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WEB BASED EV CHARGING STATION FINDER AND SLOT BOOKING

Mrs. T. GEETHA[1] M.E., M.B.A., (Ph.D).,

[1]Department of CSE, Assistant Professor, Dhanalakshmi Srinivasan Engineering College, Perambalur

ABINESH S [2],AKASH A[2], ARUN IYYAPPAN M[2], HEMANTHAN G[2]

[2]Department of CSE, UG Student, Dhanalakshmi Srinivasan Engineering College, Perambalur

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Abstract – One of the primary challenges is the inadequate availability of EV charging stations, particularly in certain regions or areas with high population density. This scarcity makes it inconvenient for electric vehicle owners to find accessible charging points, leading to range anxiety and reluctance in adopting electric vehicles. This project introduces an innovative solution for optimizing on-road vehicle services and electric vehicle (EV) charging station slot booking systems. Through this integrated platform, users can seamlessly access a range of on-road services, including vehicle maintenance, repair, and emergency assistance, while also reserving slots for EV charging stations. Leveraging advanced technologies, such as real-time GPS tracking and automated scheduling algorithms, the platform facilitates efficient dispatching of service providers to users' locations, ensuring timely assistance and minimizing downtime for vehicles.

Key Words: Electric vehicle charging locator, EV charging point finder, Charging station locator app, Electric car charging station map, EV charger locator service, Electric vehicle charging spot finder, Charging station finder tool, EV charging station search engine.

I.INTRODUCTION.

A lot of individuals face difficulties getting help when their vehicle breaks down on the road. Many of them do now not have any automobile restore provider carriers touch range and couldn't get assist because the auto restore provider middle is perhaps far away from their place This venture to help folks who are in want whilst their automobile breaks down alongside the roads to make this viable, we expand Android Application for consumer help which affords help to the passengers at some stage in their street trips. We recognize many a sway Android has imparted to the arena of technology. The very truth that Android is open supply has resulted with inside the OS being imparted in smartphones with essential hardware. This in flip has resulted with inside the world of net being accessed via way of means of humans even with inside the remotest of locations and henceforth we are going to use this utility which can be utilized by humans below misery of a breakdown and mix the various feasible help that will be at some point of the trip.

EV Charging Station

Charging station mapping services typically give the location, power, network, and connector type of publicly available charging stations, while more advanced services give the price and live availability of stations. Large charging networks provide maps of their

own stations for customers. A crowdsourced map of public, private and residential charging locations. The site uses Google Maps to provide a map of charging locations and their own database to filter by charging type. Public chargers, private chargers, and residential charging locations are listed. The service provides an

app for iOS and Android which allows users to locate chargers near their current location. An account is needed to view private persons' charging locations, as these locations are at the homes or businesses of Plug share members.

Fast charging is also known as rapid charging or quick charging and aims to recharge EV batteries within a short period similar to that for gasoline refuelling of conventional vehicles. The time necessary for fast charging is about 20 minutes for charging up 80% capacity. Thus, the total travelling distance of EVs can be greatly extended, provided that there are sufficient fast charging stations on the way. The key to fast charging stations is the off-board fast charging module, which can output 35 kW or even higher. The corresponding voltage and current ratings are 45–450 V and 20–200 A, respectively. As both power and current ratings are so high, such recharging facilities have to be installed in supervised stations or service centres.

Although fast charging enables EVs to have a driving range similar to that of conventional vehicles, it creates adverse impacts on our power system, namely harmonic contamination and high current demand superimposing on the peak-hour consumption, violating the principle of demand-side management.

Scope of the project

- The project aims to develop a user-friendly mobile application that serves as a one-stop solution for both on-road vehicle services and EV charging station slot booking. The application will be accessible to both vehicle owners and service providers, offering a seamless interface for accessing various services and making reservations.
- The application will integrate a range of on-road vehicle services, including fueling, maintenance, repair, towing, and emergency roadside assistance. Users will be able to request and schedule these services directly through the application, eliminating the need for separate service providers and streamlining the process for vehicle owners.
- The project will also incorporate a slot booking system for EV charging stations, allowing electric vehicle owners to reserve charging slots in advance. This feature will provide real-time information on slot availability, enabling users to plan their charging stops efficiently and reduce wait times at charging stations.

II. LITERATURE SURVEY

A. EXISTING SYSTEM

The existing system faces challenges where users have limited access to mechanics in their database, resulting in difficulties when their vehicles break down in remote or distant locations where their known mechanic shops may not be present. Users are unaware of whether their vehicles have encountered any mechanical issues in these areas. In such situations, users may rely on personal contacts at the location to seek help, but this is contingent upon the willingness and availability of those contacts. Finding a suitable mechanic for the required service becomes a daunting task at remote locations. As a result, users often resort to alternative transportation options when faced with a breakdown and subsequently need to arrange for a mechanic to reach the location where their vehicle is stranded. These challenges emphasize the need for an improved on-road vehicle breakdown assistant management system that can efficiently address these limitations and provide timely assistance to users, regardless of their location.

CHALLENGES

- Limited Access to Mechanics
- Dependency on Personal Contacts
- Difficulty in Finding Mechanics

B. PROPOSED SYSTEM

The proposed methodology introduces an innovative solution aimed at optimizing on-road vehicle services and electric vehicle (EV) charging station slot booking systems.Through the integration of an advanced platform, users gain seamless access to a variety of on-road services, including vehicle maintenance, repair, and emergency assistance, alongside the ability to reserve slots for EV charging stations. Leveraging cutting-edge technologies such as real-time GPS tracking and automated scheduling algorithms, the platform facilitates efficient dispatching of service providers to users' locations, ensuring timely assistance and minimizing vehicle down time.More over, the system features a user-friendly interface for booking slots at EV charging stations, empowering EV owners to conveniently plan and manage their charging needs. By streamlining on-road vehicle services and EV charging station bookings, this platform aims to significantly improve the overall

experience for both vehicle owners and service providers, promoting sustainability, efficiency, and convenience in urban mobility.

Advantages

- Seamless Access to On-Road Services
- Efficient Dispatching of Service Providers
- Convenient EV Charging Station Slot Booking
- Time Saving

III. SYSTEM REQUIREMENTS

3.1 HARDWARE REQUIREMENTS

- Processors: Intel® Core™ i5 processor 4300M at 2.60 GHz or 2.59 GHz (1 socket, 2 cores, 2 threads per core), 8 GB of DRAM
- Disk space: 320 GB
- Operating systems: Windows® 10, mac OS*, and Linux*

3.2 SOFTWARE REQUIREMENTS

- Server Side : Python 3.7.4(64-bit) or (32-bit)
- Client Side : HTML, CSS, Bootstrap
- IDE : Flask 1.1.1
- Back end : MySQL 5.
- Server : Wamp Server 2i
- OS : Windows 10 64 –bit or Ubuntu 18.04 LTS “Bionic Beaver”

IV. MODULE DESCRIPTON

Admin Dashboard Module
The administrative interface module offers comprehensive management capabilities for electric vehicle (EV) charging stations, slots, and user bookings. Administrators are empowered with functionalities to efficiently oversee and maintain the charging infrastructure. Firstly, administrators have the ability to add, edit, or delete charging stations as necessary, ensuring that the database remains up-to-date with accurate information regarding available charging facilities.

EV Charging Station Map Module
This module enhances user experience by seamlessly integrating with mapping APIs to provide a comprehensive map interface displaying the locations of EV charging stations. Users can conveniently search for nearby stations, facilitating efficient planning for charging stops during their journeys.

User Authentication Module
This module serves as the backbone for user authentication within the system, providing essential functionality for user registration, login, and account management. Users can securely create their accounts through a registration process, inputting necessary details such as username, email, and password. To ensure the validity of user accounts and prevent unauthorized access.

Slot Booking Module
This module offers users the convenience of booking charging slots at their preferred EV charging stations. Through a user-friendly interface, users can easily navigate the platform to select their desired charging station, choose a suitable date and time slot, and confirm their booking with just a few clicks. By providing this functionality, the module aims to streamline the process of scheduling charging sessions, eliminating the need for users to physically visit charging stations or wait in line for available slots.

Payment Gateway Integration Module
This module serves as a crucial component in the EV charging station slot booking system by integrating with payment gateways to facilitate secure online payments. By enabling seamless transactions, users can conveniently book charging slots for their electric vehicles without concerns about payment security. The integration with payment gateways allows for a variety of payment options, including credit/debit cards, digital wallets, and other supported methods, providing flexibility and convenience for users. With the integration of payment gateways, users can make payments for EV charging slot bookings quickly and securely

V. SOFTWARE DESCRIPTION

5.1 Python

Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. It was created by Guido van Rossum during 1985- 1990. Like Perl, Python source code is also available under the GNU General Public License (GPL). This tutorial gives enough understanding on Python programming language.

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages. Python is a MUST for students and working professionals to become a great Software Engineer specially when they are working in Web Development Domain.

Tensor Flow

Tensor Flow is an end-to-end open-source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries, and community resources that lets researchers push the state- of-the-art in ML, and gives developers the ability to easily build and deploy ML-powered applications.

Keras

Keras is a deep learning API written in Python, running on top of the machine learning platform Tensor Flow. It was developed with a focus on enabling fast experimentation.

Pandas

Pandas is a fast, powerful, flexible and easy to use open source data analysis and manipulation tool, built on top of the Python programming language. Pandas is a Python package that provides fast, flexible, and expressive data structures designed to make working with “relational” or “labeled” data both easy and intuitive. It aims to be the fundamental high-level building block for doing practical, real world data analysis in Python.

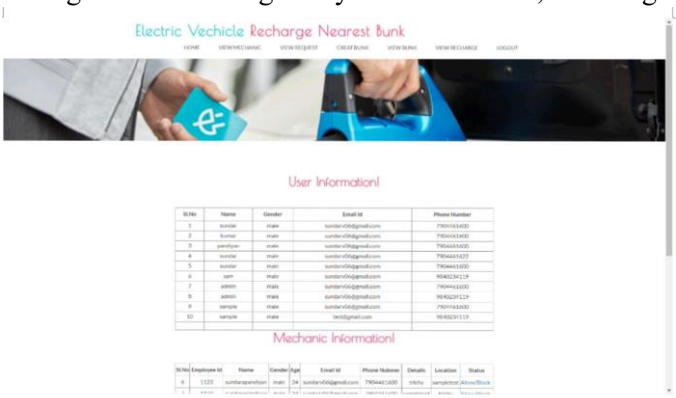
NumPy

NumPy, which stands for Numerical Python, is a library consisting of multidimensional array objects and a collection of routines for processing those arrays. Using NumPy, mathematical and logical operations on arrays can be performed.

VI. SYSTEM TESTING

6.1 System Testing

System testing is a crucial phase in the software development life cycle (SDLC) that focuses on evaluating the entire integrated system’s functionality to ensure that it meets specified requirements. This level of testing involves testing the system as a whole, checking



its compliance with the defined specifications, and verifying that all components work cohesively. The primary goal is to identify defects, ensure the system’s reliability, and guarantee that it meets user expectations before deployment.

6.1.2 Types of System Testing:

1.Functional Testing:
Description: Ensures that the system functions according to specified requirements. It verifies the behavior of the system’s features, including input validation, data manipulation, and user interface functionality.

2. Performance Testing:
Description: Assesses the system’s responsiveness, scalability, and overall performance under various conditions. This includes load testing, stress testing, and scalability testing.

3. Usability Testing:
Description: Focuses on the user interface and overall user experience to ensure that the system is user-friendly and meets user expectations.

4. Security Testing:
Description: Identifies vulnerabilities and ensures that the system is resistant to unauthorized access, data breaches, and other security threats.

5. Compatibility Testing:
Description: Verifies that the system operates correctly across different environments, browsers, devices, and operating systems.

6. Regression Testing:

Description: Ensures that new code changes do not negatively impact existing functionalities. It involves retesting the entire system after modifications.

7. Acceptance Testing:
Description: Validates whether the system meets user acceptance criteria and is ready for deployment.

VII. CONCLUSION

The project addresses the significant challenge of inadequate availability of EV charging stations and the optimization of on-road vehicle services. By introducing an integrated platform that combines on-road vehicle services and EV charging station slot booking systems, the project aims to alleviate the inconvenience faced by electric vehicle owners and improve the overall urban mobility experience. Through the integration of advanced technologies such as real-time GPS tracking and automated scheduling algorithms, the platform ensures efficient dispatching of service providers to users' locations, resulting in timely assistance and reduced vehicle downtime. Additionally, the user-friendly interface for booking slots at EV charging stations enables electric vehicle owners to plan and manage their charging needs conveniently, thereby mitigating range anxiety and promoting the adoption of electric vehicles.

VIII. REFERENCES

[1] E. Moylan, S. T. Waller, V. Dixit and S. Chand, "Analysis of vehicle breakdown frequency", A case study of new south wales Australia, vol. 12, pp. 1-14, 2020.

[2] Obloyorovich Meliyev, Hudoyor Abdukhalilovich and Ikromov Ikbljon, "Support for vehicle maintenance", Asian Journal of Multidimensional Research (AJMR), Feb 2021.

[3] Miss. Kanchan Yadav, Miss. Divya Solav, Mr. Aniket Budhbaware, Mr. Sahil Daronde and Miss. Harsha Supare, "ON ROAD VEHICLE ASSISTANCE SYSTEM", International Research Journal of Modernization in Engineering Technology and Science, vol. 02, no. 04, April 2020.

[4] Mr. Yash, S. Puraswani, Mr. Aditya, D. Attal, Mr. Prasad, G. Murhekar, et al., "REVIEW PAPER ON"ON ROAD VEHICLE", International Journal of Engineering Applied Sciences and Technology, vol. 4, no. 11, 2020.

[5] Y. Cao, T. Jiang, O. Kaiwartya, H. Sun, H. Zhou and R. Wang, "Toward pre-empted EV charging recommendation through V2V-based reservation system", IEEE Trans. Syst. Man Cybern. Syst., Jun. 2019.

[6] Gusrialdi, Z. Qu and M. A. Simaan, "Distributed scheduling and cooperative control for charging of electric vehicles at highway service stations", IEEE Trans. Intell. Transp. Syst., vol. 18, no. 10, pp. 2713-2727, Oct. 2017.

[7] D. A. Savio, V. A. Juliet, B. Chokkalingam, S. Padmanaban, J. B. Holm-Nielsen and F. Blaabjerg, "Photovoltaic integrated hybrid microgrid structured electric vehicle charging station and its energy management approach", Energies, vol. 12, no. 1, pp. 168, Jan. 2019.

[8] U. Subramaniam, S. Ganesan, M. S. Bhaskar, S. Padmanaban, F. Blaabjerg and D. J. Almakhles, "Investigations of AC microgrid energy management systems using distributed energy resources and plug-in electric vehicles", Energies, vol. 12, no. 14, pp. 2834, Jul. 2019.

[9] A. Awasthi, K. Venkitusamy, S. Padmanaban, R. Selvamuthukumaran, F. Blaabjerg and A. K. Singh, "Optimal planning of electric vehicle charging station at the distribution system using hybrid optimization algorithm", Energy, vol. 133, pp. 70-78, Aug. 2017.

[10] S. Chavhan, D. Gupta, B. N. Chandana, A. Khanna and J. J. P. C. Rodrigues, "IoT-based context-aware intelligent public transport system in a metropolitan area", IEEE Internet Things J., vol. 7, no. 7, pp. 6023-6034, Jul. 2020.