IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2024

DOI: 10.17148/IJARCCE.2024.13561

CHARGING STATION FOR E-VEHICLE USING SOLAR WITH IOT

Bhavana S, Chaitra B D,Deekshitha B C,Hema K A,Prof. Manjunatha P V

Department of Computer Science and Engineering, SJC Institute of Technology Chickballapur, India

Abstract: The world has drastically changed in recent years, with a shift toward the use of electric vehicles, which are both more comfortable and cost-effective than standard gasoline or diesel-powered automobiles. Although the number of electric vehicles produced has expanded significantly, the demand for charging stations for these vehicles has not kept up with supply. The majority of foreign nations have adopted electric vehicles in significant numbers, and as a result, household power bills have soared due to the need to charge these vehicles. For instance, the E-vehicle requires charging for more than eight hours, which quickly drives up the monthly electricity bill to $190. To lower the cost of your electricity bill, you can employ renewable energy as a power source

Keywords: EV-Electric Vehicle, Arduino-controller, LDR, GSM, MPPT controller.

I. INTRODUCTION

The International Energy Agency, or IEA, estimates that renewable energy sources, such as solar and wind power, are going to grow at the quickest rate due to their affordability and technological maturity. The global need for energy is still rising, though. One cutting-edge strategy for lessening the impact on the environment is the spread of renewable energy technologies. With its widespread availability across the globe, solar energy can help reduce dependency on energy imports. The Internet of Things, or IOT, is a network of linked computing devices, digital and mechanical technology, items, people, and animals that may exchange data across a network without the need for human-to-human or human-to-computer interaction. Each of these devices is assigned an individual identification. Smart phones, gadgets, automobiles, residences, and towns. a clever universe. The Internet of Things considers "smart" products as being significant because embedded communication and IT might be revolutionary. As WiFi and 4G-LTE wireless Internet connections become more widespread, it is becoming clear that networks for communication and information will eventually become universal. Electric vehicles are becoming more and more popular worldwide as more nations strive towards achieving pollution-free connectivity. Infrastructure for charging electric vehicles will become more essential as the number of these vehicles rises. An Internet of Things system is sure to enhance the capacity of charging electric vehicles and examine its effects. Transit networks benefit from this approach. The suggested structure will facilitate city living and enhance urban planning. The maintenance and repair requirements associated with these diesel generators may be unnecessarily costly because of low prices for fossil fuels combined with complicated petroleum delivery and generator protection. Across the world, a large number of hybrid systems have been deployed, and the growing renewable energy sector has since created dependable and affordable systems utilizing a variety of technologies. Enhancing photovoltaic energy from the sun production with Internet of Things technology can lead to significant advancements in plant performance, monitoring, and preservation. Advances in technology are bringing down the cost of renewable energy equipment globally, making massive solar photovoltaic installations quite appealing. This report's study serves as the basis for a new, financially feasible strategy that uses IOT to remotely monitor a solar photovoltaic plant in order to provide presentation costs. This will help with error detection, chronological analysis of the plant in comparison to real-time monitoring, and protective preservation. Smart phones and tablets, among other internet- connected mobile devices, are now widely used due to progress in wireless as well as wired network technologies. The Internet of Things (IOT) has been established and acquired more knowledge than the previous in only a short amount of time, leading to the development of a fresh theory. IOT, or Internet of Things, is a general term for the data dissemination that surrounds any everyday things that are connected to wired and wireless networks. These days, it is used not just to smartphones and apps but also to other industries like energy systems, industrial safety, smart homes, smart cars, smart cities, and healthcare.

II. LITERATURE SURVEY

1.B. Yashaswinibai et.al, In the year 2022, they are proposed the technology enabling the Internet of Things to evolve quickly presents chances for electric car makers to obtain a competitive edge, but there are still a number of obstacles to overcome. Authentic choices are undermined by the necessity for incremental action, community agreement, fragmentation, cooperation, and vulnerability to cyber attacks. In any event, IOT suppliers offer systems and efficiently

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2024

DOI: 10.17148/IJARCCE.2024.13561

plan and execute robust security measures. These quick advancements indicate a promising future for IOT integration in the electric car sector. But realizing potential still requires addressing these important problems[1].

2. Akila.A, Akila.E et.al, In the year 2019,This paper's impact is that growing concerns about rising fuel prices, erratic supply, and environmental effects are fueling the comeback of electric cars (EVs). Expanding upon their established presence in the 1800s, EVs have attractive features such as reduced emissions, clever charging via Internet of Things-enabled accessibility monitoring, andreal-time solar radiation monitoring. In order to build a place for a greater impact and practical form of transportation, this section suggests a framework in which solar-powered photovoltaic cells manage charging stations for various EV types and make use of the Internet of Things to continuously monitor the stations' accessibility. This succinctly, without resorting to bullet points, outlines the main points, advantages, and drivers of the suggested structure in just five lines[2].

3. Ms.VijayalakshmiTGet.al, By2022, regular vitality sources like coal, natural gas, and oil will have increased, which will force analysts to concentrate on creating alternative or natural sources of energy. There has been a lot of discussion in the last few years on fuel costs that are distinct from the price deregulation for petroleum and natural gas and gasoline. Electric cars were the first on the street sin the1800s.Theextension`sprimaryobjective isto carry power from the solar PV cell to the charging infrastructure so that a rechargeable battery can be utilized for running the motor vehicle. Additionally, with the help IOT, the chargingstation'saccessibilitystatuscanbemonitored on a regularbasisat anytime[5] .

4. Vijith.K et.al, In the year 2018 the regarding With cities booming and natural concerns heightening, EVs fueled by proficient batteries have developed as a guide of trust. As their numbers take off, imaginative charging arrangements like Nissan's vehicle-to-grid (V2G) framework pick up footing. This two-way road permits EVs to not as it were charge, but moreover offer overabundance vitality back to the framework, boosting steadiness and winning proprietors benefits. This undiscovered potential, coupled with EVs' commonplace 90% downtime, opens energizing conceivable outcomes. Envision stopped EVs getting to be solid reinforcement control sources amid blackouts, providing basic loads like industrial facilities[3].

III. EXISTING SYSTEM

Currently, the only component of an EV charging station is a power converter topology. After that, a rectifier and a DC converter are used to connect this to the current electrical grid, transferring energy from the EV to it. Since there aren't many public charging stations, owners of EV vehicles also charge their cars at home. Due to the unfamiliarity of the area, owners should be aware of the locations of charging stations be for setting out on a journey.

PROPOSED SYSTEM

The system described is geared towards enhancing the charging process for electric vehicles by harnessing the potential of solar power. It utilizes Light Dependent Resistors (LDRs) and torches to efficiently track the sun's position, ensuring optimal solar energy capture. A crucial component of the system is the DC-DC converter setup, which plays a pivotal role in regulating the voltage output from the solar photovoltaic (PV) array. By maintaining the reliability of the output and mitigating hysteresis loss, the converter ensures seamless power delivery to the electric vehicle charging infrastructure. Moreover, the integration of a PIC microcontroller adds a layer of intelligence to the system. This microcontroller is responsible for monitoring, controlling, and displaying the required power output supply. By receiving a regulated constant voltage input, the PIC microcontroller streamlines its operation, facilitating efficient energy management within the system. Beyond the technical intricacies, the narrative also underscores the broader environmental implications of the project. It highlights the detrimental effects associated with the burning of fossil fuels, including the release of harmful compounds such as carbon dioxide, nitrogen oxides, and other pollutants. These emissions contribute significantly to the global warming phenomenon, emphasizing the urgent need for sustainable alternatives in the transportation sector. In essence, the system represents a significant stride towards sustainable mobility solutions. By leveraging solar power and embracing innovative technologies, it not only addresses the immediate challenge of electric vehicle charging but also aligns with the larger imperative of transitioning to renewable energy sources to combat climate change and environmental degradation.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2024

DOI: 10.17148/IJARCCE.2024.13561

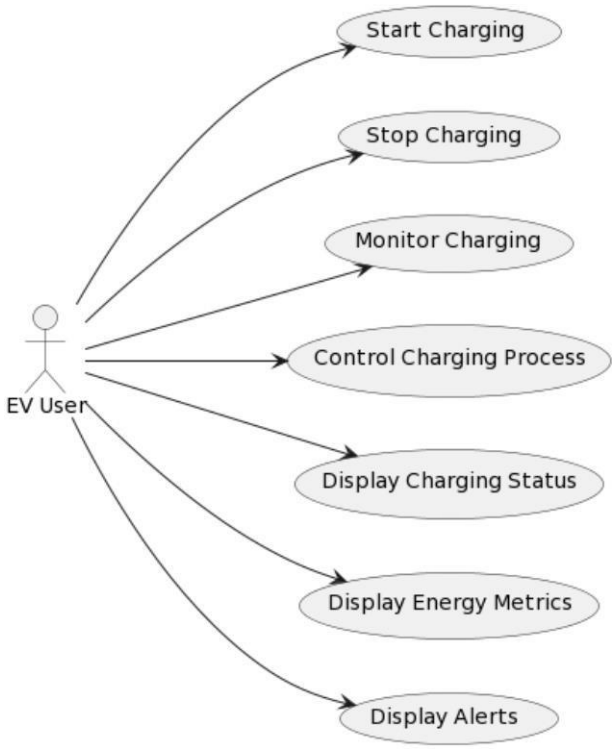

Fig: Usecase Diagram

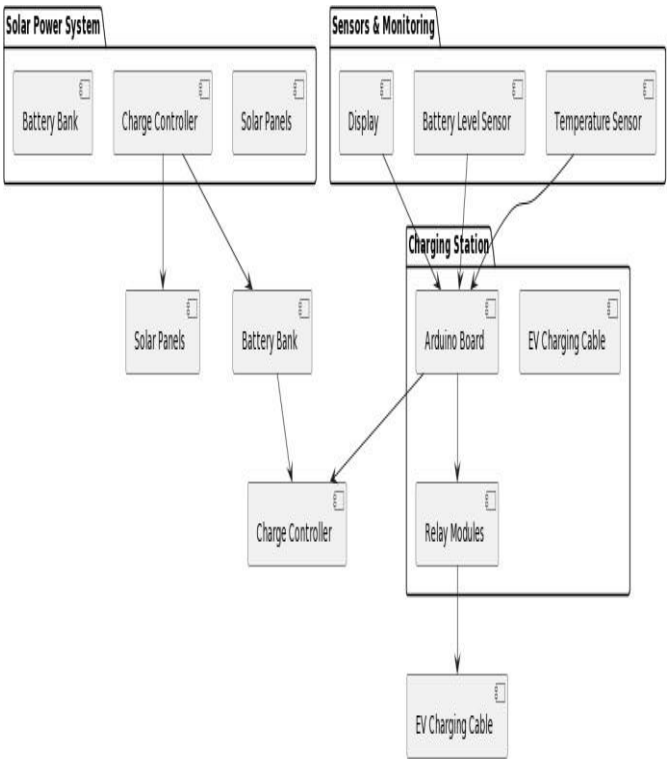

Fig: DataFlow Diagram

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 5, May 2024

DOI: 10.17148/IJARCCE.2024.13561

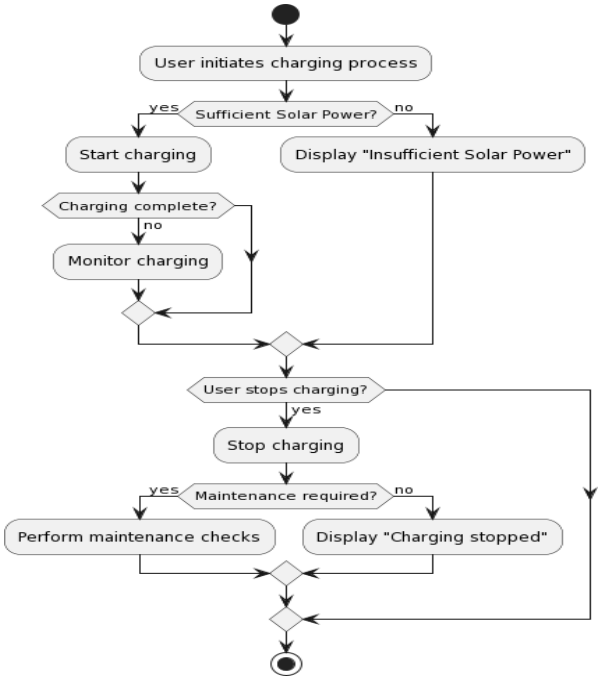

Fig: Blockdiagram

IV. METHODOLOGY

Contemporary vehicles for the foremost portion is inferior on mould fill such crude oil, diesel, LPG etc. Fossil fills are non-renewable resource which is one time exploit. For a test case think about, dangers gasses. This increases the natural contamination within the world. In later a longtime to diminish the contamination analysts have given the arrangement of EV's or cross breed vehicles and many nations embraced this as one of the leading arrangements to diminish contamination. Display the thought the utilization of a agile based on electric fueled engines along persuaded which the utilize of the vehicles in this strategy do adjust the moved forward purchase expenses of electric vehicles. A additional edge provided through cell electric vehicles is the moving of overflowing absent the component of activity, providing expanded discuss condition in crowded cities. In show disdain toward of the in come drag off, EV development possess so a way wicked fast based on prospect. The elemental cause is related to infiltration of awful affecting and shift nearby with esteem

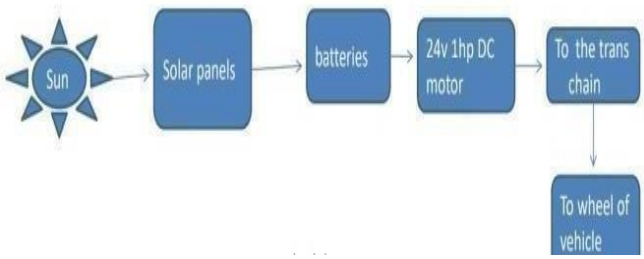

Fig:Appearsacommonchartofe-vehiclehavingsun powered charging alternative

V. RESULT

The system described focuses on improving electric vehicle charging efficiency through solar power utilization. It employs Light Dependent Resistors(LDRs) and torches to track the sun's position, optimizing solar energy capture. A pivotal component is the DC-DC converter setup, which regulates voltage output from the solar PV array, ensuring reliable power delivery while minimizing hysteresis loss. The system described focuses on improving electric vehicle charging efficiency through solar power utilization. It employs Light Dependent Resistors (LDRs) and torches to track the sun's position, optimizing solar energy capture. A pivotal component is the DC-DC converter setup, which regulates

DOI: 10.17148/IJARCCE.2024.13561

voltage output from the solar PV array, ensuring reliable power delivery while minimizing hysteresis loss.

VI. CONCLUSION

r Internet of Things (IOT) based smart-grid has been developed to monitor status of batteries in smart-grid systems. The IOT which is developed here uses a cloud platform and Android Apps for communication purposes. The car user can easily check the health of his car battery and he can easily make a decision whether to take power from grid or to sell power to grid. For future work, handling of multiple users could be implemented so as to compare the status of different users. The data stored in the Arduino can withstand until battery fails to charge. Multiple user for the e-vehicle who settles the station are stored and upgraded in the database so that the distribution to the different user can be monitored. Solar powered EV charging stations with IOT integration hold immense potential for transforming our transportation landscape towards a more sustainable and connected future.

REFERENCES

[1].B.YASHASWINIBAI,S.ROHAN,K.T.YOGESH,S.KAVANA, AND P. S. BABU, "CHARGING STATION FOR E-VEHICLE USINGSOLAR WITHIOT",IJRESM,VOL.5,NO.6,PP.85–88,JUN.2022.

[2] 5TH INTERNATIONAL CONFERENCE ON ADVANCEDCOMPUTING&COMMUNICATIONSYSTEMS,CHARGINGSTATIONFOR ELECTRIC VEHICLE USING SOLAR WITH IOT BY AKILA.A, AKILA.K, AKILA.S, ANU.K, . IEEE, 2019.

[3] ANUKUMAR.P, VIJITH.K , "IOT ENABLED SMARTCHARGINGSTATIONSFORELECTRICVEHICLE",2018,VOL119.

[4] This work has "Gold" OA status. This means it is published in an Open Access journal that is indexed by the DOAJ.IOT Based Solar Charging Station for E-Vehicles Prof. Gita Reshmi,Ms. Vijayalakshmi T G,Ms. Soundarya B,Ms. Tahiyaba Afreen K,Ms. Mubeena M.

[5] DOUGKETTLS,FLORADSOLARENERGYCENTER,REPORTON "ELECTRIC VEHICLE CHARGING TECHNOLOGY ANALYSISAND STANDARDS", 2015.

[6] PRABHDIP SINGH RAYAT,TECHNICITY PROJECT REPORT, "DEFINING ELECTRIC VEHICLE CHARGING INFRASTRUCTUREFOR SMART CITIES USING IOT. PAGE DEFINING ELECTRICVEHICLE CHARGING INFRASTRUCTURE FOR SMART CITIESUSING IOT AND SMART SENSORS TECHNICITY",2015.

[7] DR. THIPPESWAMYK,HEMANTHKUMARAM,"CHARGING ELECTRIC VEHICLES USING SOLAR ENERGY WITH DIFFERENTTECHNIQUES" INTERNATIONAL JOURNAL FOR RESEARCH INAPPLIEDSCIENCE&ENGINEERINGTECHNOLOGY(IJRASET)ISSN: 2321-9653VOLUME8ISSUEVMAY2020.

[8] Prof. Gita Reshmi,Ms. VijayalakshmiT G,Ms. Soundarya B,Ms. Tahiyaba Afreen K,Ms. Mubeena M.

[9] Nusrat Chowdhury, Chowdhury Akram Hossain, Michela Longo and Wahiba Yaici: "Optimization of Solar Energy System for the Electric Vehicle", Energies 2018,11, 2433;doi:103390/en11092433.

[10] Erik Blasius, Erik Federau, Zbigniew Leonowicz, Przemyslaw Janik: "Assessment of e-vehicles availability in chargingpool for supportservicesinSmartGrids" 2017IEEE.

[11] D. Della Giustina and S. Rinaldi, "Hybrid Communication Network for the Smart Grid: Validation of a Field Test Experience," IEEE Transactions on PowerDelivery, vol. 30, no. 6, pp. 2492–2500, 2015.

[12] S. Rinaldi, D. Della Giustina, P. Ferrari, A. Flammini, and E. Sisinni, "Time synchronization over heterogeneous network for smart grid application: Design andcharacterization ofarealcase," AdHocNetworks, vol. 50, pp. 41–57, 2016.