# IMPLEMENTATION OF SOLAR PANEL BASED DAY/NIGHT BATTERY CHARGER

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**Abstract -** *Solar is a prominent energy source for generating power. But the availability of the same is possible only during the day time and is also affected by monsoon variations. An alternative effort to solve this problem is proposed in this paper using IR sensors. The IR sensor is a grid arrangement could be used for energizing the solar panel during the night time and even during the days of monsoon variations. This work analyse the efficiency and driving capacity of the IR grid used for power generation. The objective of this project is to control solar panel cover open/close depending upon the sun light. Nowadays power demand has increased due to this power failure happens many time. This project is designed to provide the solution for this power loss day and night. This project is designed with LDR, amplifier, ADC, Infrared, microcontroller, driver circuit along with motor and limit switches solar panel consists of number of silicon cells, when sun light falls on this panel it generates the voltage signals then these voltage signals are given to changing circuit. Depending on the panel board size the generated voltage amount is increased. Naturally suns direction varies per hour. Infrared circuit is used to produce energy when night mode activated.*

***Key Words:*** Power Generation, IR sensor, Solar Panel IR Grid, Solar Cells, LDR.

## 1. INTRODUCTION

Solar is a prominent energy source for generating power. But the availability of the same is possible only during the day time and is also affected by monsoon variations. An alternative effort to solve this problem is proposed in this paper using IR sensors. The IR sensor is a grid arrangement could be used for energizing the solar panel during the night time and even during the days of monsoon variations. This work analyzes the efficiency and driving capacity of the IR grid used for power generation.

## 2. DESIGN:

### 2.1 ARDUINO UNO

Arduino uno is a microcontroller board which contains 14 digital input /output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

It will be powered by the usb cable by the computer and the program will be inserted into this board through this cable.
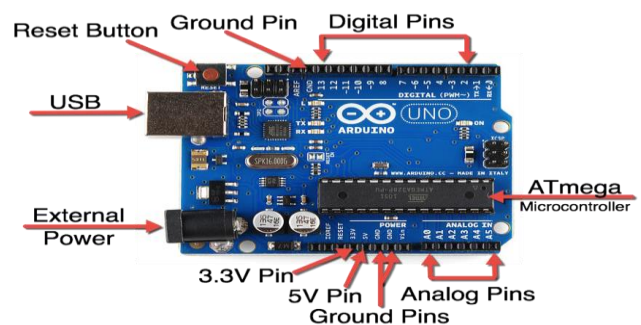


**FIG.1**

### 2.2 LCD

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.

### 2.3 RELAY

A relay is an electrical switch in which the current flow through the coil of the relay creates a magnetic field which attracts the lever and changes the switch contracts.

### 2.4 MOTOR

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor. DC motors are the most common type of motors used in robotics. DC motors appear in a large variety of shapes and sizes: permanent magnet iron core, permanent magnet ironless rotor, permanent magnet brushless, wound field series connected, wound field shunt connected, wound field compound connected, variable reluctance stepper, permanent magnet stepper, and hybrid stepper motors.

## 2.5 LIMIT SWITCH

Limit switch detects the physical motion of an object by direct contact with that object.

## 2.6 LDR

The Light Dependent Resistor (LDR) is just another special type of Resistor and hence has no polarity. Meaning they can be connected in any direction. They are breadboard friendly and can be easily used on a perf board also. The symbol for LDR is just as similar to Resistor but adds to inward arrows. The arrows indicate the light signals.

## 2.7 SOLAR PANEL

A Photo voltaic module is an assembly of photo-voltaic cells mounted in a framework for installation. Photovoltaic cells use sunlight as a source of energy and generate direct current electricity. A collection of PV modules is called a PV Panel, and a system of Panels is an Array. Arrays of a photovoltaic system supply solar electricity to electrical equipment.

## 2.8 BATTERY

The battery is use to run the embedded modules without any need AC voltages. This is the 12v battery of rechargeable method. we can use continuously to use of any load and save energy from the solar panel.

## 3. SOFTWARE AND BLOCK DIAGRAM:

## 3.1. ARDUINO:

The open source Arduino Software (IDE) makes it easy to write code and upload it to the Arduino board.

## 3.2 BLOCK DIAGRAM:
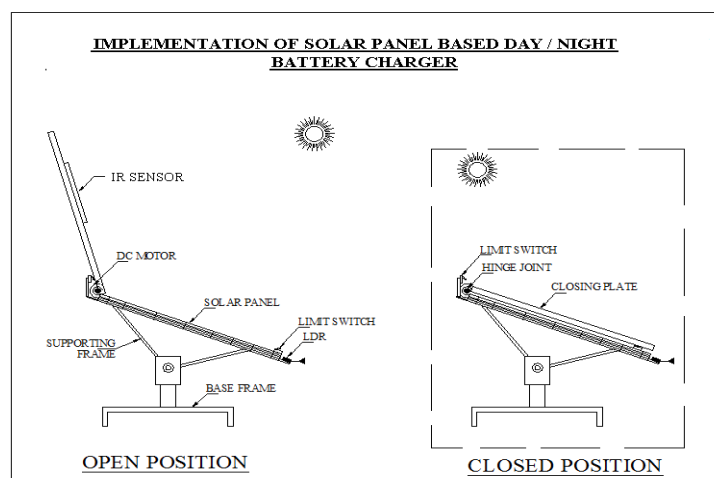


**FIG.2**

## 4. PROPOSED SYSTEM:

## 4.1 SYSTEM FLOW

Two LDR is fixed on the solar panels either side. LDR is nothing but Light Dependant Resistor which varies the resistance depending on the light fall. The varied resistance is converted into voltage signal. Then the voltage signal is given to ADC.

ADC is nothing but analog to digital converter which receives the two LDR voltage signal and converts the input analog signal to corresponding digital signal. The converted digital signal is given to microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller received two digital signals from the ADC and compares that signal. This signal is varied as per the sun light. The microcontroller displays the corresponding information on the LCD display and activates the driver circuit for motor rotation. The motor is attached with the cover plate for open and close. The limit is specified by using limit switches.
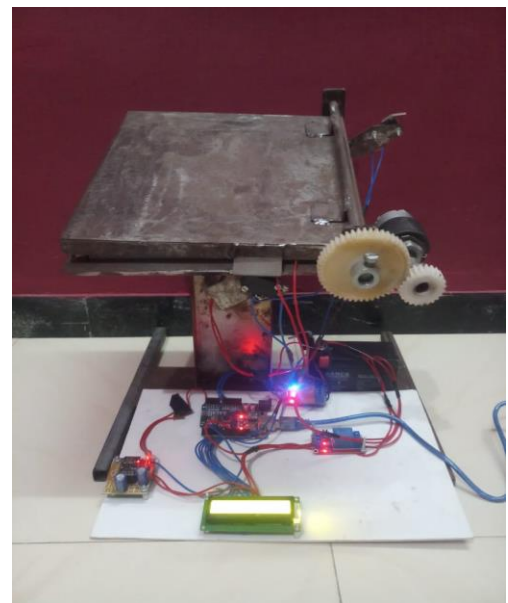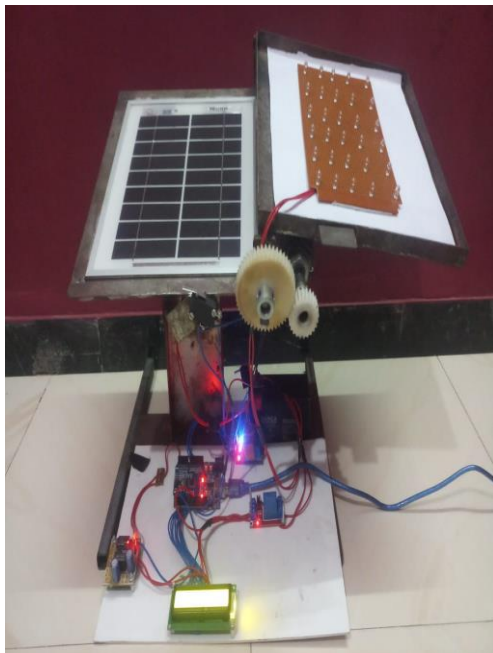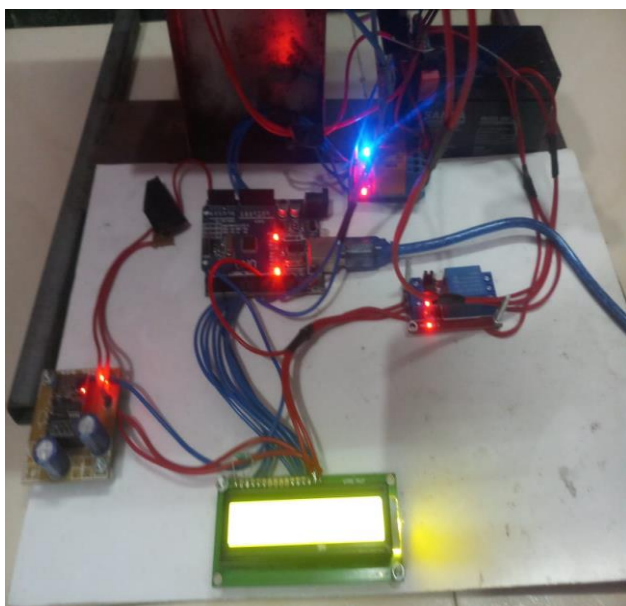


**FIG.3**

**FIG.4**



**FIG.5**

## 5. CONCLUSION

It is inferred and concluded that solar panel can conserve power effectively during both day and night time. The night time power conservation is effective because the IR grid size, IR sensor with high intensity also by using different types of sensors like moon light sensors, pyro electric sensors. This paper also focuses on the alternatives to the IR sensor which is under the study for further development.

## REFERENCES

1. Efficiency improvements of photo-voltaic panels using a Sun-tracking system by A Al-Mohamad - Applied Energy, 2004.
2. J. Rizk and Y. Chaiko. "Solar Tracking System: More Efficient Use of Solar Panels, " in Proc. World Academy of Science, Engineering and Technology, 2008.
3. F. Blaabjerg, D. M. Ionel, Y. Yang, H. Wang, "Renewable energy systems—Technology overview and perspectives" in Chapter 1 in Renewable Energy Devices and Systems [7] F. Blaabjerg, K. Ma, "Wind energy systems", Proc. IEEE.
4. Stepper motor control system by CO Markkanen, DB Blackwell, GA Knaust... - US Patent ..., 1971.
5. Ravindra Parab; Pawan Pandey. "Design Smart Solar Inverter using e-waste with IOT control". International Research Journal on Advanced Science Hub, 3, 1, 2021, 5-12. doi: 10.47392/irjash.2021.002
6. Anupama C.; Thilakam M. R.. "Designing and Evaluating the Performance Solar Powered Iron Box". International Research Journal on Advanced Science Hub, 3, 1, 2021, 1-4. doi: 10.47392/irjash.2021.001
7. Subramanian C.; Chandru Deva Kannan P.; Karthikeyan L.; Prakashraj G.; Nadaraj P.. "Performance enhancement of Waffles (Appalam) drying using mixed mode solar dryer". International Research Journal on Advanced Science Hub, 3, Special Issue ICEST 1S, 2021, 40-45. doi: 10.47392/irjash.2021.018
8. Chandru Deva Kannan P.; Nadaraj P.. "Improving the Efficiency of Solar Flat Plate Collector Using Phase Change Material and Nanofluids". International Research Journal on Advanced Science Hub, 2, Special Issue ICSTM 12S, 2020, 121-129.
9. Kavin D; Sai Santhosh A; Bharath S. "Mini Solar Towers using Fresnel Lenses". International Research Journal on Advanced Science Hub, 2, 7, 2020, 167-173. doi: 10.47392/irjash.2020.83
10. Chalana V; Christy Rockey; Shifa Fathima; AlMubashir P M. "Development of Voice Operated Exoskeleton Arm Using Solar Power". International Research Journal on Advanced Science Hub, 2, 6, 2020, 109-114. doi: 10.47392/irjash.2020.46
11. Nithiyanand P; Boopathy S; Gobi A; Manikandan S; Suresh kumar M. "Performance and study of magnesium chloride and Sodium chloride using solar pond". International Research Journal on Advanced Science Hub, 2, 4, 2020, 13-21. doi: 10.47392/irjash.2020.21