

# Online Appointments Booking System for CNG Pumps with Feedback Analysis

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**Abstract**—The mobile devices are becoming more and more popular and are providing a new notion of communication that only once could imagine. With respect to CNG Cars, one of the major problems faced by the lakhs of people, who use CNG Car is standing in the long queues for an average of 40-45 minutes to fill the Gas. This often leads to people not buying the CNG cars. A transport department official said, “Fluctuations in manufacturing of factory-made CNG car models are a probable reason and long queues at CNG gas stations also act as a deterrent for many buyers.” This project aims to find a remedy for these lakhs of people by using an online application to book appointment on their mobile phone and feedback system for analysing user experience with different pumps regarding service and safety. Customers provide feedback in quantitative ratings and qualitative comments related to service and safety. Analysing and evaluating this qualitative data helps us to make better sense of customer feedback on service. This paper focus on providing qualitative and quantitative feedback to analyse and provide better service.

**Index Terms**— Sentiment Analysis, Firebase, Naive Bayes.

## I. INTRODUCTION

Fill CNG Gas in Cars is most challenging now a days, in the current Filling facility we have to fill gas by standing in queue. This is really inconvenient for users as days are passing the this queue is getting larger and larger.”Auto manufacturers cited long queues at CNG stations as a reason as well. “After court orders, all taxis and public transport in Delhi are now CNG fuelled. This will put consumers off the fuel since it means longer queues and waiting at stations in Delhi. The CNG network is not enough at the moment,” sources in an auto manufacturer said. The existing filling system is causing a considerable increase in the travel time due to a Major drawback “Long Queues”, which absorbs a significant portion of the travelling time. On an average, a customer spends around 45 minutes in the queue at the CNG Station.

The aim of our system is to ease the CNG gas filling system by maintaining virtual queue. In this application all the pump owners will be registering their pumps. While registering we will be taking their location , latitude and longitude which will be used while calculating distance of each pump from the current location of customer. As user install the application which is platform independent first user needs to register will registration necessary details will be taken and once the user is register user can use username and password for login. In this application first landing page is the page showing favourite pumps of user which user as marked as favourite for the first time it will be displaying no favourite pumps as there is no pumps in favourite pump list. User can fetch pumps from pump list user need to select city once city is selected it will be showing the list of pumps in that city with distance from current location of user. Clicking on pump list

will take it to Pump Details page where pumps details is displayed it has option for checking location of pump on map as well as route for that pump from user location. User can go to on book appointment option and can view different slots available and booked for different days and if user wants to book the appointment user can click on the slot user want to book it. The user need to reach just 5 to 10 before is time on pump user will be getting remainder 15 before. This actually avoids from wasting large span of time in manual queue. After filling gas after some user will get sms with a link to feel a feedback form based on some qualitative and quantitative feedback Parameters with respect to safety and service with will be analyse to find sentiments using niave bayes algorithm.

## II. ONLINE APPOINTMENTS BOOKING SYSTEM FOR CNG PUMPS WITH FEEDBACK ANALYSIS

### A. What is Online Appointments Booking System for CNG Pumps with Feedback Analysis.

This application deals with the development and implementation of a smart-phone application to book a appointment in a CNG pump by maintaining virtual queue for each pump which is simple and easy to use and taking the feedback of user and analysing the feedback. This analysing feedback can be used by CNG station owners to improve the pumps service as well as by user to check reviews of the particular pumps and by Government authorities to check safety of particular CNG Station.

### B. Existing System

The current CNG Filling station are more time consuming. The car has to be taken CNG station and wait in queue till over chance comes. This process is time consuming because we have to stand in queue to Fill gas and this is very hectic process. And as all CNG pump are not online there could be a chance that gas station is empty before user get the gas so it could be wastage of time standing in queue.

### C. Proposed System

The main aim of the proposed system is to avoid customer spending time in queue. It is done by maintaining a virtual queue for each pump. Each pump will have queue of customized slots each of 5 to 10 minutes which user can view whichever user want can book it but before booking user must do login. In this we have a page Pump Queue were user can view the queue of each pump and accordingly make a appointment with pumps having lesser queue. This system also takes feedback from customer based on some qualitative and quantitative measures. Further it analyse the feedback using sentiment analysis technique.

### D. System Architecture

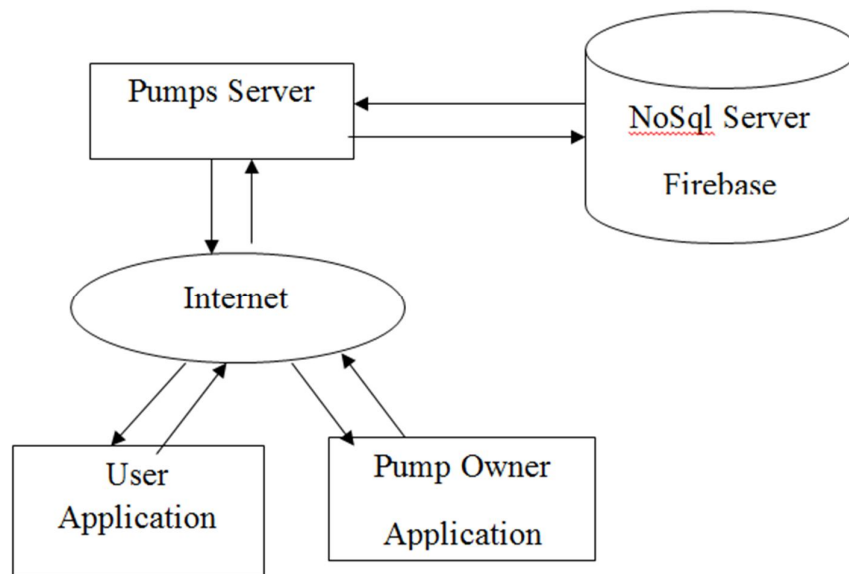


Figure 1: System Architecture

### III. WORKING

#### *A. Registration Details*

The registration of application starts from personal information. It gathers the customer information such as Name, Mobile no., E-mail, Pin and OTP will we using One time password technique to confirm the phone no is right and this entire information will be stored into NOSQL database.

#### *B .Login Page*

During login into this system we required to enter the mobile no/email which is used as a username and pin.

#### *C. Booking slots*

In this application first landing page is the page showing favourite pumps of user which user as marked as favourite for the first time it will be displaying no favourite pumps as there is no pumps in favourite pump list. User can fetch pumps from pump list user need to select city once city is selected it will be showing the list of pumps in that city with distance from current location of user. Clicking on pump list will take it to Pump Details page where pumps details is displayed it has option for checking location of pump on map as well as route for that pump from user location. User can go to on book appointment option and can view different slots available and booked slots for different days and if user wants to book the appointment user can click on the slot user want to book it. The user need to reach just 5 to 10 before is time on pump user will be getting remainder 15 minutes before.

#### *D. Feedback Form*

System takes feedback from customer based on some qualitative and quantitative measures. Further it analyse the feedback using sentiment analysis for qualitative measure. Naive Bayes algorithm is used for sentiment analysis.

The Naive Bayes classifier is a simple probabilistic classifier which is based on Bayes theorem with strong and naïve independence assumptions. It is one of the most basic text classification techniques with various applications in email spam detection, personal email sorting, document categorization, sexually explicit content detection, language detection and sentiment detection. Despite the naïve design and oversimplified assumptions that this technique uses, Naive Bayes performs well in many complex real-world problems.

As stated earlier, the Naive Bayes classifier assumes that the features used in the classification are independent. Despite the fact that this assumption is usually false, analysis of the Bayesian classification problem has shown that there are some theoretical reasons for the apparently unreasonable efficacy of Naive Bayes classifiers as Zhang shown. It can be proven that even though the probability estimates of Naive Bayes are of low quality, its classification decisions are quite good. Thus, despite the fact that Naive Bayes usually over estimates the probability of the selected class, given that we use it only to make the decision and not to accurately predict the actual probabilities, the decision making is correct and thus the model is accurate.

#### *E. Pump List Page*

Pump list displays the list of all the pumps for the selected city with distance's calculated from the current location of user to the pump. To get current location of user we are using Geolocation API provide by Google and then applying haversine algorithm to calculate the distance between different from current location. On Pump list page we have button on clicking it will show pump location on map. As well we have button for navigaton that will show the direction to that pump.

#### *F. Pump Details Page*

When Pump from Pump List is selected Pump Detail Page displays the details of pumps for the selected pump with distance's calculated from the current location of user to the pump. On Pump list page we have button on clicking it will show pump location on map. As well we have button for navigation that will show the direction to that pump. . User can go to on book appointment option and can view different slots available and booked for different days and if user wants to book the appointment user can click on the slot user want to book.

## IV. SYSTEM ANALYSIS

### *Functional Requirement*

#### *A. Customer Requirements*

The current CNG gas Filling system is human dependent and time consuming when it comes to filling gas process. This application is to bring convenience in filling gas in car using smart phone and booking appointments. This system deals with the development and implementation of a smart-phone application to book appointment in CNG pump which is simple and easy to use.

#### *B. User*

Our system is to develop an android/ios application which will serve as a medium for users to take appointments in CNG pumps and provide feedback of pumps service and safety. The application should reduce the time required for standing in queue and keep the user data secured and take feedback and analyze the sentiment of this data.

## V. INTENDED USE

### *A. Expectations*

#### *Challenges*

The Application should be designed in such a way that even common man should be able to understand the process of booking slot without any ambiguity.

#### *B. System Requirements*

The software requirements identified for developing the application are Angular 2, Visual studio Code and Firebase.

### *Software Requirements*

#### *1. Angular 2*

Angular 2 is an open source JavaScript framework to build web applications in HTML and JavaScript. This tutorial looks at the various aspects of Angular 2 framework which includes the basics of the framework, the setup of Angular and how to work with the various aspects of the framework. Other topics discussed in the tutorial are advanced chapters such as interfaces, nested components and services within Angular. Topics such as routing, modules, and arrays are also dealt with in this tutorial.

Following are the key features of Angular 2 –

- Components – The earlier version of Angular had a focus of Controllers but now has changed the focus to having components over controllers. Components help to build the applications into many modules. This helps in better maintaining the application over a period of time.
- TypeScript – The newer version of Angular is based on TypeScript. This is a superset of JavaScript and is maintained by Microsoft.
- Services – Services are a set of code that can be shared by different components of an application. So for example if you had a data component that picked data from a database, you could have it as a shared service that could be used across multiple applications.

In addition, Angular 2 has better event-handling capabilities, powerful templates, and better support for mobile devices.

#### *2. NoSql*

A NoSQL (originally referring to "non SQL" or "non-relational") database provides a mechanism for storage and retrieval of data that is modelled in means other than the tabular relations used in relational databases. Such databases have existed since the late 1960s, but did not obtain the "NoSQL" moniker until a surge of popularity in the early twenty-first century,<sup>[1]</sup> triggered by the needs of Web 2.0 companies such as Facebook, Google, and Amazon.com.<sup>[6]</sup> NoSQL databases are increasingly used in big data and real-time web applications.<sup>[6]</sup> NoSQL systems are also sometimes called "Not only SQL" to emphasize that they may support SQL-like query languages.

### *Real-time Database*

Firebase provides a real-time database and backend as a service. The service provides application developers an API that allows application data to be synchronized across clients and stored on Firebase's cloud. The company provides client libraries that enable integration with Android, iOS, JavaScript, Java, Objective-C, swift and Node.js applications. The database is also accessible through a REST API and bindings for several JavaScript frameworks such as AngularJS, React, Ember.js and Backbone.js. The REST API uses the Server-Sent Events protocol, which is an API for creating HTTP connections for receiving push notifications from a server. Developers using the real-time database can secure their data by using the company's server-side-enforced security rules.

### *Firestore Storage*

Firestore Storage provides secure file uploads and downloads for Firestore apps, regardless of network quality. The developer can use it to store images, audio, video, or other user-generated content. Firestore Storage is backed by Google Cloud Storage.

### *b. Hardware Requirements*

Intel Pentium 4 processor or higher.  
Minimum RAM of 512mb.  
Free disk space of 16GB or more.  
1024 x 768 resolution monitor.

## VI. CONCLUSION

Eradicates the need to stand in a queue to fill the gas as well as provide the feedback analysis. This feedback could be used to improve the service. Using sentiment analysis for finding sentiments in the comments. Naive bayes is one of most easiest and simple algorithm to find the sentiment of the text.

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