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Charging Station for E-Vehicle Utilizing Solar Panel with IOT

Subiksha T[1], Naveena M[2], Ramya J[3], Sugapriya M[4], R.Selvaraj[5]
[1,2,3,4]Student, Department of Electronics and communication engineering, Vivekanandha College of Engineering for women, Tiruchengode, Namakkal District, Tamil Nadu,637205.
[5]Assistant professor, Department of Electronics and communication engineering, Vivekanandha College of Engineering for women, Tiruchengode, Namakkal District, Tamil Nadu,637205.

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Abstract: *Energies that are draining out of the earth is going to be replaced by our paper. In this paper, the main objective is to build a solar vehicle that is charged by our essential resource, Sun. The whole system is monitored using IoT. Due to changing circumstances in nature, we use LDR(Light-dependent resistor) for finding the best intensity of light. For controlling the movement of air e-vehicle, we have used node MCU (Micro Controller Unit), due to excessive change and bursting of vehicle. We used a fan and buzzer to reduce the heat produced at the above temperature level. The main motive of this project is to utilize renewable sources and to maintain global warming and greenhouse gases(GHG).*

Key Word: *GHG; E-Vehicle; IOT; MCU*

I. INTRODUCTION

As of now, growing new kinds of energy change and capacity frameworks are becoming obvious thanks to expanding human populace and accordingly more prominent dependence on energy-based gadgets for endurance. Due to the quick increment inside the globe populace and financial extension mathematically, this can be frequently achieving quickly decreasing petroleum products thus the ceaselessly developing natural worries as ozone harming substance emanations. Besides the innovative progressions during this age, more electronic gadgets are becoming acclimated to trade labor supply consequently prompting an extra expansion in

energy utilization. Energy acquired from the sun's radiations when in-tuned with the world's climate and additionally surface as irradiances is named energy. As of now, this can be frequently known by people to be the prime environmentally friendly power living till date, the energy delivered in the day is in a very position of supporting humanity in any event, when customary energy sources get wrapped up. This promptly accessible earth cordial energy source can without much of a stretch be acquired through a series of techniques such as photovoltaic, sun-based nuclear power, fake photosynthesis, sun-based warming, and sun-oriented engineering. Research works have shown that at the center of the sun. With the free and bountiful sun-oriented irradiances that have colossal times more energy to the globe than we consume, photovoltaic cycles guarantee that supportable as well as more noteworthy proficiency and unwavering quality to access wattage for charging electric vehicles anyplace all over the planet without natural contamination. With little upkeep, reasonable way to deal with the self-charging of electrical vehicles.

II. MATERIAL AND METHODS

Arduino UNO R3:

It has fourteen optical input/output connectors and six simple information sources. It is an open-source gathering for the improvement of online endeavors. Circuit board and a piece of both a computerized electronic circuit board (frequently called a microcontroller) as well as a piece of innovation, or on the other hand IDE (Integrated Program Environment) running on the unit, used to compose and pass programming code to the genuine board.

Solar panel:

The term sun-powered charger is best applied to a level sun-based warm authority, for example, sun-oriented high temp water or air board used to warm water, air, or generally gather sunlight-based nuclear power. In any case, a 'sun-powered charger' may likewise allude to a photovoltaic module which is a gathering of sun-based cells used to create power. In all cases, the boards are normally level and are accessible at different levels and widths.

A cluster is a get-together of sunlight-based warm boards or photovoltaic (PV) modules; the boards can be associated either in equal or series relying on the plan objective. Sunlight-based chargers ordinarily track down the use in private, business, institutional, and light modern applications.

LDR:

A Light Dependent Resistor (LDR) is often referred to as a camera resistor or a cadmium sulfide wire. It's sometimes named a photoconductor. It's a photocell that chips away from the law of photoconductivity. The latent component is a resistor whose sense of interference decreases as the intensity of light decreases. For the most part, this optoelectronic device is used in two-different sensor circuits and bright and dull switching circuits. Many of its uses include video light meters, road lamps, clock radios, light shaft alarms, smart smoke notifications, and outdoor tickers.

Relay:

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal repeaters: they refresh the signal coming in from one circuit by transmitting it to another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

Node MCU:

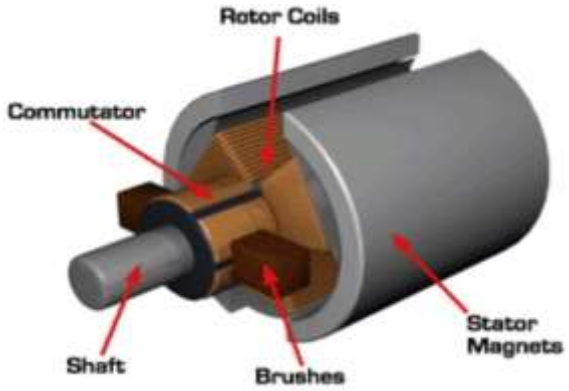
The NodeMCU (Node Microcontroller Unit) is an open-source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains all crucial elements of the modern computer: CPU, RAM, networking (Wi-Fi), and even a modern operating system and SDK. When purchased in bulk, the ESP8266 chip costs only USD 2 apiece. That makes it an excellent choice for IoT projects of all kinds.

MOTOR DRIVER (L293D):

Motor drivers act as an interface between the motors and the control circuits. The motor requires a high amount of current whereas the controller circuit works on low current signals. So, the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

DC MOTOR:

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields.



Procedure methodology

In this proposed framework the microcontroller Arduino UNO is fueled by the DC supply. The Solar board is comprised of PV cells, these cells are behaves like a semiconductor device this ingests the essentialness when the sun-fueled radiation hits the contraption. According to the environment, constantly the exact circumstance of the sun is changing. The LDR (Light Dependent Resistor) is used to identify the closeness of light and a DC engine is related to the two LDRs, LDR left and LDR right. The DC engine turns the daylight-based board towards the course of sunshine. The LDR is likewise called the photograph resistor, a light touchy gadget. The electric obstruction of the light-reliant resistor depends upon the power of the light which is falling on it. Arduino UNO R3 is a kind of microcontroller board. This relies upon the ATmega328. It contains 14 electronic information/yield pins with a 16MHZ valuable stone oscillator. The working voltage of Arduino UNO R3 is around 32KB and RAM is 2KB, whereas EEPROM is 1KB. From the battery the voltage shouldn't return to the sun-powered charger with the goal that we use diode it permits to stream in forwarding bearing and 12v is given to drive supply board by utilizing LM7805IC it correct the voltage as 5v it is given to NodeMCU and engine driver and 12v is given to relay, buzzer, excess fan, and motor driver input pin .engine driver is utilized for running the engine and take a low current signal and flow sign and convert into high momentum signal NodeMCU based ESP8266 can be used control the speed and rotational course of DC engine. When the temperature is high the ringer and abundance fan will be naturally turned on assuming that the temperature is low it will be switched off. In the blynk application by utilizing a joystick we have some control over the vehicle in both forward and inverted directions. The temperature in the LM35 sensor and voltage in the battery is seen through the blynk application.

III. RESULT

As a solar arranged board PV cells expect critical occupation in this assignment to follow the circumstance for making power from the source this model utilizes the lights with an LDR sensor. Since the slanting edge of the sun is between 0 to 180^0two sensors ate utilized on both the right and left sides. From the sun-powered PV cell, the electric source is gathered and moved to the converter which settles the power. The Blynk app shows the result of every activity. The Blynk app also displays the voltage, and temperature by using the joystick we can control the movement of the vehicle.

Fig1.Top view

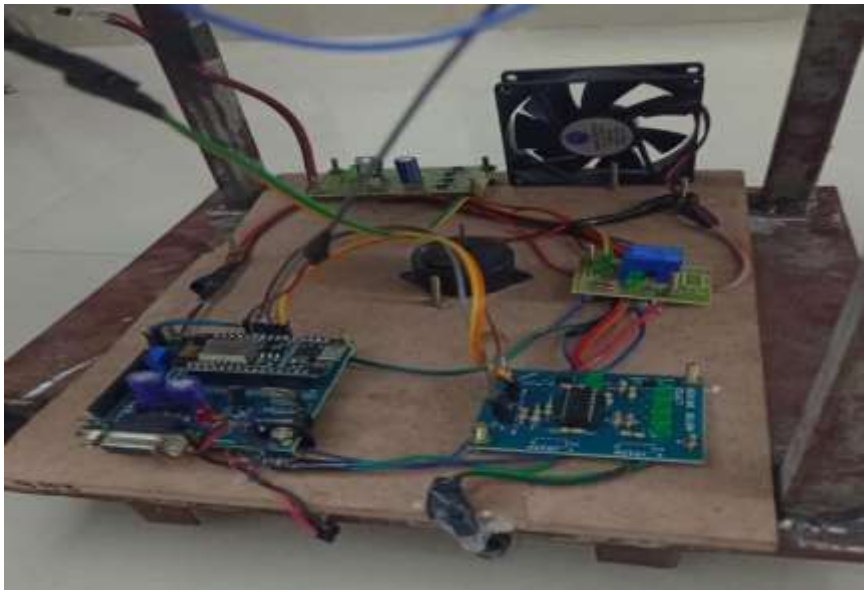


Fig2.Bottom view

Fig3.Joystick, Temperature, and voltage display unit

IV.DISCUSSION

The proposed structure comprises sun oriented energy framework, checking and control structure, estimations units, energy capacity framework, fuel-based electric power age framework, and power transformation framework. The EV charging terminal comprises of programmable insurance framework and a voltage controller that helps to supply the quality power. The electric-vehicle charging station is getting the electric power from the sun-oriented and capacity framework. The ostensible power created by the planetary group is 200 kWh. The voltage from the planetary group is changed over completely to 585VDC which decreases the charging time for the electric vehicles. Irradiance and temperature block are utilized to give sun capacity to the boards. Contribution from the irradiance is changing. Voltage source converters are utilized to change over the power from the sun-based ranch. Then this power was added to the DC/DC converter station where a buck-help converter is put in to adjust the voltage. A low pass channel is applied to eliminate the homeless people and music. It likewise supports controlling the current and keeping up with the DC voltage level. A bi-directional converter is put between the DC microgrid and the battery bank that energizes and releases the batteries from the microgrid and screens the power stream at the network and battery bank.

During the rush hour, the battery capacity framework is reliant upon the sun-oriented power age unit, the fuel generator takeover to fulfill the energy need. This geography is considered to further develop the power stream on the transmission network because of the decrease in music and voltage variances. Homeless people and spikes emerge in the framework are likewise because of the establishment of supercapacitors at the electric-vehicles capacity framework. This decreases the proficiency of the power stream on the framework because inductively acts standout at lower frequencies and capacitance load shows great execution at higher frequencies. Because of the DC power framework, there is no stage shift between current and voltage yet the voltage

steadiness needs consideration which can be kept up with by providing the right heartbeats to the power converter switches. List down of energy converters associated with the electric-vehicle terminal.

- DC/DC energy change framework for the sun-based energy framework.
- AC/DC energy change framework from the fuel generator.
- DC/DC power change framework for the capacity framework.
- Monitoring and control focus energy estimation and guideline framework.

The DC/DC buck converters are utilized to send the managed voltage to the electric vehicles. To make the numerical definition consistent voltage and steady power are thought to be streaming out from the energy converter terminals. The consistent voltage is accomplished by applying the 50 kHz frequencies at the converter switches. The obstruction of the transmitted guide is viewed as consistent. The capacitance and inductance are ignored because of the DC type of power stream framework.

V. CONCLUSION

A solar-oriented energy-based electric-vehicle charging station is proposed in this paper. The proposed framework is equipped for dealing with the directed voltage to supply the expected energy during the top/off-busy times. The applied electrical control strategies further develop the voltage execution independent of the irregular sun-powered energy because of the progressions in illumination/temperature. The applied electrical control framework is the progression of the most extreme power point following calculation-based steady conductance. The progression is the expansion obstruction between the sun-oriented, stockpiling, and fuel-based energy age framework with the miniature matrix control focus and the utilization of higher recurrence to accomplish the quality outcomes.

References

[1]. Satadru Dey, Member, IEEE, and Munmun Khanra, Member, IEEE, "Cybersecurity of Plug-in Electric Vehicles: Cyber Attack Detection During Charging", Vol no.68 issue 1,(2021):478-487.

[2]. International Journal of Scientific & Engineering Research, 2020 IEEE. Steven Ruddell, Udaya K. Madawala, "A Wireless EV Charging Topology with Integrated Energy Storage", IEEE, Duleepa J. Thrimawithana, Member, IEEE,2020

[3]Haris M. Khalid, "Bidirectional Charging in V2G Systems: An In-Cell Variation Analysis of Vehicle Batteries Member, IEEE, and Jimmy C.-H. Peng, Member, 2020 IEEE.

[4]M. Kural, F. K. Tuncer, D. Memiş, and M. N. Dai, "A Smart Mobility Platform for Electric Vehicles with Event Processing," 2019 IEEE 5th World Forum on Internet of Things (WF-IoT), Limerick, Ireland, 2019.

[5]Kim, Ho-Sung, Myung-Hyo Ryu, Ju-Won Baek, and Jee-Hoon Jung. "High-efficiency isolated bidirectional ACDC converter for a DC distribution system." IEEE Transactions on Power Electronics

[6] Cheng, Ka Wai Eric, B. P. Divakar, Hongjie Wu, Kai Ding, and Ho Fai Ho. "Battery-management system (BMS) and SOC development for electrical vehicles." IEEE transactions on vehicular technology 60, no. 1(2011)

[7].Jo, O., Cho, D.H.: Seamless spectrum handover considering differential path-loss in cognitive radio systems. IEEE Commun. Lett.13(3), 190–192 (2009).

[8].C.Park and P. H. Chou, "Ambimax: Autonomous energy-harvesting platform for multi-supply wireless sensor nodes," in 3rd Annual IEEE Communications Society on Sensor and Ad Hoc Communications and Networks, 2006. SECON'06, vol. 1. IEEE, 2006.

[9].B.Calhoun, D. Daly, N. Verma, D. Finchelstein, D. Wentzloff, A. Wang,S.-H. Cho, and A. Chandrakasan, "Design considerations for ultra-low energy wireless micro sensor nodes," IEEE Trans. on Computers, vol.54, (6), pp. 727 – 740, Jun. 2005.

[10].J. C. Gomez and M.M.Morcos, "Impact of EV battery chargers on the power quality of distribution systems," IEEE Trans. Power Del., vol. 18, no. 3, pp. 975–981, Jul. 2003.