iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** VIII **Month of publication:** Aug 2023

DOI: https://doi.org/10.22214/ijraset.2023.55000

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue VIII Aug 2023- Available at www.ijraset.com

Revolutionizing Charging Efficiency: Charging Slot Prediction using Android

Dr. J. Sreerambabu[1], Mr. Mohammad Riyaz[2], Mr. N. Santhosh[3], Mr. A. Uvanshankar[4]
[1] *Head of the Department,* [2]*Assistant Professor,* [4]*PG Scholar*

Abstract: ***With ever- adding pollution situations and its impact on the terrain, governments are looking for alternate energy options for transportation services. fleetly depleting global oil painting reserves and rising oil painting import bills of governments are also driving the need for alternate energy sources for the transport vehicles. Transportation as a total is undoing a transformational change worldwide and Electric vehicle are the stylish result to address both pollution and oil painting import bills. Electric vehicles are getting more and more common these days. With the growing demand for Electric vehicles, the charging structure is critical for sustaining theE-Mobility services. As EVs come more marketable, there will be a need to produce an effective niche reserving system as the charging process can be time consuming and the need for further stations will be demanding. Developed the Framework and Architecture of the Next- Generation Communication grounded Online Evs Charging niche reserving at Charging Station. We erected the stochastic queuing model for Evs in the charging station. We formulated the objective function of EV's charging at charging points in charging stations to determine the optimal charging time, minimum charging cost, least distance, minimum queuing detention and optimal duration for particular charging places. The proposed model of the booking system is designed to produce a cost effective and effective system. The proposed garçon- grounded real- time cast charging structure avoids staying times and its scheduling operation efficiently prevents the EV from halting on the road due to battery drain out.***

Keywords: EV charging, electrical vehicle, energy stations, slot booking, parking.

I. INTRODUCTION

An electric vehicle (EV) is a vehicle that runs on an electric motor powered by rechargeable batteries instead of using internal combustion engines that run on fossil fuels. EVs are becoming increasingly popular due to their low environmental impact, improved performance, and reduced operational costs. The batteries that power EVs can be recharged by plugging the vehicle into an electric power source, such as a charging station, or by regenerative braking, which captures the kinetic energy of the vehicle during braking and converts it into electrical energy to recharge the batteries. EVs are available in a range of types, including all-electric vehicles, plug-in hybrid electric vehicles, and hybrid electric vehicles. EVs offer several advantages over traditional gasoline-powered vehicles. First, they produce zero emissions while driving, making them a more environmentally friendly transportation option. Second, they are often more efficient than gasoline-powered vehicles, meaning they require less energy to travel the same distance. Finally, EVs can save drivers money in the long run by requiring less maintenance and offering lower operational costs due to the lower cost of electricity compared to gasoline. Despite these advantages, EVs also face some challenges, including limited driving range and the need for widespread charging infrastructure to support their use. However, ongoing developments in battery technology and charging infrastructure are helping to address these challenges and make EVs a more viable transportation option for drivers around the world

II. SYSTEM ANALYSIS

A. Existing System

1) First Come First Serve (FCFS) priority for Charging.

In "Recharging Phase", each CS performs scheduling for EVs already parking herein based on the FCFS order, or even with smart method by knowing the anticipated EVs arrival information (as included in EVs reservation information).

2) Admission Control Algorithm

The admission control mechanism can be viewed as a virtual scheduling procedure. Whenever a new task i arrives, it will be put into an active scheduling task set I together with the existing admitted tasks. Then, all the tasks in I will be scheduled by the corresponding scheduling algorithm. Since each admitted task must achieve the requested SOC while departure, if any existing admitted task or the newly arrived task itself cannot be charged to its requested battery SOC at the departure, the new task should be declined of service; otherwise, it should be admitted.

3) State on Charge

The proposed real- time EV charge scheduling depends upon the battery dynamics and vacuity of charging places. Grounded on the scheduling operation installation, the system will deliver the information to the stoner regarding the nearest charging station, stylish cost function and booking places with respect to estimated vehicle battery SOC.

4) Electric Vehicles Recharge Scheduling with Time Windows (EVRSTW)

It's nearly related to the resource allocation and resource constrained scheduling problems. EVRSTW, in its special case, belongs to the class of Complete problems, meaning that exact styles are generally unfit to manage with large problem cases in reasonable time, and display changeable runtimes. In order to make a real- world dynamic system grounded on stoner requests and nearly immediate system responses, we need to find styles which can operate within a short, bounded prosecution time.

B. Proposed System

1) Stochastic Queuing Models

Stochastic Queuing Simulation (SQS) is a methodology for characterizing and simulating large-scale workloads (e.g. To evaluate new server configurations, scheduling policies, etc.).

The technique builds upon analytic foundations, but adds simulation to account for cs workload properties that make closed-form solutions intractable. While pieces of these methods may be well known to queuing theorists or statisticians, they have not been presented in a cohesive manner, or widely adopted by the systems community.

A queuing model is composed of a collection of “slots” which process charge. We model each charging station as a single queuing system; this queuing system may have multiple “slots” which correspond to individual CS in a multicore CS. car arrive into the system according to an inter arrival time distribution and their size (measured in time) is distributed according to a service time distribution. A queuing discipline must be chosen to determine how queued jobs are scheduled and processed.

2) Forecasting in Open Car Parks with Charging Point

Web and mobile application the innovative advantages over other charging stations are the web and mobile application. When a user registers, all the functions of the system can be managed through the application. With the application, charging of EV becomes reliable, and the trip less stressful, as the application allows the user:

a) Find the nearest charging stations,
b) Reserve charging time,
c) Navigation to the location,
d) Easy charging activation,
e) Charging limit setup (amount of energy, amount, time),
f) Flexible payment system.

III. DEVELOPMENT ENVIRONMENT

A. Hardware Requirements

1) Processors : Intel® i5 processor
2) Disk space : 320 GB
3) Operating system : Windows 10

B. Software Requirements

1) Server Side : PHP 7(64-bit) or (32-bit)
2) Client Side :HTML,CSS, Bootstrap
3) IDE : Dreamviewer
4) Back end : MySQL 5.
5) Environment : Android

IV. METHODS

1) Admin
2) Parking Lot Controller & Slot
3) Electric vehicle charging point
4) Tariff Management
5) Schedule your charging
6) Charging Station Payment
7) Notification & Rescheduling Reservation

A. *Admin*

Manage all aspects of your charging structure, client & mate relations, billing and payments, view stats and reports. Accessible online with comprehensive access control.

The operation unit exposes a web operation, developed in Angular, which relies on the services exposed and allows the EV platform directors to cover, configure and operate the platform. It also provides to the platform druggies a reciprocal stoner interfaces that, although supporting only a reduced set of the operations available on the native mobile app, allows the druggies to interact with the platform using cybersurfer-only technologies, available in a wide.

End user/Admin Module

1) *Registration:* In this module describe the user registration process. User/Admin register the information like a user name, mobile number, mail id, etc.
2) *Login:* User/Admin was registered into this website after that they are receive the notification via SMS/email id. The user/admin can login in this page. It checks whether the username and password are correct, if correct allows the user/administrator to update or view the details else displays the error message.

B. *Parking Lot Controller*

The parking lot control centre (PLCC) plays a major role in collecting all available offer/demand information among parkedelectric vehicles.

1) *Parking Slot*

This module creates and configures parking lots, sometimes referred to as parking orbits,Real-time monitoring of parking space availability by facility, level, and single space.Monitors the occupancy of parking lots and parking garages.

C. *Electric Vehicle Charging Point*

Add and manage charging stations and locales. Set access rules and visibility(private/ public), examiner operation and consumption.

D. *Tariff Management*

Tariffs could be setup based on power consumption or time elapsed or combination of both. Different fees could be applied during charging and for parking after charging is complete.

- Level 1 Charging
  Up to 2 miles, 30 minutes
- Level 2 Charging
  Up to 10 miles, 30 minutes
- DC Fast Charging
  Up to 90 miles, 30 minutes

1) *Charging On-the-Go*

On forecourts electric fast charging services are developed for drivers who need to recharge their vehicle during their journeys. High-powered fast or super-fast chargers (50kW to 350kW) can charge an electric vehicle in between 10 and 30 minutes, depending on the size of the battery.

E. Schedule your Charging

Easy booking via web or mobile application, Authentication with a telephone call or mobile application allows the ad hoc use of unregistered users (no need to build roaming systems for users).EV drivers will be able to locate EV charging stations, get step by-step directions, determine the charger type (Single or Dual Level Port), and view real-time station status (available, in use, etc.) in our new Advanced dashboards.

F. Charging Station Payment

Accept payments from customers, generate receipts and reports. PayPal, credit & debit card and voucher payments are supported out-of-the-box with further payment options to be added upon request.

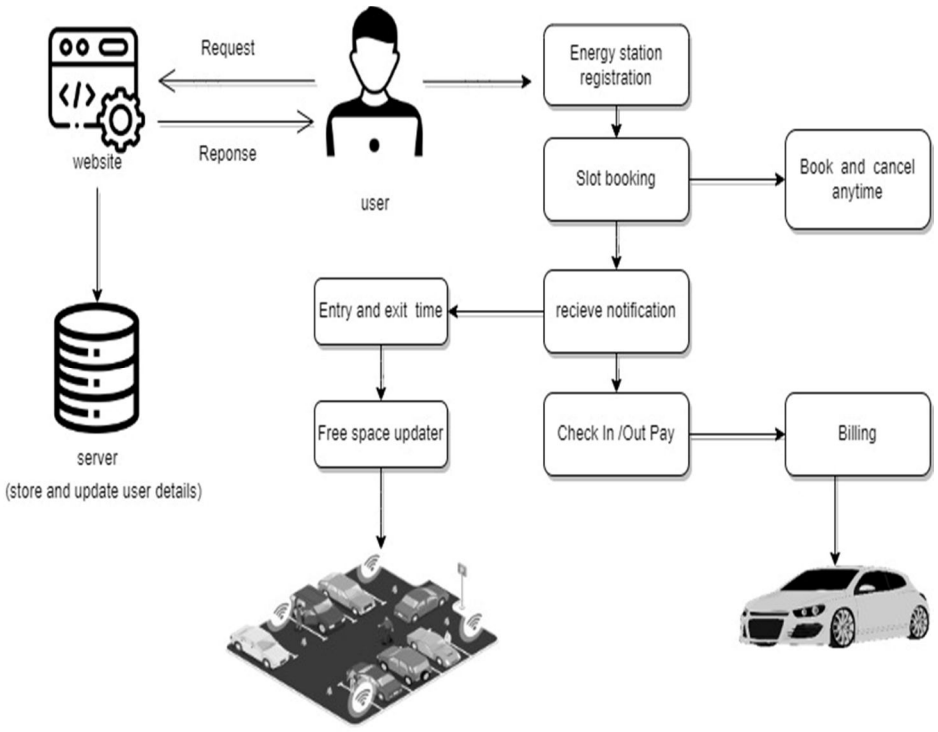
1) *Charging History:* View usage statistics and generate and export usage reports. Monitor network activity in real time and export historical data.
2) *Notification Service:* This module provides all the notification related services to the platform, routing the system-generated notifications to users that had subscribed to that notification (i.e., vehicle charged, abnormal charge pattern, etc
3) *Parking Simulator:* The parking simulator takes, as input, a lot physical layout file, a schedule file of incoming EVs and normal cars, and a set of parking behavior rules. In order of arrival in the schedule file, the parking simulator applies the following steps to determining the placement of the EV or normal car:

G. Rescheduling Reservation

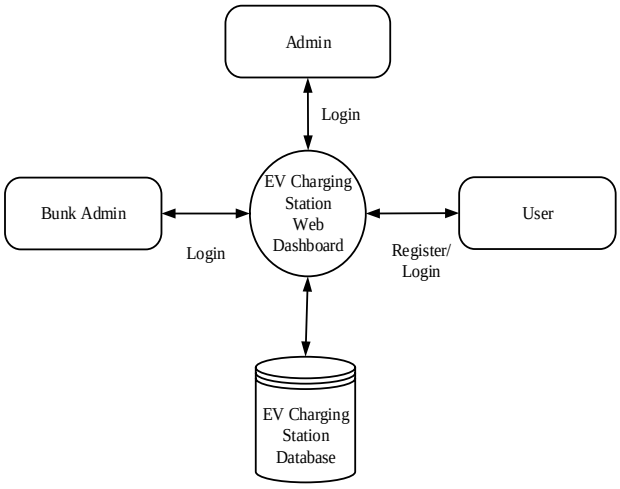
Push/ Pull Mode communication frame to support introductory EV charging service as well as the Advanced Pull Mode to support reservation- grounded service are completely compatible with these two norms. Note that our proposed communication frame can also support a reservation streamlining operation. Specifically, an EV may publish an update about its reservation, if it can not arrive at the named CS on time due to business traffic, similar that its original reservation can be tallied. Upon entering reservation updates due to educated business misgivings on the EV side, a CS may publish this information periodically to EVs through RSUs.

V. SYSTEM DESIGN

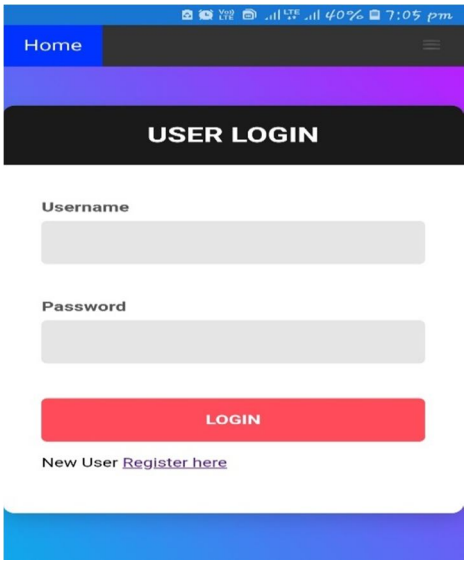
A. System Architecture

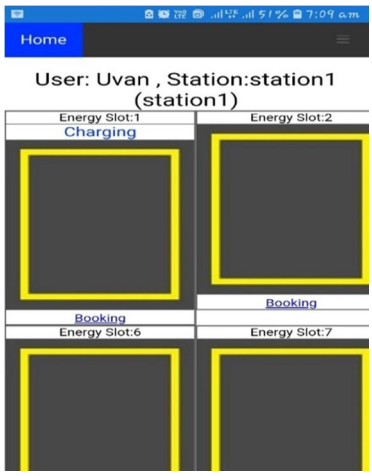


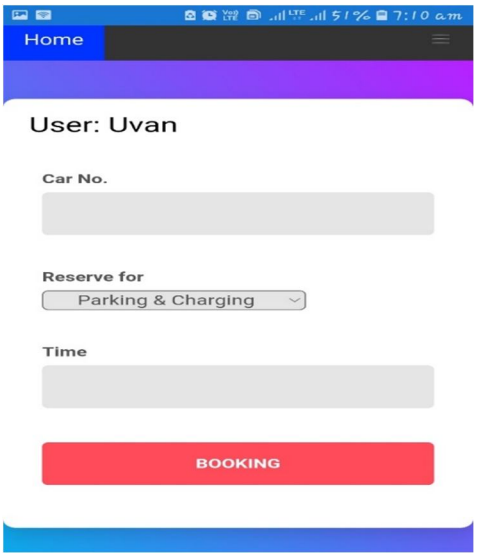
B. Work Flow Diagram

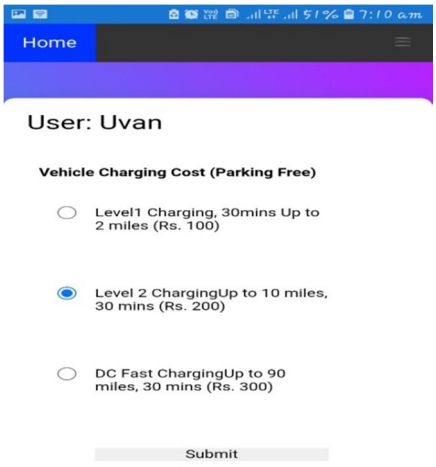


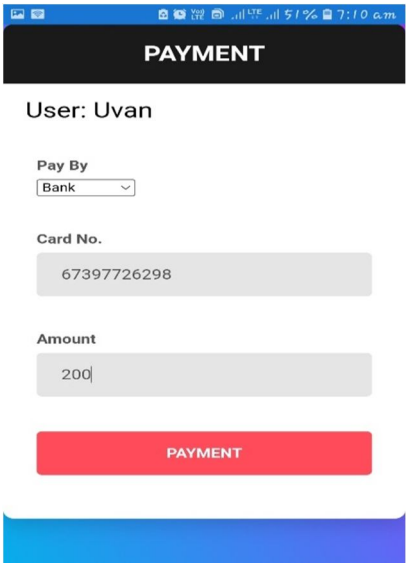
VI. RESULTS

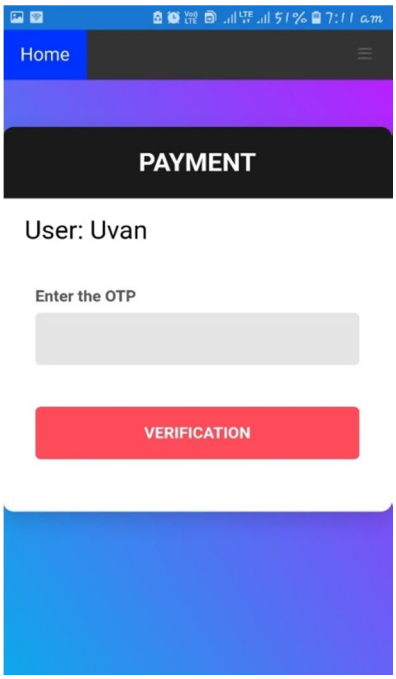












VII. CONCLUSION

We've enforced a complete system to supervise the charging of EVs in auto premises , using small and cheap is connected to the Internet wirelessly. The proposed system allows a stoner to pierce the information associated with the charging process(cost, effective ceased time, estimated time to full charge,etc.), and a administrator to manage different aspects of the process similar as billing of consumed energy, charging precedences, etc. The use of a Wi- Fi connection dramatically reduces the wiring and the complexity of the installation, and simplifies the commerce with the druggies of the system. The main idea behind this is the fact that every single parking space will need to be acclimated to serve as a charging point, and given the participated power nature of these garages, we need a way to measure and manage the power consumed by the vehicle recharge. Electric mobility is developing fleetly- both in demand and force. The demand for(better) charging structure is bigger than ever. This is why we ’ve installed charging installations for electric vehicles in all of our parking locales. Charging stations, charging operation, and support services. each- by- one. We are then to save you from the hours of administration, by taking care of the installation of our charging stations, the monitoring and balancing of their power consumption, the pricing and invoicing of all charging sessions, and specialized support altogether.

VIII. FUTURE ENHANCEMENT

To further extend our work and use the M/ G/ K line to dissect the charging process. How to record the charging exertion according to different pricing schemes and how to integrate the incitement medium to achieve a palm- palm result for both the guests and the charging driver are some farther directions for us to consider. Live covering the energy stations while driving.

.

REFERENCES

[1] Cao, Yue and Tao, Jiang and Kaiwartya, O. and Sun, Hongjian and Zhou,Huan andWang, Ran (2019) ’Toward preempted EV charging recommendationthrough V2V based reservation system.’, IEEE transactions on systems,man, and cybernetics: systems.

[2] Throughput and Fairness Analysis of 802.11-Based Vehicle-to-Infrastructure Data Transfers Conference Paper · October 2011 DOI:10.1109/MASS.2011.30 · Source: DBLP

[3] Bayram, Islam Safak, and IoannisPapapanagiotou. "A survey on communicationtechnologies and requirements for internet of electric vehicles."EURASIP Journal on Wireless Communications and Networking 2014, no.1 (2014): 223.

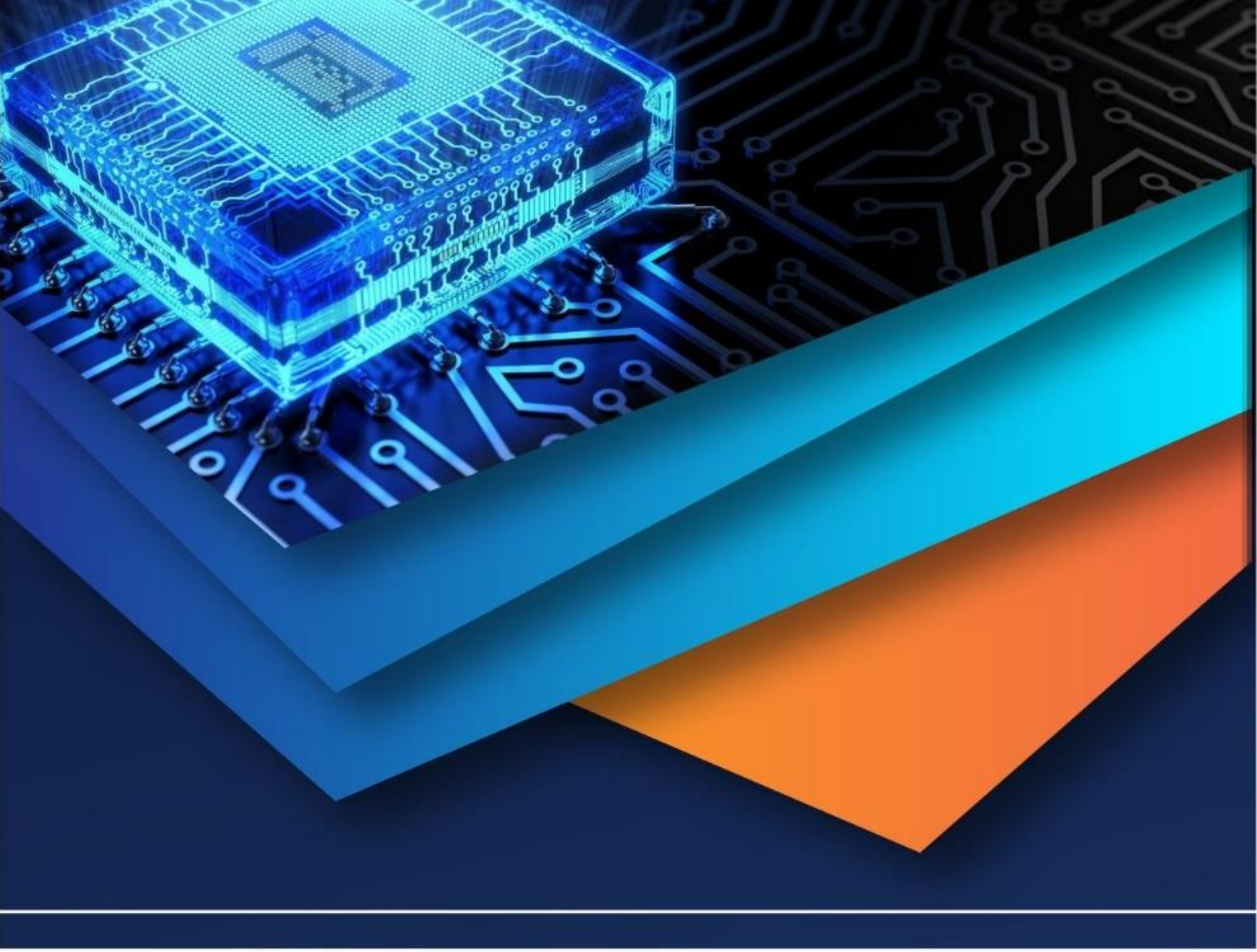
[4] Cai, Lin, Jianping Pan, Lian Zhao, and Xuemin Shen. "Networked electricvehicles for green intelligent transportation." IEEE Communications StandardsMagazine 1, no. 2 (2017): 77-83.

[5] Hatton, Chandler E., Satish K. Beella, J. C. Brezet, and YC2009 Wijnia."Charging Stations for Urban Settings the design of a product platformfor electric vehicle infrastructure in Dutch cities." World Electric VehicleJournal 3, no. 1 (2009): 134-146.

[6] del Razo, Victor, and Hans-Arno Jacobsen. "Smart charging schedules forhighway travel with electric vehicles." IEEE Transactions on TransportationElectrification 2, no. 2 (2016): 160-173.

[7] Gusrialdi, Azwirman, Zhihua Qu, and Marwan A. Simaan. "Distributedscheduling and cooperative control for charging of electric vehicles athighway service stations." IEEE Transactions on Intelligent TransportationSystems 18, no. 10 (2017): 2713-2727.
[8] S. Djahel, N. Jabeur, R. Barrett and J. Murphy, "Toward V2I communicationtechnology-based solution for reducing road traffic congestion insmart cities," 2015 International Symposium on Networks, Computers andCommunications (ISNCC), Hammamet, 2015, pp. 1-6, doi: 10.1109/ISNCC.2015.7238584.
[9] Savio, Dominic A., Vimala A. Juliet, BharatirajaChokkalingam, SanjeevikumarPadmanaban, Jens Bo Holm-Nielsen, and FredeBlaabjerg. "Photovoltaicintegrated hybrid microgrid structured electric vehicle chargingstation and its energy management approach." Energies 12, no. 1 (2019):168.
[10] Bheema Thiagarajan Lokesh, June Tay Hui Min, A Framework forElectric Vehicle (EV) Charging in Singapore, Energy Procedia,Volume143,2017,Pages 15-20,ISSN 1876-6102,
[11] Bayram, I.S., Papapanagiotou, I. A survey on communication technologiesand requirements for internet of electric vehicles. J Wireless Com Network2014, 223 (2014).
[12] Qin, Hua &Zhang,Wensheng. (2011). Charging scheduling with minimalwaiting in a network of electric vehicles and charging stations. Proc. 8th ACM VANET. 51-60. 10.1145/2030698.2030706.
[13] Subramaniam, Umashankar, Swaminathan Ganesan, Mahajan SagarBhaskar, SanjeevikumarPadmanaban, FredeBlaabjerg, and Dhafer J. Almakhles."Investigations of AC microgrid energy management systemsusing distributed energy resources and plug-in electric vehicles." Energies12, no. 14 (2019): 2834.
[14] CSE India “The Urban Commute” 2017
[15] S.-N. Yang, W.-S. Cheng, Y.-C. Hsu, C.-H. Gan, and Y.-B. Lin, “ChargeScheduling of Electric Vehicles in Highways,” Elsevier Mathematical andComputer Modelling, vol. 57, no. 1112, pp. 2873 – 2882, June, 2013.

.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY