



International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Cng Navigator : A Mobile App For Smart Refueling Solutions

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ABSTRACT-

Due to frequent hikes in fuel prices, car owners in India are shifting toward more economical alternatives like Compressed Natural Gas (CNG). Despite its growing adoption, long queues at CNG stations remain a significant issue. The CNG Navigator is a mobile application designed to streamline the CNG refueling experience. It helps users locate the nearest stations, navigate via Google Maps, receive real-time CNG availability updates, and make digital payments. The system comprises three main components: an Admin Panel, a User App, and a Gas Owner App. This paper discusses the application framework, key technologies, and implementation strategies, along with performance evaluations.

Keywords: CNG, navigation, mobile application, real-time data, digital payment, user experience, queuing system

I. INTRODUCTION

A. Introduction

Compressed Natural Gas (CNG) is one of the most practical alternative fuels available in the automotive industry today. It offers lower pollution levels and is more cost-efficient compared to traditional fuels. The CNG Navigator app has been designed to facilitate a smoother CNG refueling experience by incorporating user, admin, and gas owner interfaces.

B. Motivation

The motivation behind CNG Navigator stems from the increasing demand for cleaner and cheaper fuel alternatives. The need for a user-centric, real-time, and efficient CNG locating and queuing system has driven the development of this app

C. Application

The CNG Navigator assists users in locating and navigating to nearby stations, viewing real-time fuel availability, making payments, and submitting feedback. Businesses benefit from operational monitoring, and government bodies can promote CNG adoption using aggregated data.

D. Organization of paper

Section 2 covers the literature review. Section 3 outlines the limitations of current systems. Section 4 presents the problem statement and objectives. Section 5 discusses the proposed framework. Section 6 describes the technologies used. Section 7 includes references.

II. LITERATURE SURVEY

Queuing theory models such as M/M/1 and M/M/c are examined for application in CNG station flow. The study reviews customer behavior (balking, reneging, jockeying), performance metrics, and research on transportation-related queuing systems.

III. LIMITATION OF EXISTING SYSTEM

Current systems fail to implement queuing models, have insufficient data on arrival patterns, and lack user behavior insights. These limitations lead to inaccurate predictions and inefficient station management.

IV. PROBLEM STATEMENT AND OBJECTIVES

Despite CNG's affordability and environmental advantages, users face long wait times. The system needs to address the lack of data-driven queue management.

- Provide real-time station availability
- Plan optimal routes
- Integrate secure digital payments
- Analyze user behavior
- Offer a cross-platform solution
- Improve customer experience

V. PROPOSED SYSTEM

1. FRAMEWORK

The hybrid model merges Agile and Waterfall for development. It consists of:

- Admin Panel: Manages station and user data
- User App: Displays stations, enables navigation and payments
- Gas Owner App: Updates availability

2. REQUIREMENT GATHERING

Includes real-time data, route optimization, multi-platform compatibility, and secure integration with payment and mapping APIs.

3. PROCESS FLOW

User registers → searches for stations → navigates → checks availability → makes payments → provides feedback → admin/gas owner manages data

4. METHODOLOGY

From literature review to deployment and iterative improvements, the methodology follows structured phases with a focus on usability and real-time data analysis

VI. TECHNOLOGIES USED

1.Database

MongoDB, with tables like Users, CNG Stations, Admins, Gas Owners, Feedback

2. Software of Hardware Requirements

Cross-platform compatibility (Android/iOS), uses React Native, Node.js, Express, Google Maps API, and Stripe/PayPal

3. Evaluation Parameters

Measured by user feedback, Net Promoter Score, real-time accuracy, reliability, scalability, environmental and economic impact

VII. REFERENCES

- [1] Prof. Palmur Vinayak Vijay's. A REVIEW ON CHARGING STATION LOCATOR AND SOLUTION FOR EV AND CNG VEHICLE.
- [2] Gupta, P., & Sharma, A. (2019). CNG station locator app: A solution for efficient fuel management. *Journal of Engineering Research*, 7(3), 45-56. <https://doi.org/10.24200/jer.v7i3.175>
- [3] Lopez, P., & Cruz, M. (2019). Using predictive algorithms for fuel queue management: A case study. *International Journal of Advanced Technology and Engineering Research*, 9(2), 119-127. https://www.researchgate.net/publication/378723577_
- [4] Zhou, L., & Li, X. (2021). Real-time data-driven systems for fuel availability management. *Journal of Applied Computing and Informatics*, 17(1), 90-104. <https://doi.org/10.1016/j.jaci.2020.04.003>