

A REVIEW ON CHARGING STATION LOCATOR AND SOLUTION FOR EV AND CNG VEHICLE

Prof. Palmur Vinayak Vijay

Guide, HoD, Assistant Professor, Department of Computer Science & Engineering,
Vidya Vikas Pratishthan Institute of Engineering and Technology, Solapur Maharashtra, India

Prof. Mote Ashwini Gopinath

Assitant Professor, Department of Computer Science & Engineering,
Vidya Vikas Pratishthan Institute of Engineering and Technology, Solapur Maharashtra, India

Mr. Goden Nagesh Anand

Student, Department of Computer Science & Engineering,
Vidya Vikas Pratishthan Institute of Engineering and Technology, Solapur Maharashtra, India

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Abstract:

The current review work tries to understand the existing technologies and apps available to the customers to book their appointments on EV charging stations and CNG filling stations also it tries to find out the existence of research gap in the systems. The gap found out in the review will be addressed by designing a new app that will help to reduce the burden on EV stations as well as on CNG stations.

Introduction:

EV

The accelerating global transition to electric mobility has spurred the need for efficient and user-friendly Electric Vehicle (EV) charging infrastructure. As an integral component of this transition, the development of intelligent and accessible solutions to locate charging stations becomes paramount. In this context, Electric Vehicle Charging Station Finding Apps emerge as a pivotal tool, seamlessly bridging the gap between EV users and the expanding network of charging stations.

The surge in electric vehicle adoption is met with a parallel expansion of charging infrastructure, but effective navigation through this network remains a crucial challenge. EV users require real-time information about charging station availability, compatibility, and amenities. Addressing these needs, Electric Vehicle Charging Station Finding Apps have evolved to offer not only location-based services but also enhanced features that optimize the charging experience.

This review paper delves into the landscape of Electric Vehicle Charging Station Finding Apps, examining their functionalities, features, and impact on the electric mobility ecosystem. By critically analyzing the existing literature, technological advancements, and user experiences, this review aims to provide a comprehensive understanding of the current state of these apps and their role in shaping the future of electric transportation.

CNG:

The surge in environmental consciousness and the pursuit of sustainable transportation solutions have ushered in a renewed interest in Compressed Natural Gas (CNG) as an alternative fuel source for vehicles. With the expanding fleet of CNG-powered vehicles, the need for a seamless and efficient infrastructure becomes imperative. In response to this demand, innovative solutions have emerged, with CNG Vehicle Filling Station Finding and Slot Booking Apps standing at the forefront, poised to revolutionize the CNG refueling experience.

As CNG gains prominence as a cleaner and more environmentally friendly alternative to traditional fuels, the success of this transition hinges on the accessibility and usability of refueling stations. The conventional challenges associated with locating CNG filling stations and managing refueling schedules are addressed by the emergence of sophisticated mobile applications. These apps not only provide real-time information about nearby CNG stations but also facilitate the booking of slots, ensuring a streamlined and convenient refueling process.

This review paper endeavors to comprehensively explore the landscape of CNG Vehicle Filling Station Finding and Slot Booking Apps, offering insights into their technological underpinnings, functionalities, and implications for the broader adoption of CNG vehicles.

Literature Review:

Dr. Omar A. Ibrahim, et al introduces a novel function for Android mobile devices, aimed at providing users with the ability to seamlessly add, remove, and review specific locations on an online map. The planned application not only enables users to interact with the map dynamically but also incorporates fundamental navigation operations. These operations include displaying directions with the optimal path between a given source and destination, as well as calculating the distance and expected driving time.

Technological Integration: The design and implementation of this location-based service leverage various technologies, including Google Maps APIs, Google Direction APIs, PHP, JSON, and MySQL. These technologies have been seamlessly integrated to provide a robust solution that enhances the user experience and functionality of the Android mobile application.

Dynamic Location Interaction: The application facilitates dynamic interaction with the online map, allowing users to add and remove specific locations, providing a personalized and customizable mapping experience.

Navigation Operations: Users can utilize the application for navigation purposes, obtaining optimal paths between source and destination, and receiving accurate estimations of both distance and expected driving time.

Technological Stack: The implementation relies on a sophisticated technological stack, combining the capabilities of Google Maps APIs and Google Direction APIs for map rendering and navigation functionalities. PHP, JSON, and MySQL are seamlessly integrated to store and retrieve location-based data efficiently.

H. Li, et al explores the study and implementation of a mobile GPS navigation system utilizing the Google Maps platform. The Google Maps API offers a range of utilities designed for integrating personalized content into Google Maps. This API comprises a set of application programming interfaces that facilitate communication with Google Maps services, empowering developers to create applications ranging from straightforward ones to highly sophisticated location-based applications for various platforms, including Web, iOS, and Android.

Google Maps API Functionality: The Google Maps API serves as a versatile tool, providing functionalities that enable the seamless integration of diverse content onto Google Maps. By leveraging this API, developers can create applications with varying complexity, tailored for different platforms such as Web, iOS, and Android.

Technological Landscape: The implementation of a mobile GPS navigation system is grounded in the Google Maps API, which acts as a bridge enabling communication with Google Maps services. This approach allows for the creation of applications that cater to the unique requirements of Web, iOS, and Android platforms.

A. M. Qadir et al presents the design and functionality of a GPS-based mobile cross-platform cargo tracking system, complemented by a web-based application. The core functionality revolves around the utilization of the Global Positioning System (GPS), which comprises a constellation of over 30 navigation satellites orbiting the Earth. These satellites continually transmit signals, allowing for precise location determination. In this system, a web-based application interacts with the GPS to enable efficient cargo tracking.

Global Positioning System (GPS) Overview: The Global Positioning System (GPS) is a constellation of 30+ navigation satellites that orbit the Earth. These satellites continuously emit signals, and their positions are precisely known. A GPS receiver, such as the one integrated into mobile phones, captures these signals. By calculating its distance from four or more GPS satellites, the receiver determines its location, providing accurate and real-time positioning information.

Web-Based Application Integration: The cargo tracking system described in this paper employs a web-based application that interfaces seamlessly with the GPS. The integration of these technologies facilitates efficient tracking and monitoring of cargo across different platforms.

F. Thung delves into the realm of API (Application Programming Interface) recommendation systems and their crucial role in simplifying the integration of new application components into existing architectures during software development. APIs serve as invaluable tools that facilitate collaboration between business and IT teams, particularly in the context of ever-evolving digital markets.

The Significance of APIs in Software Development: APIs play a pivotal role in streamlining the integration of novel application components into established architectures. Their utilization is instrumental in fostering effective collaboration between business and IT teams, providing a framework that adapts to the rapidly changing landscape of digital markets.

Adapting to Dynamic Business Needs: The business landscape is inherently dynamic, responding swiftly to the unpredictable shifts in digital markets. APIs offer a flexible solution, enabling organizations to promptly respond to changing business needs. This becomes particularly crucial in an environment where new competitors can reshape entire industries with the introduction of innovative applications.

João C. Ferreira et al introduces the design of an intelligent system dedicated to the creation and management of Electric Vehicle (EV) charging procedures. The approach aims to address challenges associated with the limitations of the electrical power distribution network and the absence of smart meter devices. The proposed system prioritizes a balanced approach to EV charging, incorporating insights from past experiences, weather information derived through data mining, and simulation methodologies.

Intelligent Process-Based Charging: The core of this work lies in the implementation of an intelligent process for Electric Vehicle charging. Recognizing the constraints posed by the electrical power distribution network, the system adopts a strategic and informed approach to ensure balanced and efficient charging procedures.

Considerations for Optimal Charging: To overcome challenges related to network limitations, the system relies on insights derived from past experiences. Additionally, it incorporates weather information obtained through data mining techniques. These considerations, combined with simulation approaches, contribute to the development of a charging system that optimally adapts to varying conditions.

Hamza Patel said that the primary goal of our system is to enhance the efficiency of the CNG gas filling process through the implementation of a virtual queue. This application provides a platform for all pump owners to register their pumps. During the registration process, essential details such as location, latitude, and longitude of each pump are recorded. These geographical coordinates are subsequently utilized to calculate the distance between each pump and the customer's current location. Upon installing the application, users are required to register, providing necessary details. Once registered, users can conveniently log in using their unique username and password, streamlining the process and eliminating the need for extensive waiting times in manual queues

S. Sri Gowthem created a smart appointment reservation system represents an electronic, paperless application that prioritizes flexibility and user-friendliness. It allows patients to seamlessly book appointments within designated slots based on their preferences. This system plays a vital role in appointment management, enabling patients to cancel or reschedule appointments by integrating various clinical systems into a unified set of services accessible through a web browser. Administrators are responsible for reviewing patient requests, managing the appointment schedule, and maintaining patient information. Patients receive timely updates, including confirmation of appointments, notifications about delays, and information regarding the unavailability of doctors. Additionally, the system encourages patient feedback to continually enhance services. The design of the proposed system offers a straightforward method for patients to reserve appointments according to their preferences. The implementation involves the development of web forms applications using .NET Framework 4.0 tools and technologies in Visual Studio 2010. SQL Server 2008 is employed for the system's database management.

Gap Identification:

The review of literature has shown some gaps in the existing systems and technologies used. By using those gaps we have identified the problem statement and the main objective of study has been decided and the objective is to develop EV Charging Station app has been developed to help EV drivers locate available charging stations near them. After locating a charging station, users can also book a slot at the station to charge their vehicle

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