PREMIER UNIVERSITY

COMPUTER SCIENCE & ENGINEERING

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COURSE CODE:: CSE 482 Section:C

NAME:: Solar Panel Moving and Power Monitoring System Using IOT

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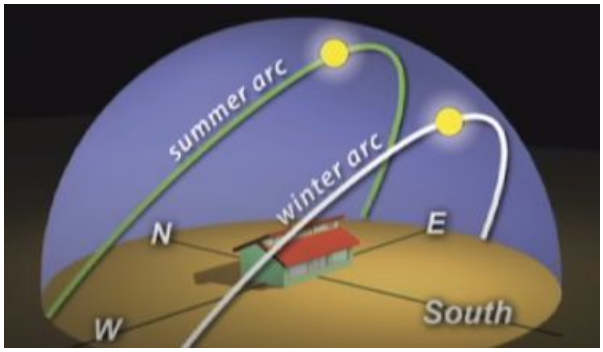
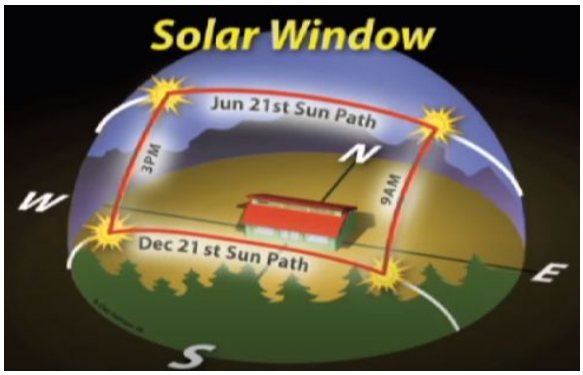
REMARK

Introduction:Solar power plants need to be monitored for optimum power output. This helps retrieve efficient power output from power plants while monitoring for faulty solar panels, connections, dust accumulated on panels lowering output and other such issues affecting solar performance.So here we propose an automated IOT based solar power monitoring system that allows for automated solar power monitoring from anywhere over the internet.And Our Solar panel can be (0-180)Degree .Thats helps to get more power from solar.Maximizing output from solar system increases efficiency.Presently solar panels are of fixed type which lower the efficiency.

.Maintaining vertical direction between light and panel maximizes efficiency. Solar tracking system has 35% higher generating power than fixed.Solar tracking system based on PLC can adjust automatically
orientation of panel.Using the Internet of Things Technology for supervising solar power generation can greatly enhance the performance, monitoring and maintenance of the plant. With advancement of technologies the cost of renewable energy equipment is going down globally encouraging large scale solar plant installations.

Problem Of Today Solar panel System :Most of the solar panel are one sided.Single axis trackers.Single axis solar trackers can either have a horizontal or a vertical axle.
That makes a problem in the morning and evening this time panel cannot get proper power from the sun. Another problem in the Winter seasons . And It can not moving as much needed.





Difference in Summer and winter Sun Moving

Our System: Double axis solar trackers have both a horizontal and vertical axis It can track the Sun's apparent motion exactly anywhere in the world.And Solar power can to be monitored for optimum power output.

1.Increase Solar Panel Output 2
2.Max.efficency of the panel
3.Maximize Power per unit Area
3.Able to grab the energy throughout the day
4.Monitor power anywhere in the world.
5.Can control anywhere in the world.

COMPONENTS USED

- Arduino UNO
- Solar Panel
- Raspberry Pi 4
- Voltage Sensor
- Current Sensor
- Resistors
- Cables & Connectors
- Servo Motor SG90

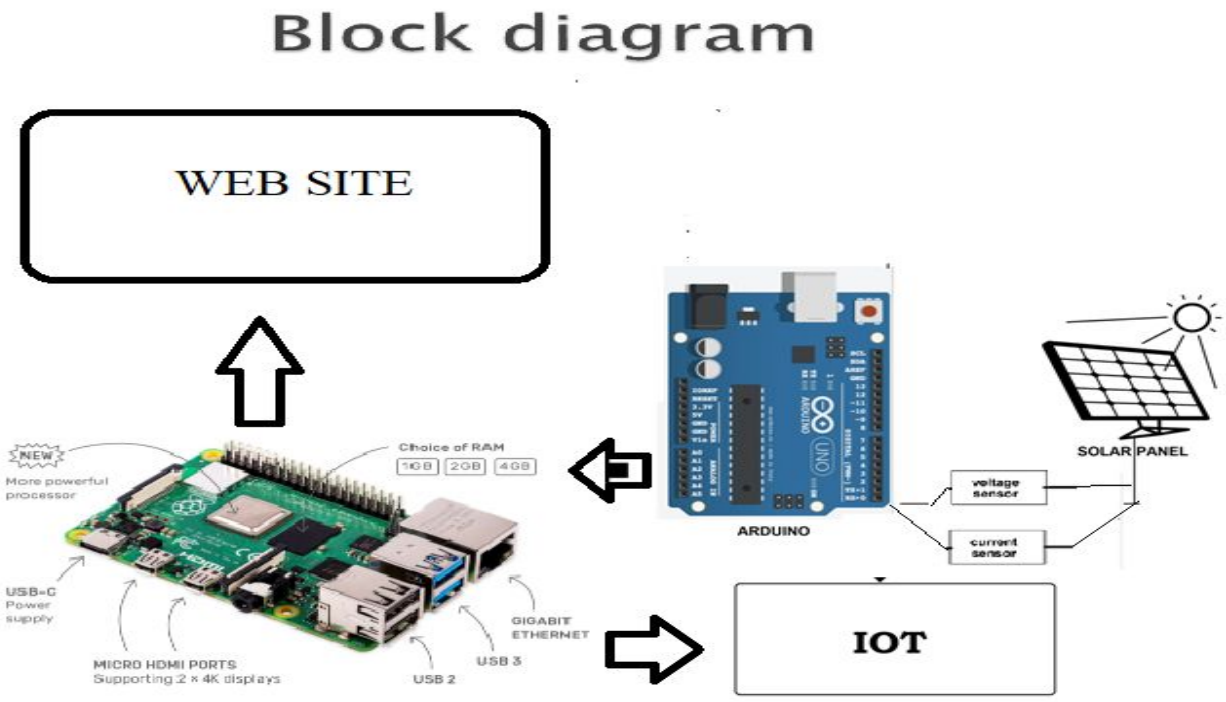


Fig :Block Diagram

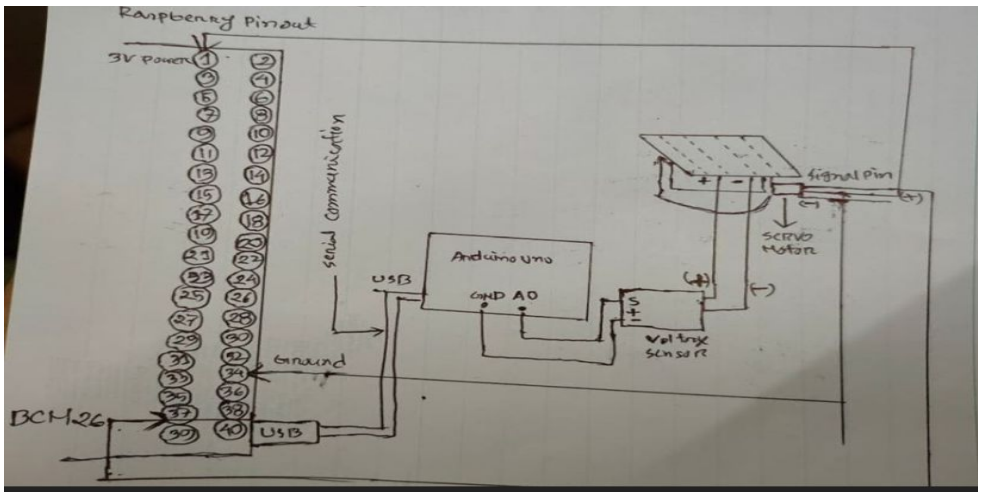


Fig :Circuit Diagram

CIRCUIT DESCRIPTION

CIRCUIT CONNECTIONS:First of all setup solar panel and its positive and negative connected to the voltage sensor and current sensor .And then its voltage and current read by Ardino . And Setup this solar panel to the servo .Herer Two servo are use to moving the solar panel. And connected the servo to Raspberry Pi 4.There are a lot of ways to use Raspberry for communication. Some may use it to send / receive data online or regularly upload data. Its just show you how can we communicate to Arduino wirelessly using website..Also Pass the data to the Raspberry . After that Raspberry pi sends all data to the web host .In web hosts it receives those Data and stores MY SQL database.For Design and Development its using HTML,CSS,JAVASCRIPT,PHP. Horizontal Value are Degree of the solar panel.This json file are use to Horizontal valu.And then it can monitor and moving the solar palen

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After any of voltage or current we find the power:Ohms Law and Power

To find the Voltage, (V) [V = I x R] V (volts) = I (amps) x R (Ω)

To find the Current, (I) [I = V ÷ R] I (amps) = V (volts) ÷ R (Ω)

To find the Resistance, (R) [R = V ÷ I] R (Ω) = V (volts) ÷ I (amps)

To find the Power (P) [P = V x I] P (watts) = V (volts) x I (amps)

Machine Learning: We can not do this right now. But will work for this .We will use “Time series analysis” for this Power voltage ,and current. Our plan to get which time and which angle we can get more power from the solar panel.Thats helps to get more power and use this sun energy properly .And forcusting the power.

In time Series analysis we divided the power into Three column in Hourly basics in Open,High,Low,Close.Use those data use for forecasting and analysis which time we get better power.

Time	Open	High	Low	Close
7:00 AM	142.9	144.75	142.9	144.18
8:00 AM	143.02	143.5	142.41	142.73
9:00 AM	143.69	144.79	142.72	144.09

APPLICATIONS: The internet of things has been considered the third revolution in digital technology after the computer and the internet. The application of IoT in the solar power monitoring system is vast.

• IoT utilizes computing facilities and software systems for information processing and knowledge digging.

• Using IoT Human to machine and machine to machine information exchange and seamless linkage of information flows can be achieved in the solar power monitoring system.

• Using IoT in the solar power monitoring system; real time control, accurate management and intelligent decision making of the physical world can be made. Other applications of the solar power monitoring system are in :

• Rooftop Solar, Ground mounted Solar, Solar cities, Smart villages, Micro grids and Solar Street lights.

• Consumer Products like solar water heating systems; Solar home lighting systems; solar lanterns; solar pumps; solar mobile chargers; solar cookers; LED solar torch; solar RO plant; solar fan, solar Inverters, etc. can be monitored through this project.

• Commercial Products like Solar traffic signals, solar road studs/blinkers are also to be monitored through the proposed system.

CONCLUSION

Implementing Renewable Energy technologies is one recommended way of reducing the environmental impact. Because of frequent power cuts it is important to use renewable energy and monitor it. Monitoring guides the user in analysis of renewable energy usage. This system is cost effective. The system efficiency is about 95%. This enables the efficient use of renewable energy. Thus it is reducing the electricity issues. It is an ideal solution to increase efficiency of plant monitoring.The invention of Solar Tracking System helps us improve the performance of PV solar system in a simple way Used relative method of sunlight strength.Established a model of automatic tracking system to keep vertical contact between solar panels and sunlight.

• Presentation of consumption.and Recommended consumption.

• Improved the utilization rate of solar energy and efficiency of power generation system

.• Automatic and intelligent control.

• Visualization of live data.

Bangladesh, where frequent power cuts are very common. Due to which it is important to use renewable energy and monitor it. By monitoring the energy forecast, households and communities using solar power can time their energy production and consumption during good weather. Application of Smart Solutions such as this Solar Power Monitoring System using IOT will enable cities to use technology, information and data to improve infrastructure and services. Comprehensive development in this way will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive Cities.

Project Video https://bit.ly/2CqGytj