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# Self-Orienting Solar Panel

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ABSTRACT

As our nonrenewable sources are getting exhausted, and fuel prices are reaching the sky. Using solar panels is one of the ways by which we can use renewable energy, as solar energy is abundant in nature. The efficiency of the solar panel will increase as solar panel is aligned according to the position of the sun.

Keywords:Solar panel, Self-orienting, Time dependent, Microcontroller, Real time clock.

## 1. Introduction

We all know that solar energy is abundant in nature, using this infinite energy is the handiest way of employing renewable energy source. By which we'll be moving towards an eco-friendly energy production and towards sustainable future.

To extract maximum solar power, we are aligning the solar panel to the position of the sun as per the time using RTC module. By this we'll be completely automating the method of positioning the solar panel using servo motors which is in term connected to Arduino nano by which we'll be extracting 30-40% more solar energy.

## .2.Literature Survey

The paper says about single axis and azimuth altitude dual axis solar tracking systems, which tracks the sun in all direction ie.360degree Design Using LDR's, these LDR's (light detecting register) detects the sun depending upon the light emitted by the sun and the dual motors present the underneath solar panel moves the panel accordingly, using inputs from Arduino uno.[1]

Thermographic Image Processing Application in Solar power, this needs a separate thermal processing unit which senses the heat of the sun exactly and positions the solar panel accordingly, and has a high efficiency of 96%, but only boon to this project is that the cost of this experiment is too high because it requires a processing unit and thermal scanner.[2]

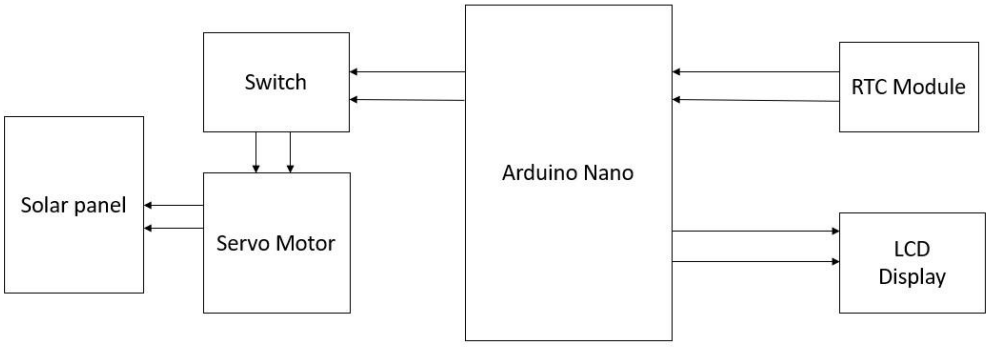
Solar panel has a particular point at which maximum solar energy is exerted by the sun, this point is termed as MPPT (maximum power point tracking) and this point is calculated by using algorithm based on Fuzzy Logic Controller even **this project requires**

a processing unit which processes the real time algorithm and notable disadvantage of this is that it doesn't take real time weather into account. [3]

The Solar panel rotates along the axis of the sun i.e., it rotates from east to west from morning to evening, the microcontroller takes input from the LDR's and also the DC motor rotates accordingly but the important drawback of this project is that, to urge the pricise position of the sun the amount of LDR's must be more . [4]

## 3. System Working

### 3.1 Block Diagram



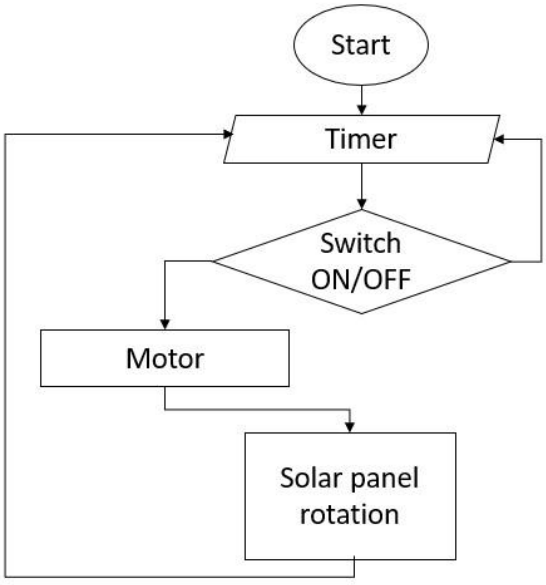

### 3.2 Working

The circuit consists of Arduino nano microcontroller, RTC module, Servo motor ,16*2 LCD display.The Arduino nano microcontroller acts as the brain to the complete project. The Arduino nano is based on It is based on the ATmega328 8-bit microcontroller. Arduino Nano incorporates a total of 36 pins. out of these 8 are analog input pins and 14 digital input/output pins (of which 6 can be used as PWM outputs).The RTC (Real Time Clock) module comes with its own battery backup up to 1year,Servo motor to rotate the solar panel, LCD display to display time.

As per time given by the RTC module to Arduino nano, the Ardino nano will start the servo motor at given time(say 7am) which in tern rotates the solar panel ie.. from 30degree angle and ends at 140 degree angle , the sun moves 1 degree for every 4 minutes, hence the panel also rotates 1 degree for every 4 minutes. After reaching the end at 140 degree the solar panel will stay at end position until the starting time (ie.,7am) and returns back to initial point and start working again.

If its rainy outside and if we don't want to waste power in rotating the solar panel, we can just switch of the button, which will stop rotating the panel, and when its sunny again after a while we can just switch on the button. The Arduino present will take input from the RTC module and skip the time wasted and positions the panel at which it needs to be at that time.

### 3.3 Methodology




### 4 Conclusion

The goal of this project is to extract more solar energy compared to ordinary solar panel by simply automating the solar panel to rotate according to time. As the solar panel is parallel to the sun it will be extracting 30-40% more solar energy. By this project we will be moving a step towards renewable source. Which is not only good for the earth but is also important to us.

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