# Auto Charging Of Battery In Electric Vehicle

Mr.D.Jotheeswaran[1],M.Tech, N.Saranya[2], N.Sowmiya[3], S.Susila[4],
*Assistant Professor, Department of Computer Science and Engineering[1], Bachelor of Engineering[2,3,4], Department of Computer Science and Engineering[2,3,4], Muthayammal College of Engineering[1,2,3,4].*

**ABSTRACT- This system offered a solar photovoltaic (SPV) array fed EV system with a straightforward, reasonably priced, and efficient EV brushless DC (BLDC) motor drive. The SPV array's external power source is utilized to power a DC-DC motor. In order to prevent power losses from high frequency switching, the suggested control algorithm adopts an abecedarian frequency switching of the Z source inverter (ZSI) and removes phase current detectors. The BLDC motor's speed is controlled without the need for any new hardware or controls. The ZSI variable DC link voltage controls the speed. Soft starting of the BLDC motor is provided by an appropriate regulation of the DC-DC motor via the undo and bystander conductance maximum power point shadowing (INC-MPPT) method. The suggested electric vehicle system is similar in design and modeling such that dynamic conditions have no effect on performance. The effectiveness of the suggested system under realistic operating conditions is shown by MATLAB/Simulink simulation results, which are then confirmed by experiment.**

**KeyWords : Solar PV modules, Buck Boost Converter, Renewable Energy Resources, BLDC Motor**

## I. INTRODUCTION

The requirement for clean energy sources is currently one of the most important engineering problems to be solved. The majority of the world's electricity is produced from coal and natural resources. Despite its abundance, this power source has been demonstrated to contribute to global warming. Similar birth practices to hydraulic fracturing have also been demonstrated to have a mischievous effect on the terrain, including earthquakes. Solar energy is one energy source that is being investigated extensively. Up until recently, solar energy collection via solar panels was not a practical way to replace energy obtained from fossil fuels due to the low efficacy of these panels. Technological developments in accessories have made it possible to use solar energy as a renewable resource that is only slowly satisfying the energy demands that Society has developed habits.

A vehicle that uses battery energy to power one or more electric motors is known as an electric vehicle (EV). When compared to vehicles with internal combustion engines (ICEs), electric buses emigrate less overall and produce no exhaust emissions. Because modern electric vehicles require less fuel and require less maintenance than original internal combustion engine buses, their total cost of power is less. There are numerous charging stations available for electric vehicles, which can be put in both private and public spaces. The motor, regulator, power supply, and transmission are the main components.

This car's electric motor is powered by a sizable traction battery pack, which needs to be hooked into a wall outlet or charging station, commonly known as an electric Equipment for vehicles (EVSE). The car doesn't have a tailpipe or liquid energy factors like an energy pump, energy line, or energy tank because it is an electric vehicle.

The drawback of electric vehicles is that their batteries, which provide the force for the motor, eventually drain. As a result, they must be stopped or positioned in an area where current should flow freely. The largest issue, though, arises when the vehicle loses all of its charge while traveling through a region where the current cannot flow freely. Therefore, PV is employed to break it in order to change this problem. Using this technique, our primary goal is to charge the electric vehicle. with PV. It runs entirely on solar power. Solar panels typically use photovoltaic cells to directly convert solar energy into electrical energy.

Then, for the high step-up conversion, the traditional boost motor isn't a wise option for the three reasons listed below. Initially, in order to achieve the conversion rate, a very high duty cycle is required, and because of their parasitic features, this results in significant power bias losses. Second, because of the high voltage stress, low on-resistance active switches and high-performance diodes cannot be recommended. Third, because of the problematic diode's short conduction time, there is a serious rear-recovery issue. These three elements all reduce efficacy and restrict power position. Thus, after the development of semiconductor bias power These issues are solvable. As a result, many inverters are built, but essential components in each of these constitute electronic bias. Advanced power module technology, free wheeling diodes, and Insulated Gate Bipolar Transistors (IGBTs) are employed, especially in mongrel, electric, and energy cell vehicles.

## II. LITERATURE SURVEY

[1]Xining Ding; Zhaoming Qian; Shuitao Yang; Bin Cui; Fangzheng Peng, The performance of the switched resistor motor (SRM) drives using an inverter and a simplified fuzzy logic controller (FLC) with a proposed new scaling factor (SF) tone-tuning medium is the basis of this paper. The goal of this study is to reduce the number of fuzzy sets of the class functions (MFs) in order to simplify the regulator's program without sacrificing system stability and performance thanks to the flexible regulator gain. ZSI demonstrate the capacity to both increase and buck voltage.
[2] F. Z. Peng, A. Joseph, J. Wang, M. S. Shun, L. Chen, and Z. G. Pan . he voltage constraint of a traditional voltage source converter can be overcome by an inverter, which also reduces cost, as it can boost DC input voltage without the need for a dc-dc boost motor or step up motor. [3] Xinping Ding, Zhaoming Qian, Shuitao Yang, Bin Cui, and F. Z. Peng, One of the most potential DC sources of the future is the photovoltaic (PV) source. To use the PV for AC appliances, we need to convert its DC power into AC power using an inverter. [4]F. Z. Peng, A. Joseph, J. Wang, M. S. Shen, L. Chen, and Z. G. Pan, Recently, In the last ten years, fuzzy sense control has expanded across multiple plants. This is mostly due to the fact that fuzzy sense control may effectively regulate nonlinear, uncertain systems even in the absence of a fine model for the system being controlled. One way to think of a fuzzy sense regulator is as a real-time expert system that uses fuzzy sense to control qualitative variables. [5] O. Ella ban, J. Van Merlo, and P. Latrine-This work reviews and compares four PWM control approaches for various voltage type Impedance Source Inverter (ZSI) topologies: basic boost, maximum boost, maximum constant boost, and modified space vector PWM control. Three phase-two level-voltage type ZSI comes in three different topologies: basic, bidirectional, and high performance. The four PWM control methods are used to replicate these three ZSI topologies for comparison's sake, while maintaining the same input voltage, shoot-through duty ratio, peak DC voltage across the inverter, switching frequency, and output load. These Simulink/Matlab simulations were created for a 30 kW ZSI intended for use in hybrid electric car applications. The analysis demonstrates that for all ZSI topologies, the maximum constant boost control is the best PWM control technique The report also provides an overview of the best impedance network parameter design. T. Chandrashekhar, M. Veer chary, In this study, a grid-connected system's power conditioning system—a single-phase Z-source inverter—is presented. The Z-source inverter is a single-stage design with buck-boost functionality. It produces the necessary output AC voltage and is made feasible by an additional shoot through state that is added in the zero state of the traditional inverter pulse width modulation. Power conditioning units for small distributed generation (DG) systems using alternative energy sources must be inexpensive, highly efficient, and tolerant of a wide range of input voltage variations. [7] ZaraFiruz and Adabi, Jaffa, In recent years, a Z-source Inverter has been proposed as a novel topology. This inverter has an impedance network that acts as a bridge between the power supply and the inverter to give voltage buck and boost capabilities. To describe and validate the control approach, MATLAB simulations and theoretical analysis have been carried out. [8]Ahmet M. Hava, Russel J. Kerkman, and Thomas A. Lipo,- The analysis, performance assessment, and design of contemporary carrier-based pulse width modulators (PWMs), which are extensively used in PWM voltage-source inverter (VSI) drives, are covered in this work using analytical and graphical approaches. The article describes basic methods for producing the modulation waves of high-performance PWM schemes. Analytical modeling is done for the two most significant modulator characteristics: the switching losses and the current ripple. [9]Khaled A. Madi Ali and Mohammad E. Salem Abozaed, Due to its various advantages and dependability as a technology for converting electrical energy into mechanical motion, induction motors are becoming more widely used in a wide range of industrial and commercial applications. Controlling the induction motor's speed is desired in several applications. The ideal way to adjust the speed of an induction motor is to change the frequency of the AC voltage that powers the motor, as this takes into account the physics of the motor. [10]Senan M. Bashi, I. Aris and S.H. Hamad, -This study uses the microcontroller M68HC11E-9 to examine the performance of a single-phase induction motor. The pulse width variation signal that adjusts the gate voltage of the chopper, which supplies the necessary voltage for the desired speed, is provided by the microcontroller once it senses the speed feedback signal. An entirely regulated single phase isolated gate bipolar transistor (IGBT) bridge inverter has its input voltage adjusted via a Buck chopper.

## III. PROBLEM STATEMENT

This system offers an EV brushless dc (BLDC) motor drive that is fed by a grounded bridgeless Luo (BL-Luo) motor with power factor correction (PFC). The BLDC motor and PFC at the ac mains are both speed-controlled by a single voltage detector. When using a BL-Luo motor in the spastic inductor current mode, the voltage follower control is employed. A method of variable dc-link voltage is used to control the speed of the BLDC motor. This approach reduces switching losses by enabling low-frequency switching of the voltage source inverter for the BLDC motor's electronic dicker. The suggested BLDC motor drive is made to run at ac mains with advanced power quality over a broad speed control range. As a result, the power quality indicators reached are less than IEC 61000-3-2's suggested bounds. Test findings obtained on a developed drive prototype validate the suggested drive's performance.

## IV. P

ROPOSED SYSTEM

An Overview Of Maximum Power point Tracking (MPPT)

In Proposed system Just 30 to 40 percent of incident wind and solar radiation are converted into electrical energy by a conventional wind and solar panel. Maximal power point tracking is employed to increase the efficiency of the solar panel and wind power. The Maximum Power Transfer Theorem states that a circuit's power relationship reaches its peak when the cargo impedance and the circuit's venin impedance are equal. Thus, tracking in the maximum power point becomes less complicated and becomes an impedance matching problem. To improve the affair voltage on the source side for various uses, such as motor cargo, we're connecting a boost motor to a solar panel and wind generator. By altering the boost's duty cycle We can match the source impedance to the cargo impedance motor meetly.

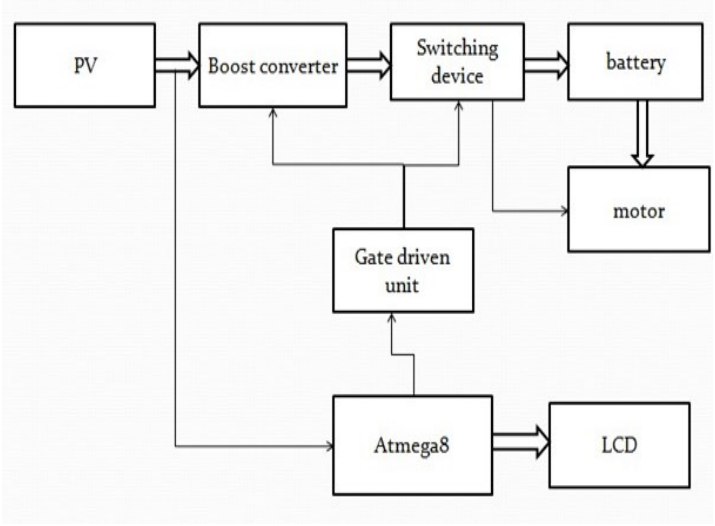



Figure 4.1: Block Diagram

Control Scheme of the Boost DC-DC Converter Interfacing PV Array In order to maximize power and control PV panel voltage, the boost conversion step is employed. Both the input current and the PV panel voltage are continuously tasted. These two numbers are also used by the MPPT control algorithm to determine the reference power needed for the PV panel to operate at MPP circumstances. As seen in figure, the MPPT is obtained by utilizing an external voltage circle and an inner current circle. Reducing the panel problem voltage is achieved by adding the boost Value and feedback are controlled by profits from the PI regulator. As a result, the affair voltage is kept below the adjusted value. Conversely, a PI regulator is used to control the performing signal that comes from the MPPT regulator. In order to induce the PWM signal, the reference current generated by the exterior circle is compared with the affair of the internal circle. motor's current. Hence, a comparison between the external voltage and a reference

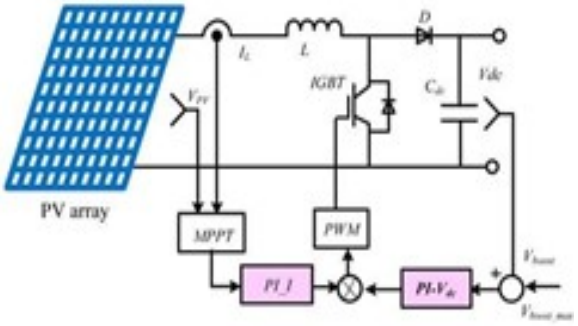



Figure 4.2: Maximum Power Point Tracker (MPPT) Control Of Boost DC-DC Converter.

Solar Panel

An electrical device known as a solar cell, also known as a photovoltaic cell, uses photovoltaic technology to directly convert light energy into electrical power. It is a type of photoelectric cell, which is described as an apparatus that changes its electrical properties in response to light, including resistance, voltage, and current. The

solar cells are the components of solar panels, sometimes called photovoltaic modules.
Solar cells are described as being photovoltaic irrespective of

Figure 4.3: Solar Panel

work with both artificial and solar light sources. They can be used as a photo detector (for instance, an infrared detector), to measure light intensity, or to detect light or other electromagnetic radiation that is close to the visible spectrum.

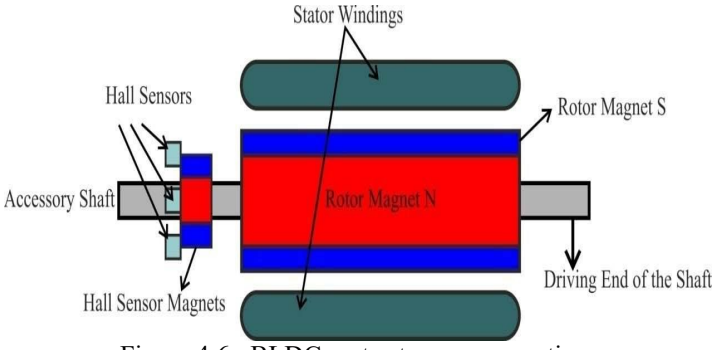
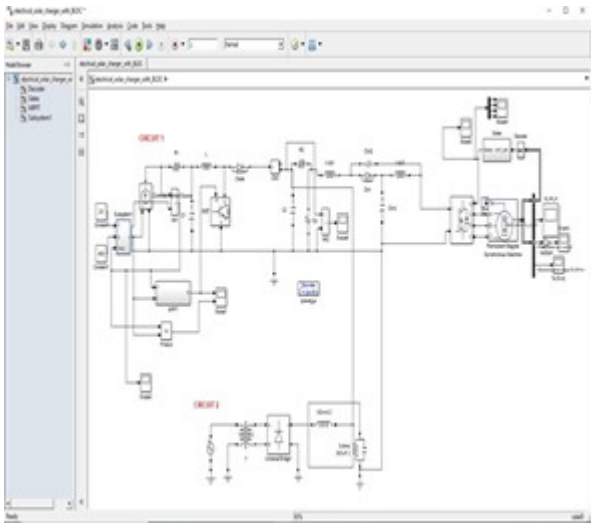



Figure 4.6 : BLDC motor transverse section.

These days, new position detectors that resemble the three branches perpendicular Hall detector shown in Figure are being created as a result of the introduction of miniature electric vehicle brushless motors in many operations. The EV brushless motor and this detector work on a similar concept, reminiscent of the glitzy, miniature angular encoder based on 3-D Hall detectors. The glamorous detector is positioned below an infinite attraction that is fastened at the end of a rotary shaft.

## V. RESULT



Simulation Circuits and Waveforms

Figure5.1:Simulatiom Screenshot of Hybrid Charger for E-Vehicle

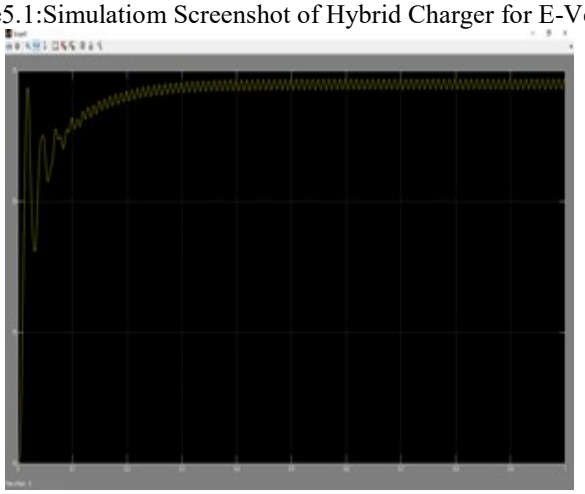


Figure 5.2:Power wave form Scope 2 This wave form represent the power from the solar panel as the input.

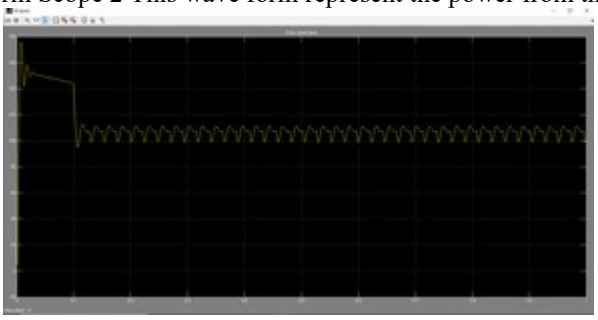


Figure 5.: Charging wave form of the battery

This waveform represents the output from the battery and this will be the input for the Motor.
An electronic drive powers the BLDC motor by alternating the force voltage between the stator windings while the rotor rotates. The Hall Effect detector monitors the rotor position and grounds on this position to provide the electronic regulator with information that determines which stator windings need to be amplified. The motor drive of these electronic drives is operated by two IGBTs on each phase. A Hall Sensor is installed on the stator in order to carry the rotor position. Depending on the poles of attraction, the hall detector detects position while the motor spins and generates a high or low signal. Several high-tech options are available for microelectronic devices that enforce control voltage. It is possible to use a microcontroller to enforce this. The BLDC motor's speed control is need to get the motor to operate at the desired speed. The DC voltage input can regulate the speed of a brushless DC motor. The speed increases as the voltage increases. The PWM model modifies the input voltage of the design when the motor operates in normal mode or at a speed lower than its rated capacity. The instigative current is advanced to weaken the flux when the motor is run faster than its rated speed.

## VI. C ONCLUSION

The PV-EV charging system's state of operation. Additionally, it offers details on batteries, the basics of electric vehicles, and a synopsis of photovoltaics. By comparing them to grid-only charging, a case study is conducted to determine the specific and provident feasibilities of the PV grid and PV-standalone charging. The PV-grid charging could be beneficial for this operation. However, due to the restricted PV and battery capacity, the PV-standalone may not be economically practical. Furthermore, given the PV's erratic nature, it might not be able to satisfy drug users' demands. Additionally, the system offers a number of suggestions and future research projects that are acceptable in this field.

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