solar tracking system & previous type of solar system.

Table -1: Comparison of solar tracking system and previous type of solar system..

Parameter	Solar tracking system	Previous type of solar system
Type of circuit	Simple	complex
Direction of sensor	30 degree from east to west(180 degree total)	45 degree from east or 45 degree from west
Output power	High	Low
Type of microcontroller	AVR (atmega16)	Intel8051

3. Scope of the project:

This project is focused to design and build the solar tracking system that would be starting point to build realistic solar tracking system move 30 degree each and total movement that is system can do is 180 degree using AVR microcontroller , LDR and using LCD to show the direction/ angle of the solar panel.

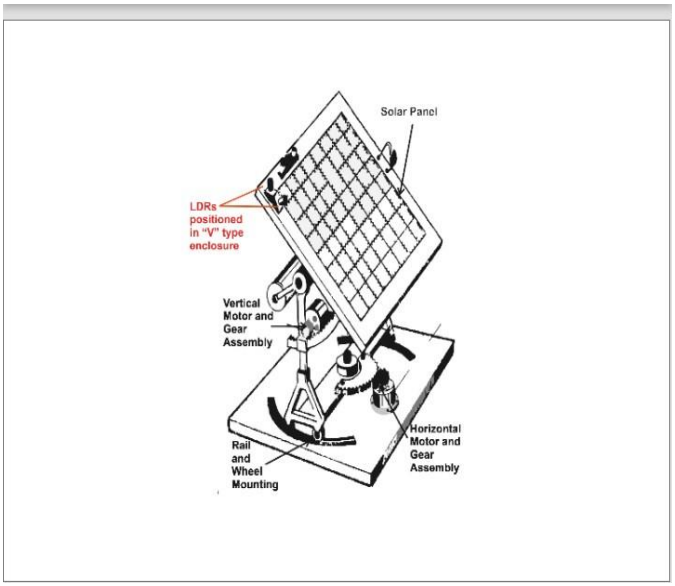

Fig -2: The principal building blocks of Solar tracking system

3.1 Proposed Work

The proposed plan of action of this project is to make a system working on solar energy. This model should effectively be able to track sun position through solar panel. The system block diagram to be used in this project is as follows.

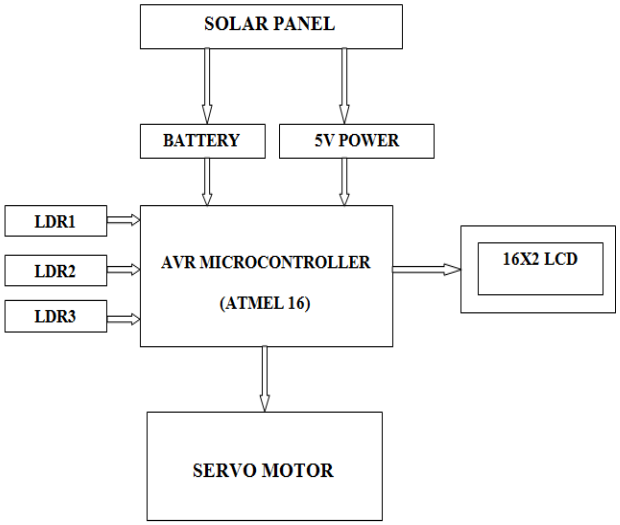

Fig -3: solar tracking system

Solar tracking system automatically detects the position of sun and track its position in the sky using solar panel when the sun moves from east to west. LDR which is present on the solar tracking system detects the rays of the sun and helps the solar panel to move with sunrays from east to west. This LDR's are placed on the three sides. Right side, left side, and at the middle. Which helps the panel to detect and rotate the panel accurately. Servomotor moves in perfect direction and gives accurate angles for panel to detect. This panel is moved with the help of servomotor. Solar tracking system has capacity to store more electric power than regular solar system. These accurate direction of the panel and voltage of electricity is displayed on the LCD.

3.2 Flowchart:

The work flow of the project is as follows

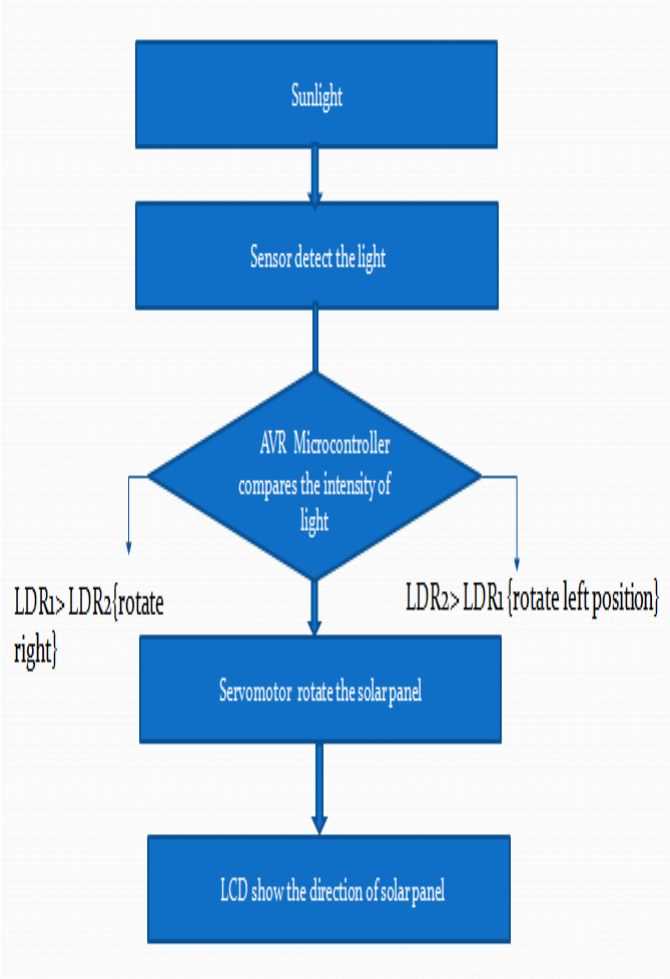

Fig -4: flow chart of solar tracking system

4. Advantages:

- It Reduces Human errors.
- Human power requirements are less.
- It saves more power.
- It requires less time.
- Cost effective and time efficient.
- Installation is easy.
- Consumes less energy and is more efficient.
- Increases the overall efficiency of the system.
- Facilities can operate with little maintenance or intervention after initial setup.

5. Disadvantages:

- Solar trackers are slightly more costly than their stationary counterpart
- Trackers are a more complex system than fixed tracking.
- Solar trackers are generally designed for climates with little to no snow making them a more viable solution in warmer climates

6. Applications:

- Used by the solar monitoring stations.
- Used by the people working in mines for monitoring cracks.
- Used by the Process control industry.
- Used by the High voltage labs.
- Used by the Wild life researchers.
- Used in the Distributed control systems& R&D industries.

7. CONCLUSION

- Using concept of solar tracking system. System detects the position of sun and keep vertical contact between solar panel and sunlight.
- And it is used to increase the efficiency of solar panel.
- This project aims to track the sun till the sun is up and generate electricity as per the need.

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