iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** V **Month of publication:** May 2024

DOI: https://doi.org/10.22214/ijraset.2024.61154

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue V May 2024- Available at www.ijraset.com

EV Charging Station & Slot Booking System

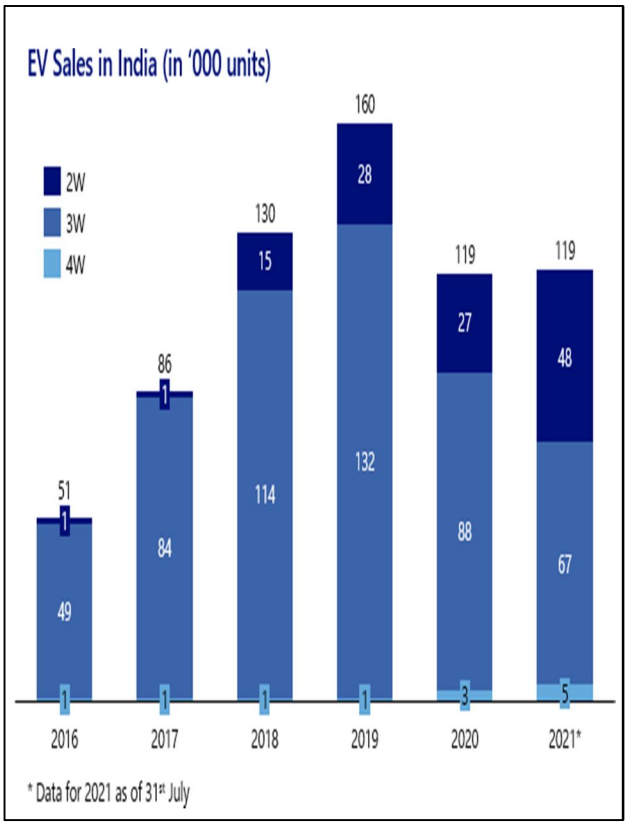
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Abstract: ***In today's world, Electric Vehicle (EVs) is drastically evolving. General public transport as buses, autos, taxis, etc., are rapidly being replaced by EVs, the major cause for this is the rapidly increasing fossil fuel price and the limited resource available. We observe people switching to EVs but still facing charging issues. The proposed system will work on this issue by displaying charging stations, providing the user with a slot at the nearest charging station, guiding them to the destination via GMAPS API, a Chabot for queries and displaying the battery percentage so that they are always aware of the currently available battery.***
Keywords: EV Industry, Charging Station, Slot Booking, Payment Options, Tracking location Notification of booking, Google Maps

I. INTRODUCTION

In recent years, there has been a significant focus on electric vehicle as a source to reduce the use of fossil fuels and cutting the extra use of these gases, also saving the ozone layer. EVs utilize reachable batteries that can recharged by plugging into charging station or electrical outlet the development as this technology has resulted in range of EV models, from compact city car to large trucks.

EVs are becoming increase popular worldwide, with both automakers and government advocating for their adoption as a way to multigame air pollution into public health. The EV charging slot booking system is a convenient and efficient way to manage the limited resources of charging stations. It allows electric vehicle owners to reserve a charging slot in advance, reducing congestion and waiting times at the stations. This system is a great way to promote the wide spread adoption of electric vehicles by making it easier and more convenient to charge them. It has the potential to revolutionize the way we charge our electric vehicles. The EV charging slot booking system is a digital website that allows EV owners to reserve a charging slot in advance, reducing congestion and waiting times at charging stations.



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An electric vehicle (EV) is one that works on an electric engine, rather than an interior ignition motor that creates Power by consuming a blend of fuel and gases. In this way, for example, vehicle is viewed as a potential substitution for current-age auto, to address the issue of rising contamination, a worldwide temperature alteration, draining
characteristic assets, and so forth in spite of the fact that the idea of electric vehicles has been around for quite a while, it has attracted a lot of interest the previous decade in the midst of a rising carbon impression and other ecological effects of fuel-based vehicles. Registrations of charging station are growing so there is no availability of this growing charging station on virtual maps.

II. LITERATURE SURVEY

In [1] describes an application for android mobile, which is developed by the Romar A. Ibrahim, Khalid Mohsen which provides efficient locations of the nearest charging stations to the android mobile users using the Google map. The proposed application also presents the basics navigation system of website operations like viewing directions with the optimal path between source and charging station calculating the less-distance and accepted riding time.

In [2] studies and develops the use of Mobile GPS tracker Navigation System Based on Google Maps by H. Li, L. Zhijian. Google Maps API provides a number of utilities for collecting individual product to the Google maps. Google Maps API is a fixed of application programming front interfaces that lets us say to its services. It will allow us to build simple apps to very advanced location based apps for web, ios, and android.

In [3] GPS-based Mobile cross process Cargo Tracking System for user to track location with Web-based Application by A. M. Qadir, P. Cooper. Methodology used in this Web based application by using Global Positioning System. Where they are because they currently provide out signals.

In [4] API Recommendation System for Software Development by Thung APIs simplifies how developers can integrate application componentsinto an existing architecture, they help business and IT teams collaborate.

In [5] recent years, Indonesia has encouraged electric car research and development as cutting-edge technology. To ensure flexibility, infrastructure for electric vehicles must include charging station.

In [6] a paper in 2020 where study shows In Electric vehicles, electrical energy is stored in batteries. So, to find acharging station and slot availability extra time will be wasted and also inconvenience will occur. The paper provides a solution technique to save time and avoid the inconvenience of EV users.

In [7] paper in 2018 where study identifies the charging problem becomes prominent with the increasing number of electric vehicles. It is necessary to build charging station.

III. METHODOLOGY

To address this problem a smart EV charging station system is proposed as in aggregator, utilizing a fixed battery for electricity trading. This system provide website from booking charging slot nearest charging station according to need of the customer.

Electric vehicle run on battery and can be changed use on the basic of battery requirement and their socket type time for charging the feature requirement EV charged also discuss there is also huge requirement EV charging connection.

IV. ARCHITECTURE

A description of the program architecture is presented below. A diagram of architecture shows the server database, user activity and charging station reply.A system is designed to locate charging stations which need user location on the network. The nearby stations are presented on the map accordingly.

Since the database is important part of the system, it is implemented with basic details of charging stations and useractivities.

A new user should register information the system and log in credentials are saved to the database. The database also contains charging station details like address, slot availability, charging rates etc. with waiting time. Our system provides facility to check the availability of charging slots by sending a request to thecharging station. The request is either accepted by charging station with slot details or denied.

The below figure shows the deployment diagram of charging station slot booking system. In this diagram, system is classified into three main sections including website, database server and user device. Website has access to both user and charging station admin while the server is intermediate element to provide information details of charging stations and login credentials.

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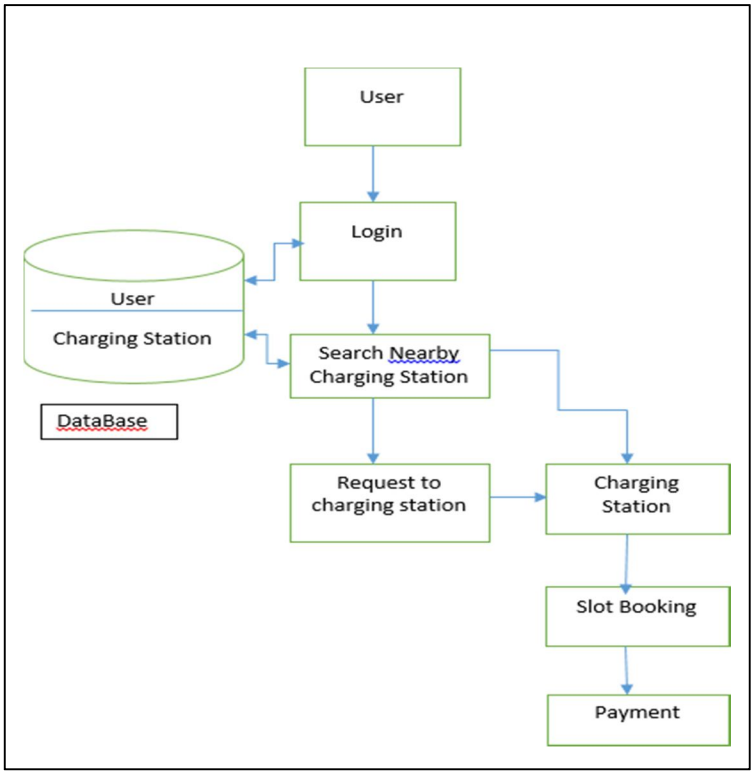


Fig: Architecture Diagram

A. Modules of booking slot

The EV Charging Station and Slot Booking system have two modules Admin, and User. The list of all Stations is created to the Admin inManage station on thecreated home page are username and password then the registerto the slot.

B. Admin

1) With an Email ID and Password, the admin can log intothe system.
2) The list of all stations is displayed to admin in Manage Station.
3) The admin can also add a new station to the list.
4) The admin can add, update and new charging slotin the station.
5) The admin view all of the user's EV charging station booking details.
6) The list of registration user can be viewed bythe admin.

C. Slot Booking

User can book the available slot any station per wish. User can see the available slot of charging station and book it according his comfortable price as per fast charged and slow charged. User can do advance slot booking at any particular date and time.

D. Payment Intigration

After booing the user can make payment himself or they can make payment himself or they can make the payment after charging at the station. User get QR code option in website.

E. Notification

App will notify users whenever slot book, payment confirmation, nearest charging station and any updating. This website will notify users whenever slot book, payment confirmation, nearest charging station and any updating.

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F. Users:

1) User Registration Or Login

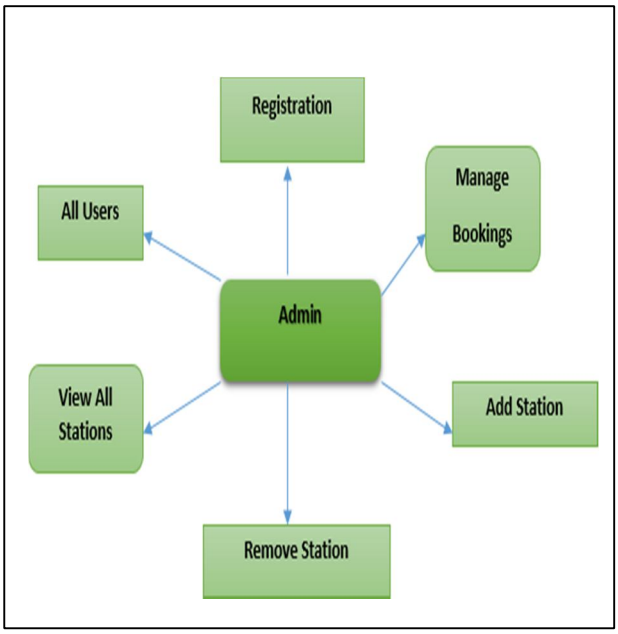
To use the web, first the new user has to register with his basic details. Alternatively, registered Users can easily with email ID and password.

2) User Location

After log in the user will have to give permission for his location then the system will show the station around user area. User can search the station of any particular area.

3) Station Detail

User can easily get information of search station like station image, number of available charging slot, station rating, description of station, operational hours, price of slow and fast charged.



V. TECHNOLOGY USED SOFTWARE REQUIREMENT

1) Database - MySQL8.0
2) Programming Language -html, CSS, JavaScript, java, php
3) Operating System – Window 10, Server
4) IDE: Eclipse, Android Studio, Apache tomacat7/8/9
5) Platform - JSP

VI. HARDWARE REQUIREMENT

1) Laptop/pc
2) Hard disk
3) Ram 4GB
4) Android Phone

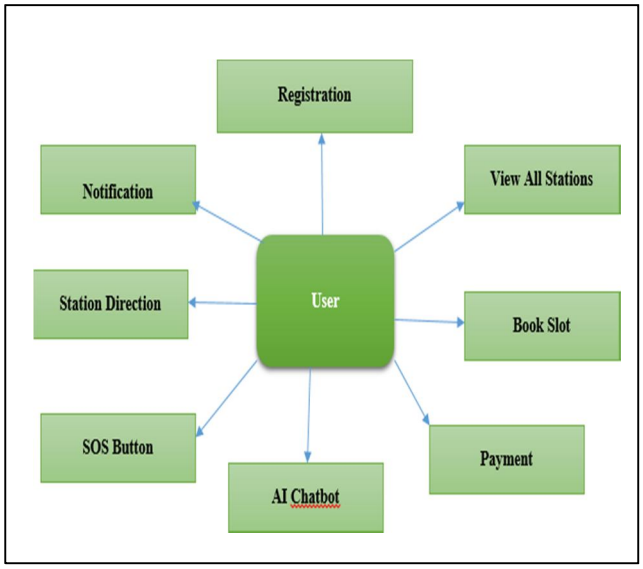
VII. LEVELS OF CHARGING

1) AC charging (Level 1)

AC charging is the slow/fast charging.It depends on the converters and the slow charging will cost less and the fast charging will cost high.

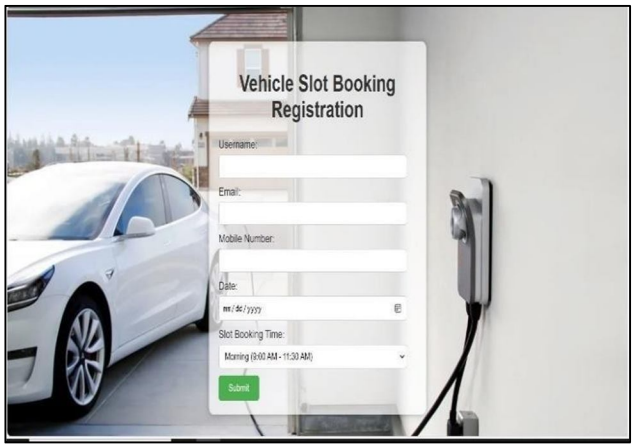
2) DC charging (Level 2)

In the DC charging the high current is provided to the battery to charge fast and the charging rates are very high. The voltage rating of the DC is 48V/72V.

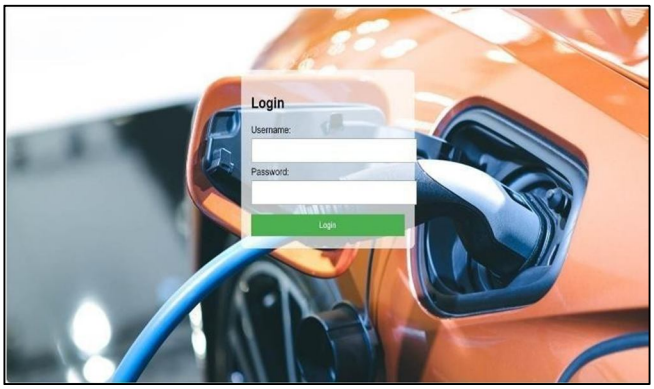


VIII. RESULT

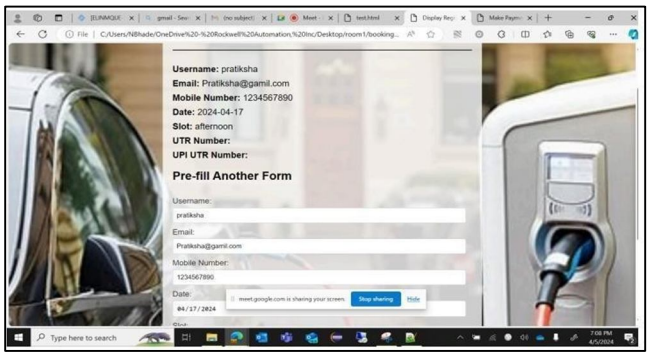
1) Step 1: User Registration and Authentication



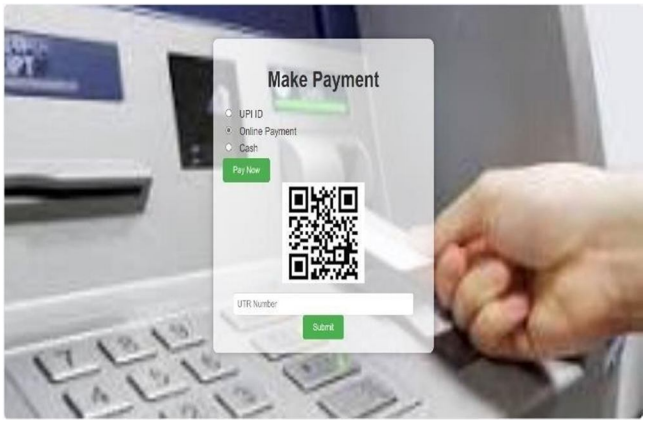
2) Step 2: Log In



3) Step 3: User Information



4) Step 4: Payment Gateway:



5) Step 5: After successful pay the money ,EV reach to CS and charging is done in book slot.User can call for battery by direct contact with charging station.

IX. APPLICATION

1) Used in emergency condition i.e. when bridge collapsed.
2) This application is useful for that bridge which is constructed abovethe river.
3) Use to prevent from flood.
4) Booking system easilyaccess optimize charging station slots of EVs.
5) Booking system owner distributed slot efficiently.
6) Implemented booking systemto experience promote EV publicaly.

X. ADVANTAGES

1) Growing number of electric charging vehicles on the road will lead to exciting changes to road travel and the EV charging infrastructure needed to support it.
2) Find out the charging stations are easily available with slots.
3) Roadmap has provided by the system.
4) Charging stations are used for booking electric vehicle slots in advance.
5) Increase in number of charging station will boost the selling of EV's as their will be reduced range anxiety.
6) Increase in number of charging station will boost the selling of EV's as their will be reduced range anxiety.
7) It is always great for environment, if many EV's are being sold in country.
8) This will boost direct and indirect employment in country.
9) As India lack charging stations, it is good opportunity to young business aspirants to install.
10) charging station in their locality.

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11) Smart EV chargers are an important innovation inelectric vehicle charging infrastructure
12) With the popularity of electric vehicles, the emergence of smart EV chargers provides users with a more convenient and intelligent charging experience.
13) These advanced chargers can not only provide fast charging but also have intelligent management functions. Through Internet connection and data exchange, functions such as remote monitoring, charging plan management, and smart payment have been realized.

XI. FUTURE SCOPE

A Smart system developed for charging station search and slot booking has wide scope in automation of charging stations. It is important in the enhancement of service performance as well as time and cost efficiency. The future scope of the project will extend the range of details on the map and automatic selection of the most convenient CS. The system can be further implement to increase the number of charging stations. It will encourage to use EVs instead of conventional vehicles with increased efficiency of facilities and infrastructure of charging stations. Also, the cost will reduce with large number of EVs on road. In short, we can define the scope of project as below.

1) Encourage users to use more electric vehicles with eco-friendly approaches.
2) The global imperative to cut carbon, air pollution and oil dependencies.
3) Budget friendly for consumers More variations in the features of the car.

This project can be transformed into a proper android or its application or else can be installed in the electric vehicles according to different battery and expand it to a large-scale project.

Today we see EVs everyone and it will have more influence in the future. Because it runs on charging. EV usage is going to increase in the future. So, they will need some system to find out the station, that's why We created a charging station finder and slot booking web. An increase in EV ridership will result in a huge crowd as a charging slot with the help of this web. And admin will also be able to manage user booking with the help of this web. There will be more demand for this web as per the number of increasing charging station. Mostly admin and user use the web to book charging slots and manage booking. Similarly, the web can prove to be helpful in the future.

XII. CONCLUSION

As India is country with vast road network, if country wants to boost the popularity of EV's, it needs to install as many charging station as possible. Installation of charging station is much easier, but lack of knowledge makes it difficult to handle. Proper intelligence will surely improve current state of infrastructure.

Its initial installation cost is high due to non-availability of equipment's in India. Because all investment will eventually get recovered through charging station. It derives large power from grid, which increase load.

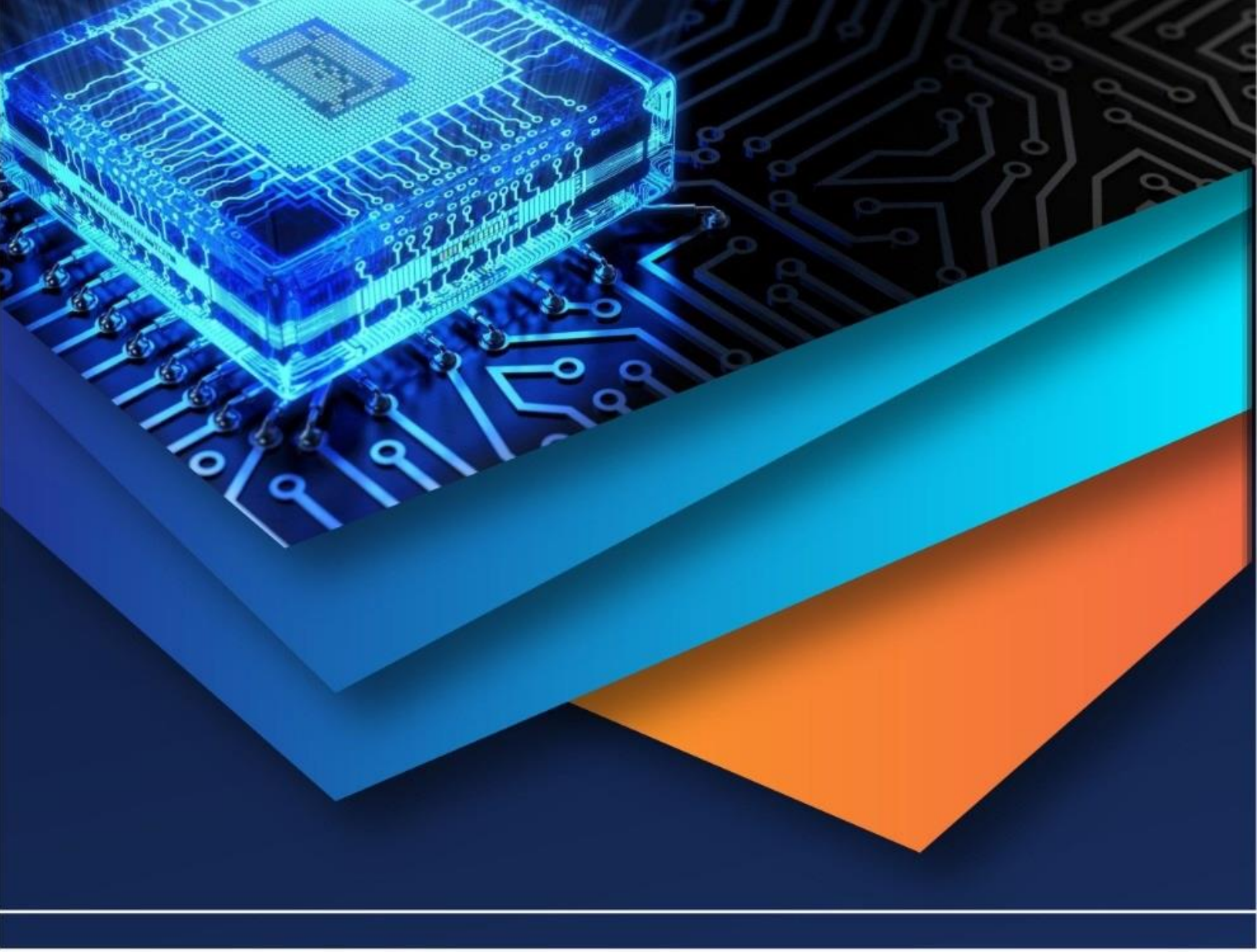
Increase in number of charging station will boost the selling of EV's as their will be reduced range anxiety. This will boost direct and indirect employement in country. As India lack charging stations, it is goodopportunity to young business aspirants to install charging station in their locality.

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