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Sun Light Tracking Solar Panel Using Arm Processor Microcontroller and LDR Sensors

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1. ABSTRACT:

In this article, aubade-tracking is a solar panel using an arm processor microcontroller In this development technique for the Solar global positioning framework, time is likewise included for the pivot of aubade-oriented boards as indicated by dayeffulgence bearing. A constant clock is utilized to keep data continuous during the day. With the assistance of a continuous clock and microcontroller, the Solar global positioning framework turns off consequently in the evening. Continuous clock use time data during the day and season. Season data is likewise used to keep thought regarding the pivot of the aubade. With the assistance of this data aubadeeffulgence-based boards pivot as indicated by the turn of the aubade. The Aubade-oriented board assimilates the energy from the Aubade, changes over it into electrical energy, and stores the energy in a battery. This energy can be used when required or can be utilized as an immediate option in contrast to the matrix supply.

keywords: Solar Panel, Servo Motor, LDR Sensor, Arm Processor Microcontroller, ADC

2.INTRODUCTION

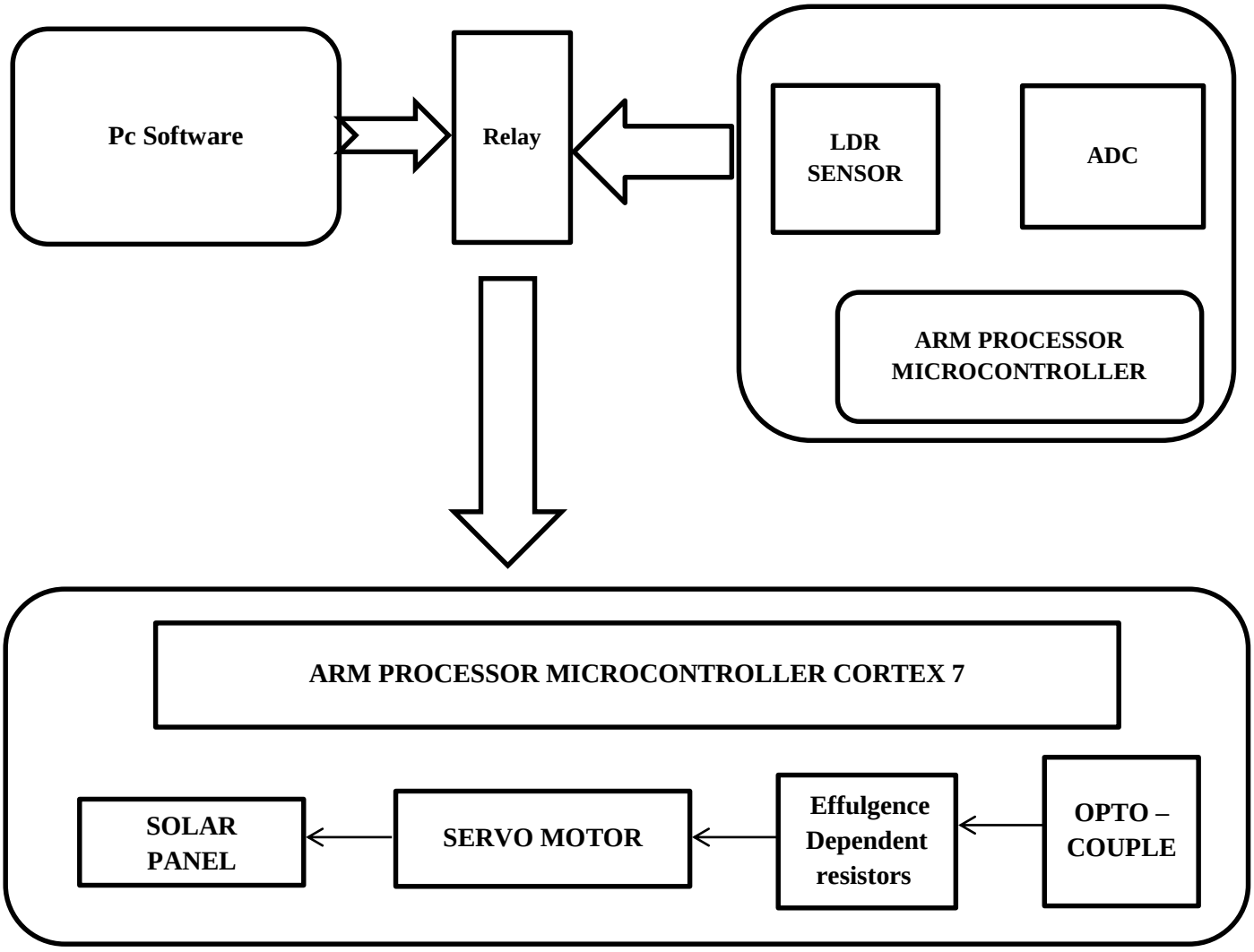
Nowadays As the non environmentally friendly influence assets are diminishing, utilization of sustainable assets for creating influence is expanding. Aubade-based boards are getting more mainstream step by step[1]. Aubade-based board ingests the energy from the Aubade, changes over it into electrical energy, and stores the energy in a battery[2]. The position of the Aubade concerning the aubadeeffulgence-based board isn't fixed because of the turn of the Earth. For a proficient use of solar influence-ended energy, the Solar boards ought to retain energy to a most extreme degree. [3]This should be possible just if the boards are consistently positioned towards the heading of the Aubade. Along these lines, anaubade-oriented board ought to persistently pivot toward Aubade[4]. This article portrays a circuit that pivots anaubade-influenced skillettwoeffulgence ward resistors are masterminded on the edges of the aubade-oriented board. Effulgence needy resistors produce low obstruction when effulgence falls on them[5] The servo contrivance associated with the board pivots the board toward Aubade. Board is masterminded so that effulgence on two LDRs is thought about and the board is pivoted towards LDR which has focused energy for example low opposition contrasted with others[6]. The servo contrivance pivots the board at a certain point. At the point when the force of the effulgence falling on the right LDR is more[7] the board gradually moves towards the right and if the influence on the left LDR is more, the board gradually moves towards the left. In the early afternoon[8]Aubade is ahead and the influence of effulgence on both the boards is the same. In such cases, the board is consistent and there is no revolution.[9] The aubadeeffulgence-based board utilized in this venture is a little 6V board with a little yield of 100mA. The yield of this aubade-oriented board won't be a steady 6V however it may vacillate somewhere in the range of 5V and 7.5V (according to its information sheet)[10].This voltage is given as a contribution to the TP4056 Li-Ion Battery Charging Module, whicWith various aubade-influenced charge regulators, you get an

alternate flow rating[11], which educates you concerning the greatest electrical burden it can deal with. While some aubade-influenced energize regulators may support 20 amps of current, better models may uphold 40 amps of greatest current[12].h in this situation goes about as a Solar Charge Controller. The contribution to TP4056 can be in the scope of 4V to 8V (which is the scope of the yield of the aubadeeffulgence-based board)[13]. TP4056 at that point charges the battery from the aubadeeffulgence-based force itself. Assuming you just need to charge the batteries, this is adequate[14]. Be that as it may, since our undertaking likewise needs to charge a Mobile Phone, we need to have a 5V yield and the yield of the 18650 Li-Ion batteries is just 3.7V.[15]

3.COMPONENTS REQUIRED

- The solar panel (as per need)
- arm processor microcontroller (cortex 7)
- Effulgence Dependent Resistor (LDR) x 4
- 30KΩ x 3
- Servo Motor x1
- 32MHz Crystal
- 66pF Ceramic Capacitors x 4
- Push Button
- pc board
- Cardboard
- Connecting Wires
- motor drive Ic
- Electrolytic capacitor – 670 of

4.BLOCK DIAGRAM



5. METHODOLOGY AND MATERIALS

5.1Arm Processor Microcontroller Cortex 7

ARM7 processor is generally utilized in implanted framework applications. Likewise, it is an equilibrium among exemplary just as new-Cortex succession. This processor is gigantic in finding the assets existing on the web with great documentation offered by NXP Semiconductors. It suits totally for an understudy to get in detail equipment and programming plan implementation. The LPC2148 is a 16 bit or 32 bit ARM7 family-based microcontroller and accessible in a little LQFP64 bundle. ISP (in framework programming) or IAP (in application programming) utilizing on-chip boot loader programming. On-chip static RAM is 8 kB-40 kB, on-chip streak memory is 32 kB-512 kB, the wide interface is 128 bit, or the gas pedal permits 60 MHz fast activity. It requires some investment for eradicating the information in the full chip and 1 millisecond time for 256 bytes of programming.

5.2Relay

A Relay is an electromechanical gadget that can be utilized to represent the deciding moment of an electrical association. It comprises an adaptable moving mechanical part that can be controlled electronically through an electromagnet, essentially, a hand-off is similar to a mechanical switch yet you can handle it with an electronic sign rather than physically turning it on or off.

5.3Analog to Digital Convertor

An ADC changes over a persistent time and ceaseless plentifulness simple sign to a discrete-time and discrete-adequacy computerized signal. The change includes quantization of the information, so it essentially presents a limited quantity of blunder or commotion. Besides, rather than consistently playing out the transformation, an ADC does the change intermittently, inspecting the info, restricting the permissible data transfer capacity of the information signal

5.4LDR Sensor

AnEffulgence Sensor produces a yield signal showing the force of effulgence by estimating the brilliant energy that exists in an extremely restricted scope of frequencies essentially called "effulgence", and which ranges in recurrence from "Infra-red" to "Obvious" up to "Bright" effulgencerange.Aneffulgence sensor is a detached gadget that converts this "effulgence energy" regardless of whether obvious or in the infra-red pieces of the range into an electrical sign yield.

5.5Servo Motor;

A servo contrivance is a kind of contrivance that can pivot with extraordinary accuracy. Ordinarily, this sort of contrivance comprises a control circuit that gives input on the current situation of the contrivanceshaft, this criticism permits the servo contrivances to pivot with extraordinary accuracy. If you need to pivot an item at some particular points or distance, at that point you utilize a servo contrivance. On the off chance that the contrivance is controlled by a DC influence supply, it is called a DC servo contrivance, and assuming it is an AC-fueled contrivance, it is called an AC servo contrivance

5.6Opto-Couple

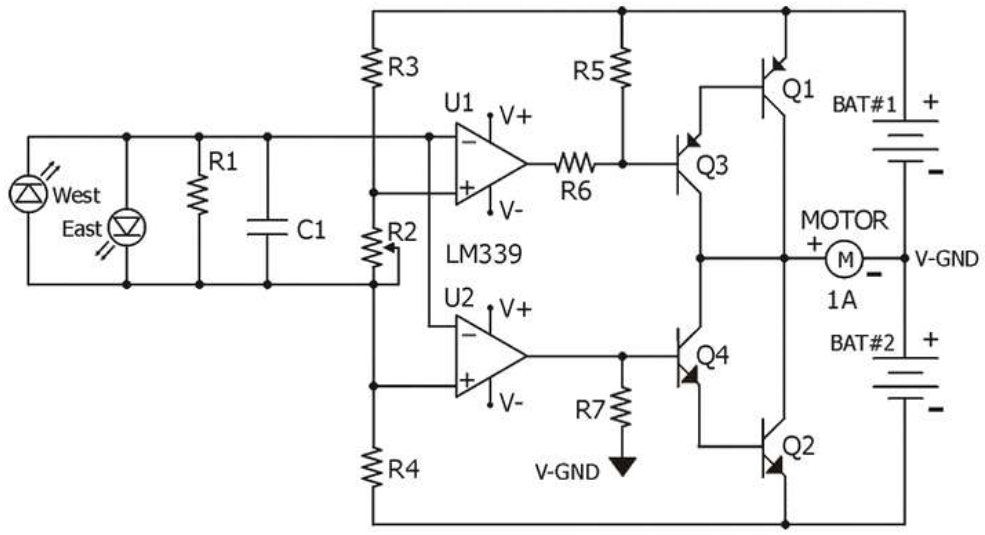
An optocoupler (additionally called optoisolator) is a semiconductor gadget that permits an electrical sign to be sent between two secluded circuits. Two sections are utilized in an optocoupler: a LED that discharges infrared effulgence and a photosensitive gadget that recognizes effulgence from the LED. The two sections are contained inside a black box with pins for availability. The info circuit takes the approaching sign, regardless of whether the sign is AC or DC, and utilizations the sign to turn on the LED.

5.7Solar Panel

The aubade-based board is put on a piece of cardboard (only for exhibition) and the lower part of the cardboard is associated with the Servo contrivance. Aubade-oriented board comprises photovoltaic cells masterminded in a request. A photovoltaic cell is only anaubadeeffulgence-based cell. Aubadeeffulgence based cell is comprised of semiconductor material silicon

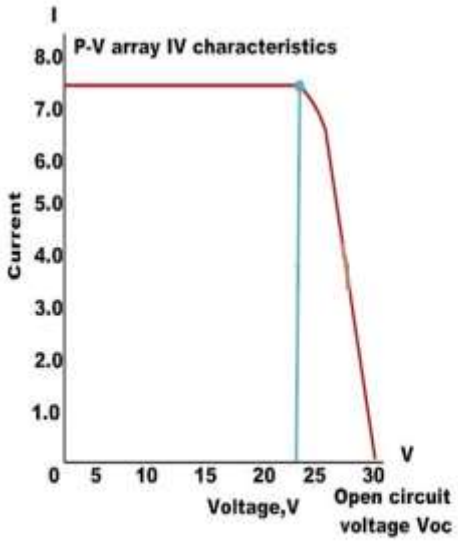
6.Working

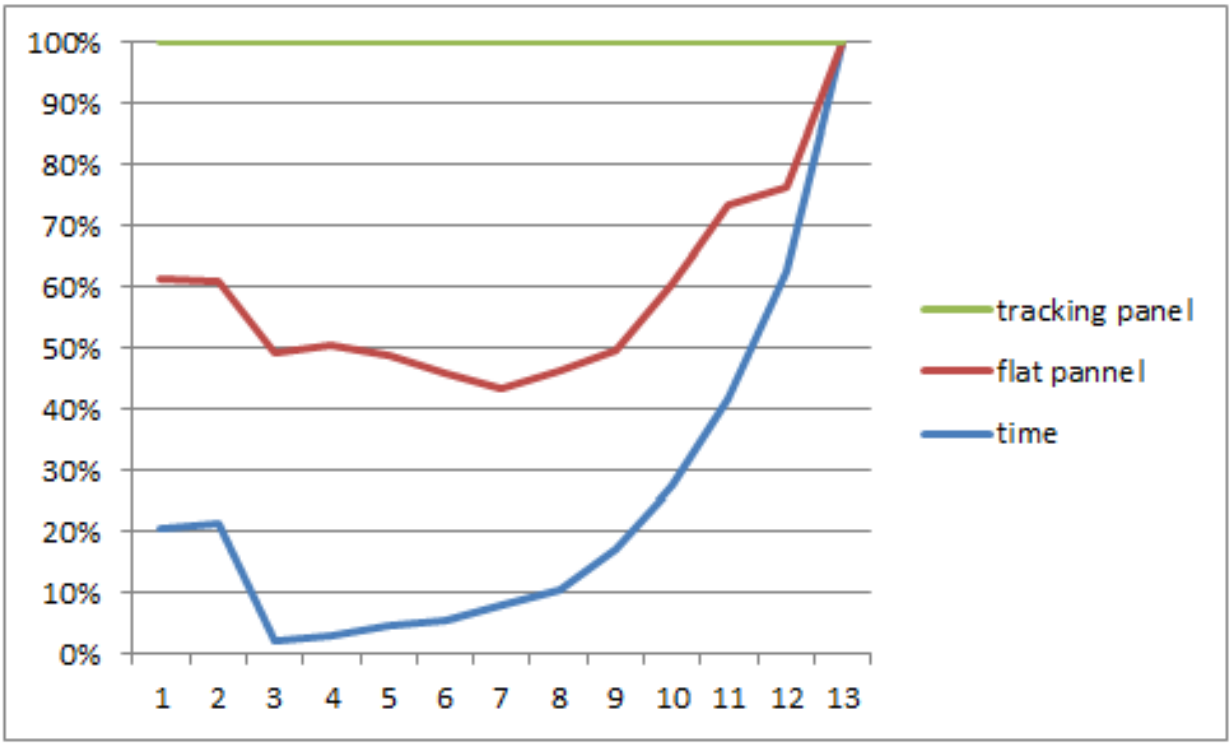
These diodes are important because a little harm or any unsettling influence in the PV module may influence the yield current significantly. The impact in yield current might be because of the phones in the module which are associated in arrangement design, a solitary PV cell with some shade and because of the modules in a string can quit creating the force. Sidestep diodes are very like the diodes that are utilized in the aubadeeffulgence-based cells where the detour diodes permit the more prominent measure of current to go through them with almost no measure of misfortunes in them. Two effulgence ward resistors are organized on the edges of the aubade-based board. Effulgence-reliant resistors produce low obstruction when effulgence falls on them. The servo contrivance associated with the board pivots the board toward Aubade. Board is organized so that effulgence on two LDRs is thought about has focused energy for example low opposition contrasted with others. The servo contrivanceturnsthe board at a certain point.



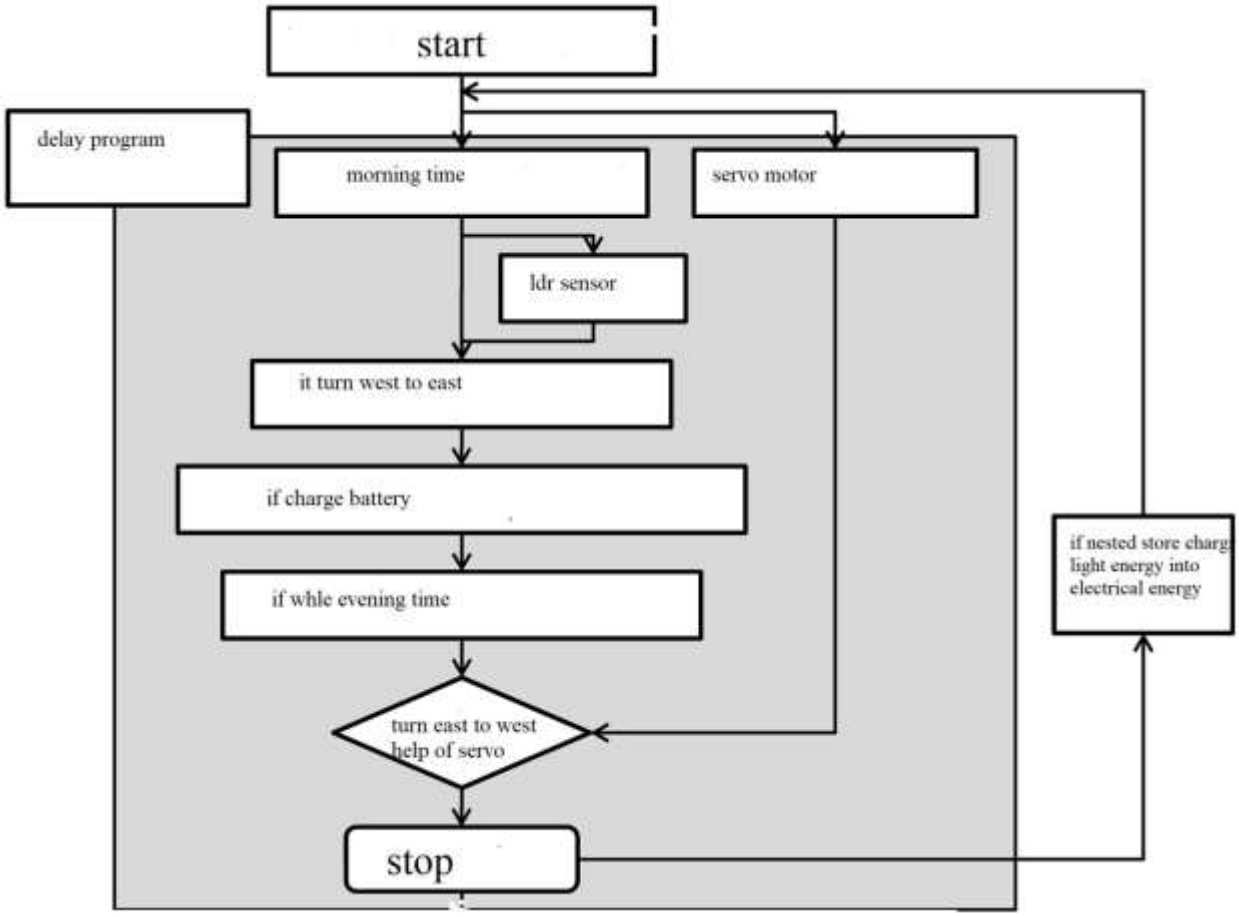
At this point force of the board gradually movesinturn.By and large, sidestep diodes are masterminded backward predisposition between the positive and negative yield terminals of the aubade-based cells and have no impact on its yield. Ideally, there will be one detour diode for every single aubade-influenced cell, however, this is more costly so that there is one diode for each little gathering of arrangement-associated aubade-based cells. They are ordinarily associated alongside the few aubadeeffulgence-based cells where no current is permitted to go through them for the situation when every one of the cells is being used with no concealing. The detour diodes are useful in 2extraordinary situations when the cells can't go the current through them. This sort of sidestep diode association forestalls the deficiency of force which permits the aubade oriented gathering to deal with the genuine – world issues all the more proficiently

time	flat pannel	tracking panel
12	24	22.5
12.3	22.5	22.5
1	21	22.5
1.3	21.5	22.5
2	19.5	22.5
2.3	16.9	22.5
3	13.5	21.5
3.3	11.4	17.1
4	7.55	11.8
4.3	5.2	6.2
5	3.8	3.2
5.3	1.19	1.99
6	0	0


I
P-V array IV characteristics
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
Current
0
5
10
15
20
25
30
V
Voltage,V
Open circuit
voltage Voc


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1
2
3
4
5
6
7
8
9
10
11
12
13
tracking panel
flat pannel
time

7. ALOGRTHIMS



8.PROGRAM:

```
#include <Servo.h>
Servo myservo;
int ldr1 = 4;
int ldr2 = 5;
int val1;
int val2;
ntpos=90;
void arrangement()
{
myservo.attach(11);
Serial.begin(9600);
myservo.write(pos);
}
void circle()
{
val1 = analogRead(ldr1);
val2 = analogRead(ldr2);
val1 = map(val1, 0, 1023, 0, 180);
val2 = map(val2, 0, 1023, 0, 180);
if(val1 > (val2+50))
```

```
{
if(pos<180)
pos=pos+1;
myservo.write(pos);
Serial.println("backward");
delay(10);
}
else if(val2 > (val1+50))
{
if(pos>0)
pos=pos-1;
myservo.write(pos);
Serial.println("forward");
delay(10);
}
}
```

9. RESULT

This paper concludes the aubade track using a solar panel with help of a microcontroller, LDR sensor, and servo motor Theaubade-influenced energy can be reused as it is a non-sustainable asset. This additionally sets aside cash as there is no compelling reason to pay for energy utilized (barring the underlying arrangement cost) Helps in amplifying the aubade effulgence-based energy ingestion by consistently following the aubade Destroying PC batteries can be dangerous. We don't suggest it. On the off chance that you have 18650 Li-Ion batteries, interface one battery as demonstrated in the accompanying association outline. You can charge just a single battery at a time. To charge the battery, you can either utilize the IN+ and IN-terminals and give 5V or on the other hand, you can utilize a USB link to straightforwardly charge from the USB supply. Albeit aubade-based energy can be saved to batteries, they are weighty and consume more space, and needed to change from time to time.

10 CONCLUSION

In this project aubadetracking system was developed based on an arm processor microcontroller Albeitaubade-based energy can be saved to batteries, they are weighty and consume more space, and needed to change from time to time. These boards can be utilized to control the traffic signals and streetlamps These can be utilized in the home to control the machines utilizing aubade-based force. These can be utilized in ventures as more energy can be saved by pivoting the panel. Though aubade-based energy can be used to the greatest degree this may make issues in the blustery season.18650 Li-Ion batteries are normally discovered Lithium-Ion batteries. They are utilized in Laptops, influencebanks, and so on it is expensive

11 REFERENCE

1. Sharma, Priyanjan, and NiteshMalhotra. "Solar tracking system using microcontroller." *2014 1st International Conference on Non Conventional Energy (ICONCE 2014)*. IEEE, 2014.
2. Akbar, Hussain S., Abulrahman I. Siddiq, and Marwa W. Aziz. "Microcontroller based dual axis sun tracking system for maximum solar energy generation." *American Journal of Energy Research* 5.1 (2017): 23-27.
3. Kassem, A., and M. Hamad. "A microcontroller-based multi-function solar tracking system." *2011 IEEE International Systems Conference*. IEEE, 2011.
4. Abdul-Lateef, Kais I. "A low cost single-axis sun tracker system using PIC microcontroller." *Diyala Journal of Engineering Sciences* 5.1 (2012): 65-78
5. Arif, E. M. H., et al. "An efficient microcontroller based sun tracker control for solar cell systems." *International Journal of Electrical & Computer Engineering (2088-8708)* 9.4 (2019)
6. Das, Protik Kumar, Mir AhasanHabib, and Mohammed Mynuddin. "Microcontroller based automatic solar tracking system with mirror booster." *vol* 4 (2015): 125-136
7. Bose, Arindam, SounakSarkar, and Sayan Das. "Helianthus–a low cost high efficient solar tracking system using AVR microcontroller." *International Journal of Scientific & Engineering Research* 3.10 (2012)

8. Huang, F., D. Tien, and James Or. "A microcontroller based automatic sun tracker combined with a new solar energy conversion unit." *1998 International Conference on Power Electronic Drives and Energy Systems for Industrial Growth, 1998. Proceedings.*. Vol. 1. IEEE, 1998.
9. Krishna, Bipin, and K. Sinha. "Tracking of sun for solar panels and real time monitoring using LABview." *Journal of Automation and Control Engineering Vol* 1.4 (2013).
10. Duarte, Francisco, Pedro Dinis Gaspar, and LuísCarrilhoGonçalves. "Two axes solar tracker based on solar maps, controlled by a low-power microcontroller." *Journal of Energy and Power Engineering* 5.7 (2011)
11. Awad, Hilmy, and Sayed Abdel Aziz. "Development and control of a sun tracking system based on stepper motor and 16f877a microcontroller." *2017 Nineteenth International Middle East Power Systems Conference (MEPCON)*. IEEE, 2017.
12. Bhote, Visha, and Jaikaran Singh. "Implementation of dual axis solar tracker model by using microcontroller." *International Journal of Engineering Research and General Science* 2.4 (2014): 780-784.
13. Jayalakshmi, B., et al. "Microcontroller based Automatic Sun Tracking Solar Panel." *2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC)*. IEEE, 2020
14. Abas, M. Amir, Samsudin A. Kadir, and A. KhusairyAzim. "Improved structure of solar tracker with microcontroller based control." *2010 Second International Conference on Advances in Computing, Control, and Telecommunication Technologies*. IEEE, 2010.
15. Sefa, Ibrahim, Mehmet Demirtas, and IlhamiÇolak. "Application of one-axis sun tracking system." *Energy conversion and Management* 50.11 (2009): 2709-2718.