AUTOMATED SOLAR IRRIGATION SYSTEM

[1]Chandana T C,[2]Deepika N, [3]Ayesha Begum M, [4]Darshini N, [5]Chaithra M H

[1234]School of C&IT, REVA University, Bengaluru , Karnataka, India

[5]Assistant Professor, School of C&IT, REVA University, Bengaluru , Karnataka, India

chandana6615@gmail.com , deepikan125@gmail.com , ayeshasonu3333@gmail.com , darshinidacchu.n@gmail.com,

Corresponding author : chaithra.mh@reva.edu.in

Abstract - Automated Solar Irrigation System is planned and manufactured. This framework traps free vitality from the sun and stores it in the battery and afterward changes over this sustainable power source to the rotating current. It makes vitality usable in farming field to siphon the water through siphon. The Solar Irrigation System vitality water system framework can be feasible option for ranchers in the ebb and flow condition of the vitality emergency in India. So the Automated Solar water system framework is utilized in horticulture field, sunlight based vitality is utilized to produce power, contingent on the dirt sort water is given to the plants. These days, for water system various methods are utilized to build the yield of harvests. In our task, pivoting sun based board is utilized to watch the sun powered vitality to create the power, and furthermore temperature and mugginess sensors are set close to the plants and this sensor data are transmitted to LED. This information is shown on the LED Display. This framework is intended to detect the earth of the field to water the harvests. Any mistakes at programming and equipment will be controlled and dispensed with. Our framework is tried for its constant responsiveness, dependability, security and solidness, our framework is intended to be impervious to climate, temperature and some minor mechanical anxieties.

Keywords:— *Rotating Solar Panel, Arduino, Servo Motor, Power Supply, LDR, Sensors, Display.*

I. Introduction

Solar energy : Sun powered vitality is most flourishing inventory of vitality inside the world. Sunlight based innovation involves a striking part in the advancement of intensity age, taking into account that the sun is the wellspring of inexhaustible wellspring of vitality. Sun based force is caught utilizing sunlight based board[2]. These procedures are eco-accommodating and inexhaustible; consequently it is protected wellspring of vitality. Since Solar board is fixed at one point, the zone of presentation to daylight is less that restricts the effectiveness of nearby planetary group. In this manner, at present days creating turning sun oriented board at decreased expense with expanded effectiveness is significant in the field of Irrigation framework.[1] Our venture has been planned keeping this in view to make the retention of sun oriented vitality increasingly proficient.

Motivation

For persistently expanding request of nourishment, power supply and furthermore expanding an Earth-wide temperature boost, it is imperative to utilize environmentally friendly power vitality effectively in the creation of nourishment. Vitality request in rural field has expanded in the ongoing years. Henceforth, there is a pressing requirement for better sun oriented boards to be created to saddle immense measures of electrical sunlight based vitality in huge scope to provide food for the regularly developing force request. Of concern also is the decrease in the ecological contamination

because of utilization of petroleum products. To build a financially savvy, effective.

II. Literature Survey

Our rotating solar panel is used to locate the position of the sun automatically as the day runs by. The position of the sun varies as the sun moves across the sky. Rotating solar panel can increase the efficiency of the solar powered equipment at any fixed position. One of those rotating solar panel is identified by Swapnali B. Pawar[3] , [1] Prithvi Rajput and Asif Sheik that is Smart Irrigation System using IOT and Raspberry pi in the year 2018 and it is overcome by using aurdino uno and non IOT based project since all farmers are not convinent use IOT.

In the same year that is on 2018, S Khandrel A [4]. and P Raut wrote a review on Solar based irrigation system identify the problem of inefficient usage of solar energy and our project is overcoming this problem by making use of rotating solar panel which increases the efficiency by tracking the position of the sun. In the year 2019 Ashraf Zaher, Hidab Hamwi, Aisha Aimas, Salma Al-Baitamouni and Mouna Al-Bathal[5] wrote a paper on Automated Smart Solar Irrigation System which makes use of GSM module and it is overcome as we are not using GSM Module to make our compact and simple thereby reducing the cost.

III. Problem statement

A Solar tracking devices has a huge application to improve harnessing of solar isolation. The problem posed thus is to implement a system that is capable of improving the efficiency by 30-40%. An Aurdino Uno is used to implement the controlled circuit which in turn positions a motor used to orient the solar panel optimally.

IV. Objectives

Considering power supply as a basic component of country advancement and nourishment security, the time has come to settle on shrewd options in water system that limits a worldwide temperature alteration and furthermore the expanding request of vitality. The undertaking looks to fulfill the accompanying targets.

1. Design a framework to follow sun based UV light for sun powered boards.
2. Independence against the troublesome climate conditions that remember tension for the populace.
3. Establishment of a serious and expanded farming on account of the heaviness of this part in the national economy.
4. Accurately recognize and measure the idea of the dirt.
5. Independence against the expanding cost of oil and gas.
6. Encourage individuals to begin utilizing sustainable power source which costs less and don't dirty.

IV. Details description about the components

1. Arduino
Arduino Uno is a microcontroller board dependent on the ATmega328P It has 14 advanced info/yield, 6 simple information sources, a 16 MHz quartz gem, a USB association, a force jack, an ICSP header and a reset button. It contains everything expected to help the microcontroller; just associate it to a PC with a USB link or force it with an AC-to-DC connector or battery to begin.

Fig : 1- Arduino Uno – microcontroller

2. Servo Motor

 A servo engine is utilized to pivot or push an article at specific point with some separation which is a fundamental piece of our undertaking.

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97

Fig : 2 - Servo Motor

3. Solar Panel

Fig: 3 - Solar Panel

A typical solar system consists of solar panels (which retain daylight), inverter (which changes over dc into ac), mounting structure (that hold the boards set up), batteries (to store the additional force produced), lattice box and equalization of frameworks (wires, nuts and so forth.)

4. LDR

LDR light sensors were used to sense the intensity of the solar light occurrence on the PV cells panel, in our system we are using 2 light dependent resistors.

Fig : 4- Light detection resistors

5. Temperature and Humidity Sensors

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. As temperature measures the surrounding heat in specific units. Its airly simple to use, but requires careful timing to grab data.
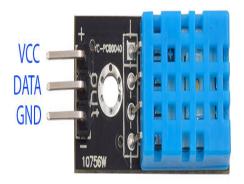

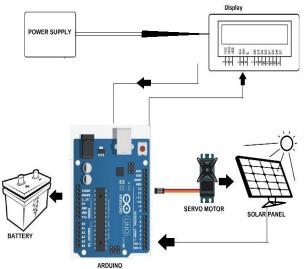Fig : 5 - Moisture Sensor

V. System Design

Fig : 6 - Architecture of Rotating System

Rotating solar panel using arduino aims at charging a 12V DC battery with the help of a solar panel mounted on platform which can rotate with the help of a motor .This motor is getting controlled by microcontroller mounted on an arduino uno board. The two LDR's are placed at the two sides of solar panel and the Servo Motor is used to rotate the solar panel.

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98

The servo will move the solar panel towards the LDR whose resistance will be low, mean towards the LDR on which light is falling, that way it will keep following the light. And if there is same amount of light falling on both the LDR, then servo will not rotate. The servo will try to move the solar panel in the position where both LDR's will have the same resistance means where same amount of light will fall on both the resistors and if resistance of one of the LDR will change then it rotates towards lower resistance LDR.

V. Implementation

Flow Chart
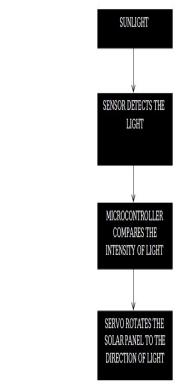

Fig: 7 - Flow Chart of Rotating System
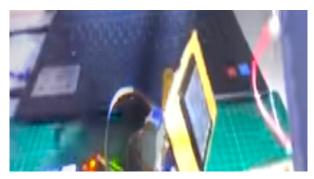
Working of our system

- In our project system two sensors are used to test the soil content in dry and wet condition.
- These two sensors send the digital information that whether the land requires water or not.
- LDRs serve as sensors to detect the intensity of light entering the solar panels.

- The Arduino sends the output signals for the servo motor whether to rotate the in Anticlockwise or in Clockwise direction.
- The motor will controls the direction of solar panel on the mounting structure.

VI. Results

VI. Applications & Advantages

Applications
- Solar Power may be stored and used by farmers for House hold purpose.
- The Agriculture livestock watering/crop irrigation home gardens and drip irrigation systems.
- It can be used for cultivation purposes
- It can be used to provide water in nursery planting area.

Advantages
- Solar Power irrigation system reduces the cost for water pumping in the long run.
- They are independent from volatile fuel prices and costly and unreliable fuel supplies.
- It has the potential for increasing agricultural income and productive due to improved access to water.
- Time saving due to replacement of labor intensive manual irrigation, which can lead to other income generating activities.
- It also has the income diversification due to multiple uses of energy (e.g. feed-in to lighting, grid, cooling) and water (e.g. domestic uses livestock watering).
- Long time working.
- More production, More Income
- The pond water management and water transfer.

VIII. Conclusion

An automated solar irrigation system benefits are numerous. With the ability to pump water for irrigation during dry and sunny weather in regions that need it most, rotating solar panel using arduino can be easily installed and enabled the pumps to work in wells of very low yields, offering a longer life span and plenty of energy in the long run. The system requires minimum maintenance and attention as they are self starting. Further enhance we can implement using daily pumping rates tracking.

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2ⁿᵈ International Conference on
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100