



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 3, March 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

FuelMaster: Smart Automated Fuel Booking System for CNG

Akash Vahadne, Amol Bhawar, Aakanksha Satpute, Sakshi More, Nandita Patil,

Mrs Dhanashree Joshi

Department of Computer Engineering, Guru Gobind Singh Polytechnic, Maharashtra, India

Sr. Lecturer, Department of Computer Engineering, Guru Gobind Singh Polytechnic, Maharashtra, India

ABSTRACT: The "FuelMaster: Smart Automated Fuel Booking System for CNG" is a web-based application designed to address the challenges of long queues and time wastage at CNG stations in India. The project aims to provide a convenient and efficient solution for customers to book CNG gas appointments online, reducing their waiting time and enhancing the overall customer experience. By leveraging location-based services and real-time data, users can access information about the availability of gas at various stations and make informed decisions while scheduling their appointments. The system also includes an admin panel for CNG station management, allowing administrators to update gas prices and handle station-related tasks. Through the implementation of this online appointment booking system, the project aims to streamline the CNG gas booking process, improve operational efficiency, and enhance customer satisfaction.

KEYWORDS: Online Appointment Booking, CNG Pump, Queue Management, Customer Experience, Location-based Services, Real-time Data, Admin Panel, Operational Efficiency, Customer Satisfaction.

I. INTRODUCTION

The "FuelMaster: Smart Automated Fuel Booking System for CNG" project aims to revolutionize the way customers interact with CNG stations in India. The current system often leads to long queues and significant time wastage for customers, causing frustration and inconvenience. By implementing an online booking system, customers can easily schedule their CNG gas appointments from the comfort of their homes, reducing their waiting time at the stations. The project focuses on providing a user-friendly web-based platform that allows customers to select their preferred CNG pump, view available time slots, and book appointments accordingly. The system also incorporates real-time data to provide users with up-to-date information on gas availability and prices at different stations. Furthermore, the project includes an administrative panel to facilitate efficient management of CNG stations. Station administrators have the capability to update gas prices, manage appointment slots, and monitor the overall operation of the system. By automating the appointment booking process, the project aims to enhance operational efficiency, optimize resource allocation, and improve customer satisfaction. Additionally, the system incorporates location-based services, enabling users to find nearby CNG stations and calculate the distance from their current location. Overall, the "FuelMaster: Smart Automated Fuel Booking System for CNG" project offers a comprehensive solution to address the challenges associated with manual queue management, providing a seamless and convenient experience for both customers and station administrator.

II. PROBLEM STATEMENT

In traditional systems, certificates are typically issued in paper form and can be easily forged or tampered with. This makes it difficult for employers and educational institutions to verify the authenticity of certificates, leading to inefficiencies and potential fraud. By using blockchain technology, certificates can be stored in a tamper-proof and transparent manner, providing a secure and efficient way to issue and verify certificates.

III. PROJECT SCOPE

The scope of the "FuelMaster: Smart Automated Fuel Booking System for CNG" project includes the development of a web-based application that enables customers to book appointments for CNG gas filling at their preferred stations. The system will provide real-time information on gas availability, allow users to select convenient

time slots, and facilitate a seamless booking process. Additionally, an admin panel will be developed to manage gas prices and station information. The project aims to enhance the customer experience, optimize resource management, ensure safety, and enable data-driven decision making.

IV. GOALS AND OBJECTIVES

A. *The Streamline CNG Gas Filling Process:*

The primary objective of the "FuelMaster: Smart Automated Fuel Booking System for CNG" project is to streamline the CNG gas filling process by implementing an online platform for appointment booking. This system aims to eliminate the need for customers to wait in long queues by allowing them to schedule their gas filling appointments in advance. By providing a convenient and efficient booking system, the project aims to reduce waiting times and optimize the overall process.

B. *Enhance Customer Experience:*

Another objective of the project is to enhance the customer experience when filling CNG gas. By offering an online platform for appointment booking, customers can avoid the hassle of waiting in queues and have more control over their schedule. The system will provide real-time information on the availability of gas at various stations, allowing customers to choose a convenient time slot for their gas filling. This objective focuses on improving customer satisfaction and convenience in accessing CNG gas services.

C. *Improve Efficiency and Resource Management:*

The project aims to improve the efficiency of CNG stations by implementing an appointment-based system. By reducing the manual queue system, the project can optimize resource allocation and management at CNG stations. The system will allow station administrators to have better visibility of gas demand and allocate resources accordingly. This objective aims to enhance the overall operational efficiency and resource utilization in the CNG gas filling process.

D. *Ensure Safety and Compliance:*

Safety is a crucial objective of the project. The online platform will incorporate necessary safety measures and compliance regulations to ensure a secure gas filling process. Users will be provided with information regarding safety guidelines and precautions when using CNG gas. The system will also allow users to provide feedback on safety and service aspects, enabling continuous improvement in safety standards and compliance.

E. *Enable Data Analysis and Decision Making:*

The project aims to collect data on customer preferences, gas consumption patterns, and feedback through the online platform. This data can be analyzed to gain insights into customer behavior, optimize resource allocation, and make informed decisions regarding service improvements. The objective is to utilize data analysis techniques to drive decision-making processes and enhance the overall effectiveness of the CNG gas filling system.

V. LITERATURE SURVEY

A. *"BIO-FUEL BOOKING SYSTEM USING MACHINE LEARNING" by Dhiraj Mondkar et al. (2022)*

[1] This paper focuses on the improvement of a bio-fuel reserving system the usage of computer studying techniques. The authors propose a device that integrates laptop studying algorithms to predict the demand for bio-fuels primarily based on a variety of elements such as historic data, climate conditions, and patron preferences. The gadget targets to optimize the bio-fuel booking technique by way of precisely forecasting demand and ensuring environment friendly gasoline distribution. The authors carried out experiments and opinions to reveal the effectiveness of their proposed device in phrases of correct demand prediction and increased gasoline management.

B. *"An Appointment Scheduling Optimization Method" by Ali Ala and Feng Chen (2020)*

[2] This paper focuses on the optimization of appointment scheduling procedures in a number of industries, together with CNG pump services. The authors advocate a approach that makes use of mathematical modeling and optimization algorithms to improve the effectivity of appointment scheduling. The paper highlights the advantages of optimizing appointment schedules, such as decreasing consumer ready times, maximizing resource utilization, and improving standard provider quality. The authors current their proposed approach and grant experimental consequences to display its effectiveness in optimizing appointment scheduling processes.

C. "Online Appointment Booking System for CNG pumps with feedback Analysis" by Hamza Patel (2019),

[3] This paper provides an online appointment reserving gadget specifically designed for CNG pumps. The device permits users to effectively e book appointments for refueling their vehicles at CNG pumps, doing away with the want to wait in lengthy queues. The writer additionally comprises comments evaluation functionality, enabling customers to grant qualitative and quantitative remarks on the security and carrier of the CNG pumps. The paper highlights the significance of such a machine in enhancing purchaser journey and optimizing the common CNG refueling process.

D. "BOOKAZOR - an Online Appointment Booking System" by V. Akshay et al. (2019)

[4] This paper affords an online appointment reserving gadget called "BOOKAZOR" that can be utilized in more than a few domains, which includes CNG pump appointment booking. The system presents customers with a user- pleasant interface to book appointments for their preferred services, putting off the want for guide reserving procedures. The authors describe the system's architecture, highlighting its key elements such as real-time availability updates, more than one price options, and appointment notifications. The paper emphasizes the efficiency and comfort presented by way of such on-line appointment reserving systems.

E. "Automatic LPG Gas Booking and Detection System" by M.S. Kasar et al. (2007)

[5] This paper introduces the computerized LPG fuel reserving and detection gadget to streamline the system of LPG fuel booking and make sure environment friendly distribution. The authors propose a gadget that makes use of embedded technological know-how and wireless conversation to enable automated reserving of LPG gas cylinders primarily based on the customer's gasoline consumption. The system additionally comprises gasoline leakage detection mechanisms to Enhance safety. The paper affords the sketch and implementation of the system, emphasizing its plausible in reducing guide intervention and bettering purchaser satisfaction.

VI. SYSTEM ARCHITECTURE

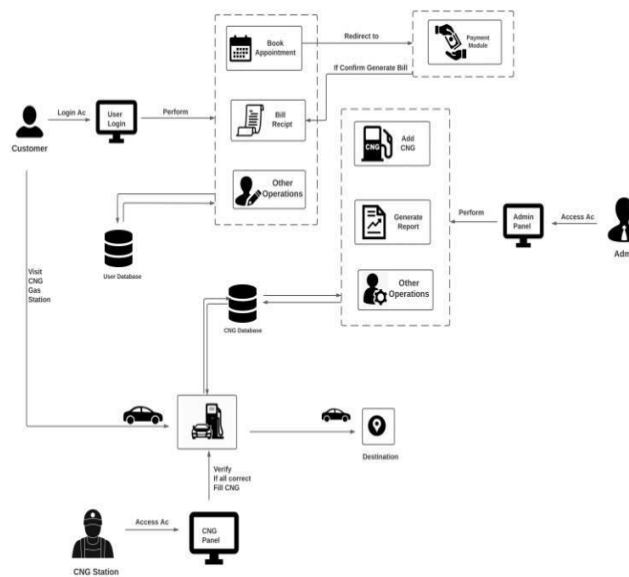


Fig. 1 System Architecture Diagram

VII. FUNCTIONAL & NON-FUNCTIONAL REQUIREMENTS

Functional requirements:

A. User Registration:

The system should allow users to register by providing necessary details such as name, contact information, and location. User registration should be secure and include validation of user inputs.

B. Pump Information:

The system should provide information about available CNG pumps, including their locations, operating hours, services offered, and current gas prices. This information should be regularly updated and easily accessible to users.

C. Appointment Booking:

Users should be able to book appointments for CNG filling at their preferred pump. The system should display available time slots and allow users to select a convenient slot for their appointment. Booked appointments should be reflected in real-time to avoid overlapping or double booking.

D. Appointment Management:

The system should provide features for users to view, modify, or cancel their booked appointments. Users should be able to reschedule appointments if necessary, and the system should handle any conflicts or scheduling constraints.

E. Location-based Services:

The system should use geolocation to determine the user's current location and provide a list of nearby CNG pumps. It should calculate the distance between the user's location and available pumps to help users choose the most convenient option.

F. Notifications and Reminders:

The system should send notifications and reminders to users regarding their upcoming appointments. These reminders can be in the form of email, SMS, or push notifications, ensuring that users are well-informed and prepared for their appointments.

G. Feedback and Rating:

The system should allow users to provide feedback and ratings for the CNG pumps and the overall service. It should include a feedback form or mechanism to collect user opinions, suggestions, and satisfaction ratings.

H. Admin Panel:

The system should have an admin panel for the CNG pump station authorities to manage pump information, update gas prices, view appointment bookings, and generate reports. The admin panel should have secure access control to ensure only authorized personnel can make changes.

I. Reporting and Analytics:

The system should generate reports and analytics on various aspects, such as appointment statistics, user feedback analysis, and pump performance. These reports can help in decision-making, identifying trends, and improving service quality.

J. Security and Privacy:

The system should incorporate security measures to protect user data, prevent unauthorized access, and ensure the privacy of personal information. It should comply with relevant data protection regulations and implement secure authentication and data encryption mechanisms.

Non-functional requirements:

A. Usability:

The system should have a user-friendly interface and be easy to navigate. It should provide clear instructions and guidance to users at each step of the booking process. The system should also be responsive and accessible on various devices, including desktops, tablets, and mobile phones.

B. Performance:

The system should be highly responsive and provide fast loading times to ensure a smooth user experience. It should be capable of handling multiple concurrent users without significant performance degradation. The response time for booking appointments, retrieving pump information, and processing user requests should be minimal.

C. Reliability:

The system should be reliable and available to users at all times. It should have robust error handling and recovery mechanisms to handle unexpected situations or system failures. Regular backups of data should be performed to prevent data loss.

D. Scalability:

The system should be designed to accommodate a growing number of users and pump stations. It should be scalable to handle increased traffic and load without compromising performance or functionality. The system architecture should support horizontal scaling if necessary.

E. Security:

The system should prioritize the security of user data and sensitive information. It should implement secure authentication mechanisms to verify user identities and prevent unauthorized access. User data should be encrypted during transmission and storage. The system should also have mechanisms in place to detect and prevent common security threats such as SQL injection and cross-site scripting.

F. Privacy:

The system should adhere to privacy regulations and protect user privacy. It should clearly communicate its data handling practices and obtain user consent for collecting and storing personal information. User data should be securely stored and only accessible to authorized personnel.

G. Compatibility:

The system should be compatible with different web browsers and operating systems to ensure a wide user base can access and use the system effectively. It should adhere to web standards and technologies to ensure cross-platform compatibility.

H. Maintainability:

The system should be designed and developed with maintainability in mind. It should have a modular and well-documented codebase that allows for easy troubleshooting, bug fixing, and future enhancements. Regular maintenance tasks such as software updates and database optimizations should be planned and performed.

I. Integration:

The system should have the capability to integrate with other existing systems or third-party services, such as payment gateways or mapping services. This integration should be seamless and ensure smooth data flow between systems without compromising security or performance.

J. Compliance:

The system should comply with relevant industry standards, regulations, and legal requirements. This includes data protection regulations, accessibility standards, and any specific regulations related to the CNG industry or appointment booking systems.

VIII. CONCLUSION

In conclusion, the development of the FuelMaster: Smart Automated Fuel Booking System for CNG has proved to be a significant step forward in improving the efficiency and convenience of CNG fuel services. The system successfully addresses the problem of long queues and time wastage at CNG pumps by providing users with the ability to book appointments online, make payments, and receive reminders. Through the implementation of various modules and technologies, such as Django, HTML, CSS, and SQLite, the system offers a user-friendly interface and reliable functionality. The project has achieved its objectives of reducing waiting times, enhancing user experience, and providing better control and management for CNG pump administrators. The implementation of security measures ensures the safety of user information and transactions. The integration of feedback analysis allows for continuous improvements in service quality and safety.

IX. FUTURE SCOPE

The FuelMaster: Smart Automated Fuel Booking System for CNG opens up several avenues for future enhancements and expansions. Some of the potential areas for future development and improvement include:

A. Mobile Application:

Developing a dedicated mobile application for the system can provide users with more convenience and accessibility, allowing them to book appointments and manage their CNG fuel requirements directly from their smartphones.

B. Integration with Navigation Systems:

Integrating the system with navigation systems can provide users with real-time information on the nearest CNG pumps, along with directions and traffic updates, further optimizing their journey.

C. Integration with Payment Gateways:

Expanding the payment options by integrating with popular online payment gateways can offer users more flexibility in making payments for their CNG fuel bookings.

D. Analytics and Reporting:

Implementing advanced analytics and reporting features can provide administrators with valuable insights into user behavior, appointment trends, and overall system performance. This data can be used to make informed decisions for service improvements and resource allocation.

E. Loyalty Programs:

Introducing loyalty programs or rewards for frequent users can incentivize customer loyalty and encourage more people to use the system for their CNG fuel needs.

F. Integration with Vehicle Systems:

Integrating the system with vehicle systems, such as onboard computers or mobile applications, can enable seamless integration of fuel requirements and appointments, further enhancing the user experience.

G. Expansion to Other Fuel Types:

The system can be expanded to accommodate other fuel types, such as petrol or diesel, to provide a comprehensive fuel booking solution for a wider range of users.



REFERENCES

- [1] Hamza Patel, "Online Appointment Booking System for CNG pumps with feedback Analysis," 2019 IEEE International Conference on Advances in Computing, Communication and Information Technology (ICACCI), 2019.
- [2] M.S.Kasar, Rupali Dhaygude, Snehal Godse, Sneha Gurgule, "Automatic LPG Gas Booking and Detection System," 2007 IEEE International Conference on Industrial and Information Systems (ICIIS), 2007
- [3] V. Akshay, Anish Kumar S., R.M. Alagappan, S. Gnanavel, "BOOKAZOR - an Online Appointment Booking System," 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), 2019.
- [4] Ali Ala, Feng Chen, "An Appointment Scheduling Optimization Method," 2020 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM), 2020.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details