

# BookMyCNG

**Atharva Ravindra Babar<sup>1</sup>, Suyog Bhart Bhor<sup>2</sup>, Komal Eknath Ghadge<sup>3</sup>,**

**Nikita Nandkumar Dhule<sup>4</sup>, S. B. Khadke<sup>5</sup>**

Students, Department of Computer Engineering<sup>1-4</sup>

Guide, Department of Computer Engineering<sup>5</sup>

Rasiklal M. Dhariwal Institute of Technology, Pune, India

**Abstract:** *The increasing adoption of Compressed Natural Gas (CNG) vehicles has created new challenges in managing refueling operations at CNG stations. In many cities, vehicle owners often face long waiting lines due to the absence of an organized scheduling mechanism. This research presents the design and development of a Smart CNG Management System that allows users to book refueling slots through an online platform. The proposed system aims to reduce congestion, improve service efficiency, and enhance user convenience.*

**Keywords:** CNG Management System , Smart CNG Management System, Online CNG Slot Booking, Digital Fuel Station Management, CNG Refueling Queue Management, Web-Based Fuel Booking Platform

## I. INTRODUCTION

The number of vehicles on the road is increasing every year, which has also increased fuel consumption in the transportation sector. To reduce pollution and protect the environment, governments and industries are encouraging the use of cleaner fuels such as Compressed Natural Gas (CNG). Compared to petrol and diesel, CNG produces fewer harmful emissions, so many vehicle owners are now choosing CNG vehicles.

However, CNG stations often face problems such as long waiting lines, especially during busy hours. This mainly happens because the refueling process is managed manually and there is no proper system for scheduling customers. As a result, vehicle owners have to visit the station and wait for their turn, which wastes time and creates congestion.

To solve this issue, this research proposes a Smart CNG Refueling Management System that allows users to book their refueling slots online. The system helps users plan their visit in advance and allows CNG station owners to manage bookings more efficiently. This digital platform can reduce waiting time, improve service efficiency, and make the refueling process more organized.

## II. LITERATURE REVIEW

Many researchers have studied how digital systems can improve fuel management and booking processes. Earlier systems mainly focused on managing fuel inventory and billing at petrol pumps. These systems helped in keeping records but did not solve the problem of long waiting times for customers.

Later, online booking platforms were introduced in different sectors such as healthcare, transportation, and hospitality, allowing users to schedule services in advance. Inspired by these systems, some researchers proposed similar solutions for fuel stations.

Some studies also developed mobile applications that help users find nearby CNG stations and check fuel availability. However, most of these systems only provide information and do not allow users to directly book refueling slots.

Recent studies suggest combining queue management with online booking systems so that users can reserve slots and avoid long waiting lines. However, many of these ideas are still not widely used in real CNG stations. Therefore, there is a need for a complete system that manages booking, scheduling, and station operations on a single digital platform.



### III. RESEARCH GAP

From the review of previous studies, several gaps have been identified in the existing systems:  
 Most current CNG stations rely on manual queue systems without any digital scheduling mechanism.  
 Existing fuel management systems focus mainly on station-level operations rather than customer experience.  
 Many proposed systems provide only information about fuel availability but do not allow users to reserve refueling slots.  
 There is limited integration between users, pump owners, and administrators within a single management platform.  
 Few systems provide analytics or reports that help station owners analyze booking patterns and optimize operations.  
 The proposed Smart CNG Management System aims to address these gaps by developing an integrated digital platform that connects users, pump owners, and administrators while enabling efficient slot booking and operational monitoring.

### IV. METHODOLOGY

The research follows a system development methodology that includes requirement analysis, system design, implementation, and evaluation.

#### 4.1 Requirement Analysis

The first stage involves identifying the functional requirements of the system. These include user registration, login authentication, slot availability display, booking management, and administrative monitoring.

#### 4.2 System Design

The system is designed using a three-tier architecture consisting of:

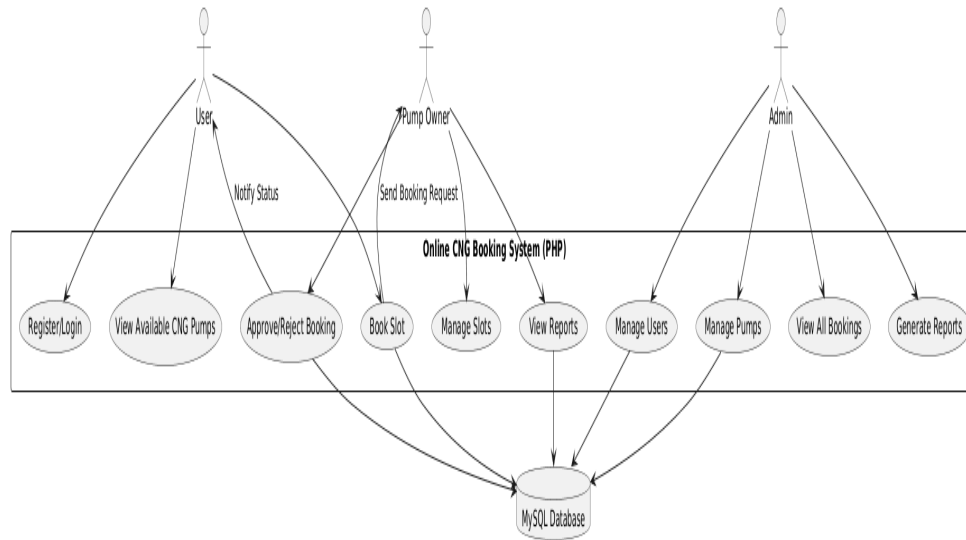
Layer Name	Components	Function
Presentation Layer	HTML, CSS, JavaScript	Provides user interface for Users, Pump Owners, and Admin.
Application Layer	PHP Scripts	Handles business logic like authentication, booking validation, and notifications.
Database Layer	MySQL	Stores all user, booking, pump, and system data securely.

#### 4.3 Workflow Diagram (PlantUML) :

The system is divided into three modules:

- User Module
- Pump Owner Module
- Admin Module





#### 4.4 Use Case Table

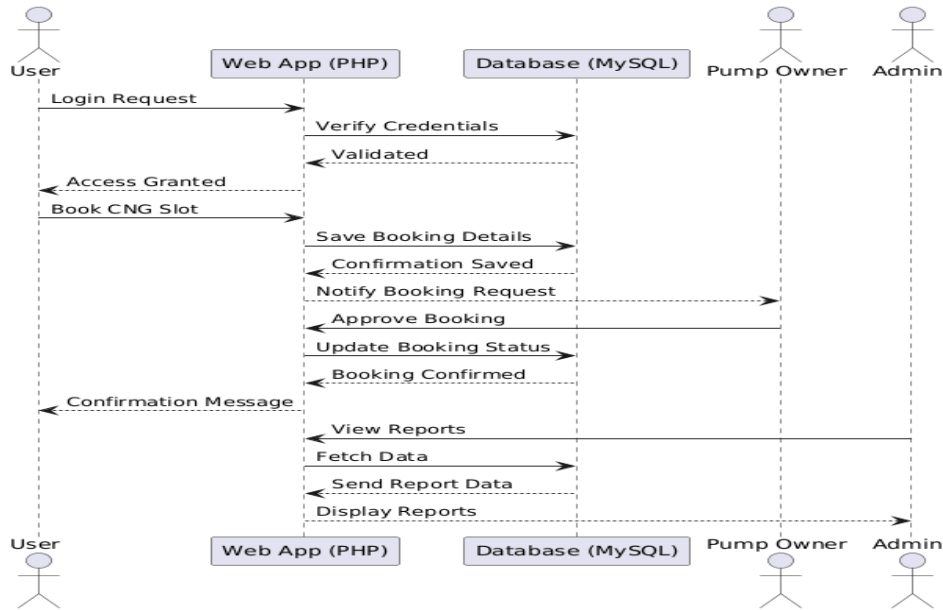
Use Case ID	Use Case Name	Actor	Description
UC01	User Registration	User	User creates an account with personal and vehicle details.
UC02	Login Authentication	User/Pump Owner/Admin	Validates login credentials and assigns role-based access.
UC03	View CNG Pumps	User	Displays list of registered CNG pumps with slot availability.
UC04	Book Slot	User	Books a slot and sends a request to the pump owner.
UC05	Manage Slots	Pump Owner	Allows pump owners to define and edit available time slots.
UC06	Manage Bookings	Pump Owner	Enables approval, modification, or cancellation of bookings.
UC07	Manage Users	Admin	Handles addition, approval, or deletion of users.
UC08	Generate Reports	Admin	Creates booking and revenue reports.

#### 4.5 System Implementation

##### Sequence Diagram :

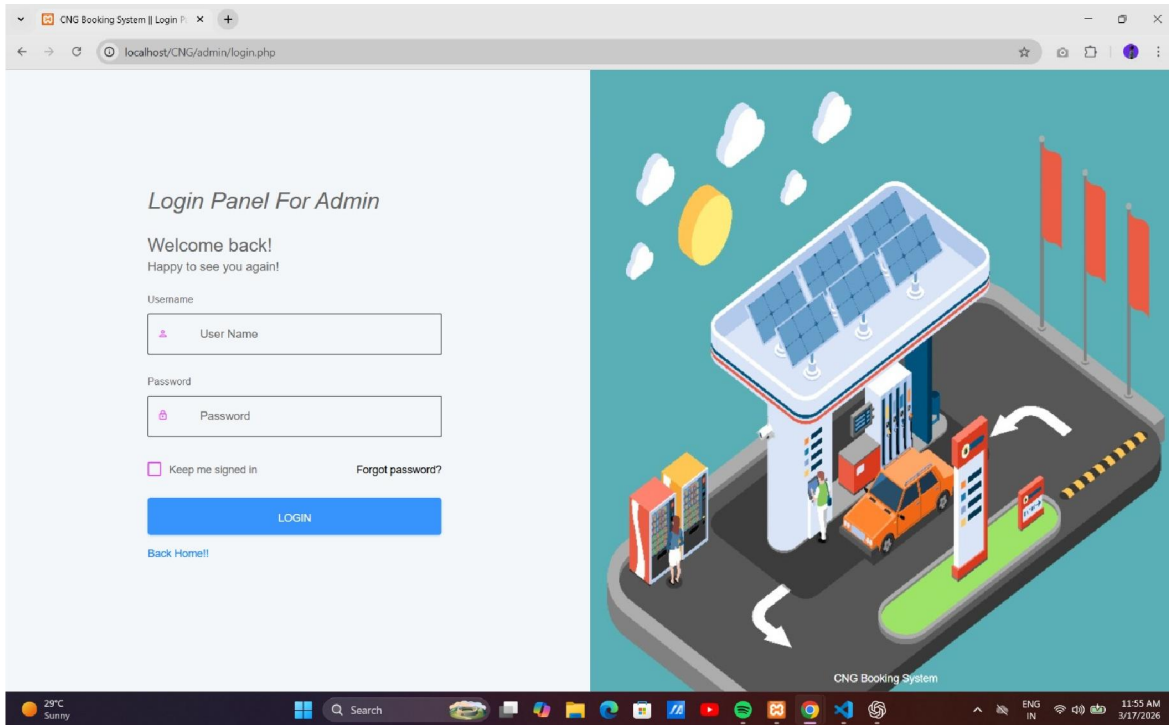
The application is developed as a web-based platform. The backend is implemented using PHP scripts, while MySQL manages the database. JavaScript and AJAX are used to provide dynamic interaction and real-time updates.

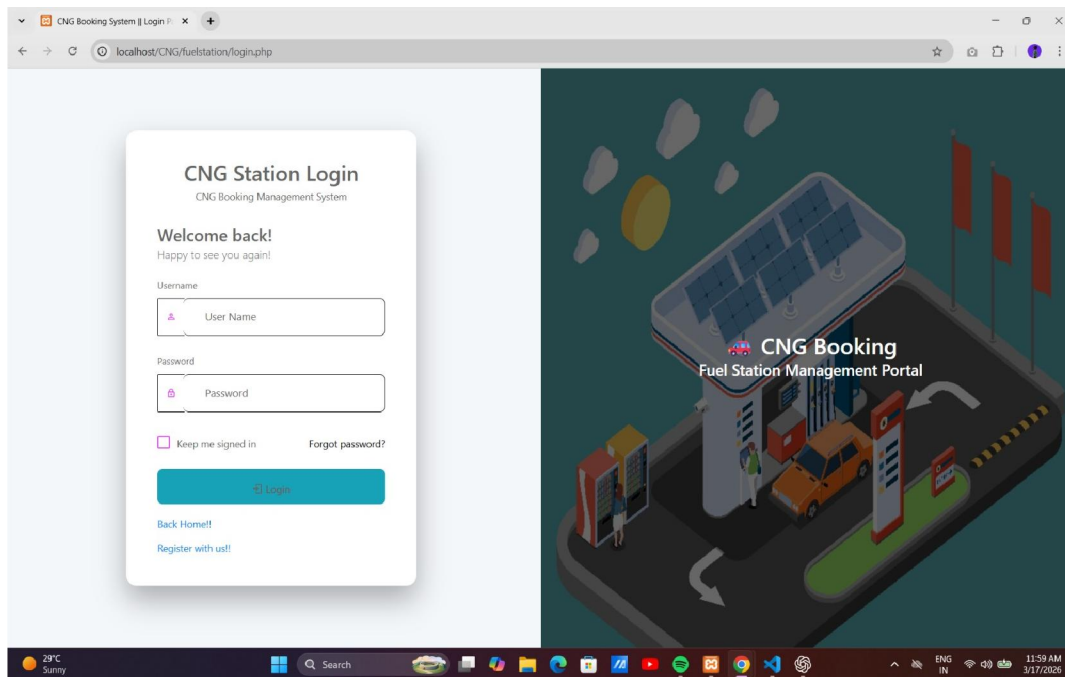
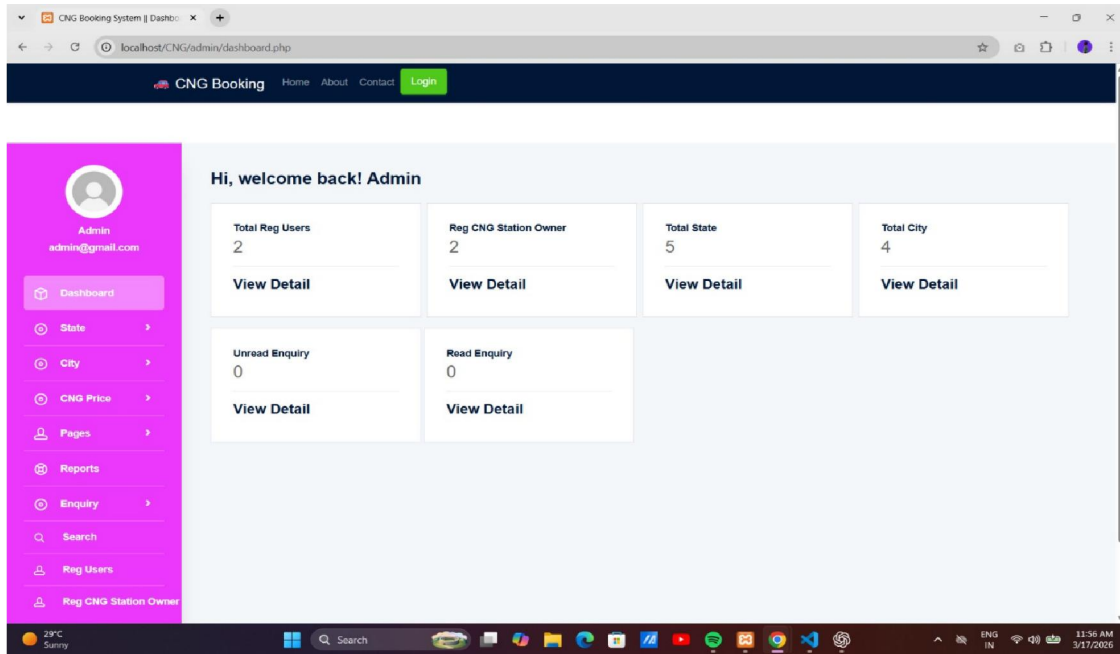


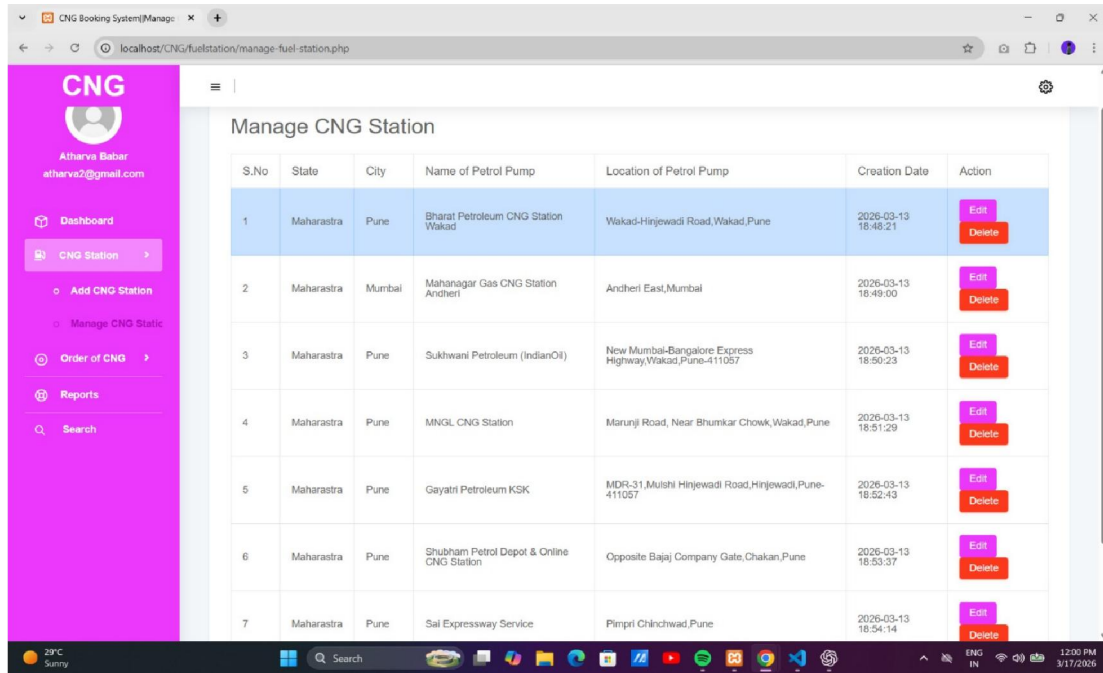


**V. RESULTS AND DISCUSSION**

After implementation, the system was tested to evaluate its performance and usability. The results indicate that the proposed system effectively reduces congestion at CNG stations by introducing a structured booking mechanism.

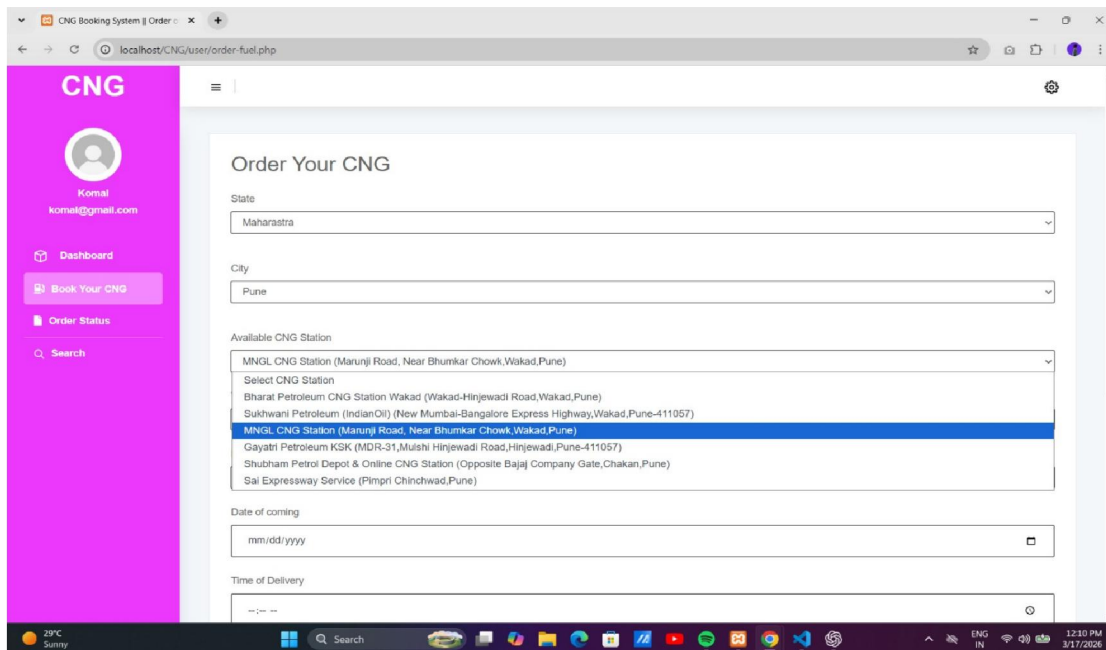






**Manage CNG Station**

S.No	State	City	Name of Petrol Pump	Location of Petrol Pump	Creation Date	Action
1	Maharashtra	Pune	Bharat Petroleum CNG Station Wakad	Wakad-Hinjewadi Road,Wakad,Pune	2026-03-13 18:48:21	<a href="#">Edit</a> <a href="#">Delete</a>
2	Maharashtra	Mumbai	Mahanager Gas CNG Station Andheri	Andheri East,Mumbai	2026-03-13 18:49:00	<a href="#">Edit</a> <a href="#">Delete</a>
3	Maharashtra	Pune	Sukhwani Petroleum (IndianOil)	New Mumbai-Bangalore Express Highway,Wakad,Pune-411057	2026-03-13 18:50:23	<a href="#">Edit</a> <a href="#">Delete</a>
4	Maharashtra	Pune	MNGL CNG Station	Marunji Road, Near Bhumkar Chowk,Wakad,Pune	2026-03-13 18:51:29	<a href="#">Edit</a> <a href="#">Delete</a>
5	Maharashtra	Pune	Gayatri Petroleum KSK	MDR-31,Mulshi Hinjewadi Road,Hinjewadi,Pune-411057	2026-03-13 18:52:43	<a href="#">Edit</a> <a href="#">Delete</a>
6	Maharashtra	Pune	Shubham Petrol Depot & Online CNG Station	Opposite Bajaj Company Gate,Chakan,Pune	2026-03-13 18:53:37	<a href="#">Edit</a> <a href="#">Delete</a>
7	Maharashtra	Pune	Sai Expressway Service	Pimpri Chinchwad,Pune	2026-03-13 18:54:14	<a href="#">Edit</a> <a href="#">Delete</a>



**Order Your CNG**

State:

City:

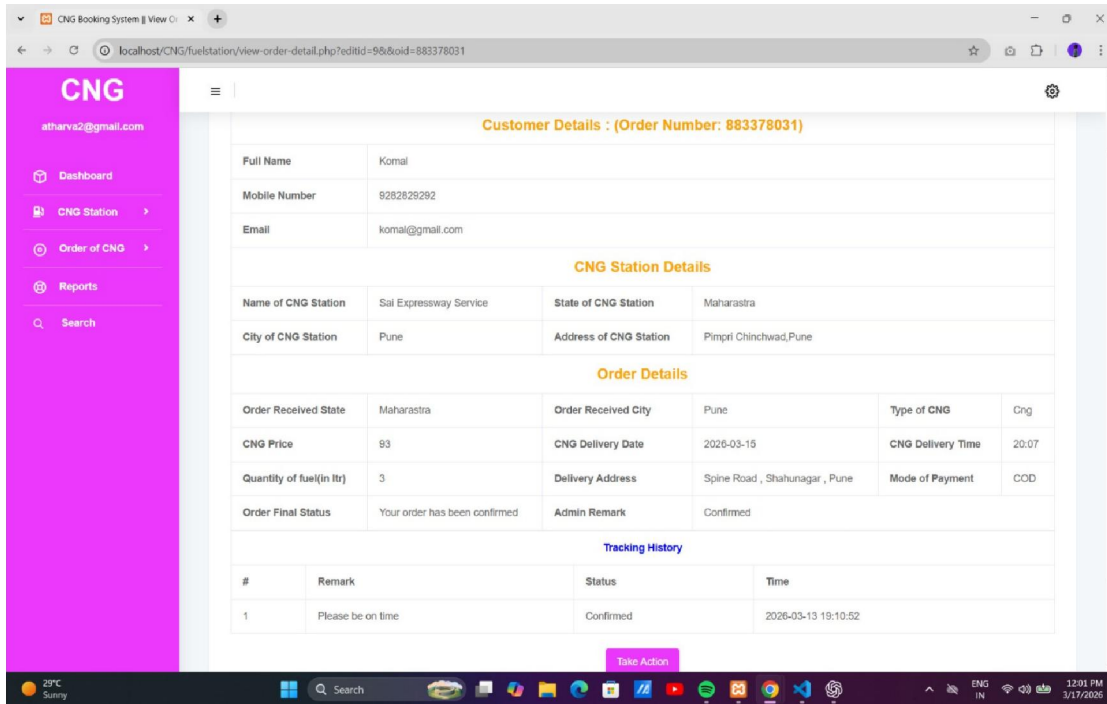
Available CNG Station:

Select CNG Station:

Date of coming:

Time of Delivery:





**CNG Booking System | View CNG**

localhost/CNG/fuelstation/view-order-detail.php?editid=9&oid=883378031

**CNG**  
atharva2@gmail.com

- Dashboard
- CNG Station
- Order of CNG
- Reports
- Search

**Customer Details : (Order Number: 883378031)**

Full Name	Komal		
Mobile Number	9282829292		
Email	komal@gmail.com		

**CNG Station Details**

Name of CNG Station	Sai Expressway Service	State of CNG Station	Maharashtra
City of CNG Station	Pune	Address of CNG Station	Pimpri Chinchwad,Pune

**Order Details**

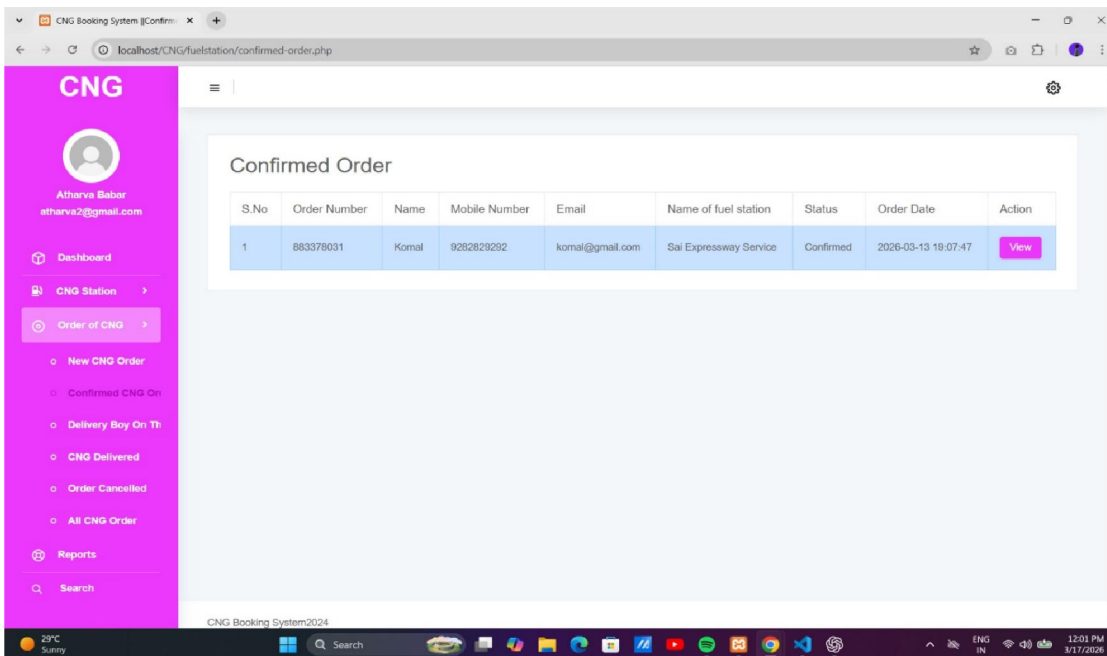
Order Received State	Maharashtra	Order Received City	Pune	Type of CNG	Cng
CNG Price	93	CNG Delivery Date	2026-03-15	CNG Delivery Time	20:07
Quantity of fuel(in ltr)	3	Delivery Address	Spine Road , Shahunagar , Pune	Mode of Payment	COD
Order Final Status	Your order has been confirmed		Admin Remark	Confirmed	

**Tracking History**

#	Remark	Status	Time
1	Please be on time	Confirmed	2026-03-13 19:10:52

Take Action

29°C Sunny 12:01 PM 3/17/2026



**CNG Booking System | Confirmed**

localhost/CNG/fuelstation/confirmed-order.php

**CNG**  
Atharva Babor  
atharva2@gmail.com

- Dashboard
- CNG Station
- Order of CNG
  - New CNG Order
  - Confirmed CNG Or
  - Delivery Boy On Ti
  - CNG Delivered
  - Order Cancelled
  - All CNG Order
- Reports
- Search

**Confirmed Order**

S.No	Order Number	Name	Mobile Number	Email	Name of fuel station	Status	Order Date	Action
1	883378031	Komal	9282829292	komal@gmail.com	Sai Expressway Service	Confirmed	2026-03-13 18:07:47	View

CNG Booking System2024

29°C Sunny 12:01 PM 3/17/2026



## **VI. CONCLUSION**

The Smart CNG Refueling Management System helps solve common problems at traditional CNG stations, such as long waiting lines. By allowing users to book refueling slots online, the system reduces waiting time and makes the refueling process more organized and efficient.

The platform connects users, pump owners, and administrators through a single digital system. It manages bookings, schedules time slots, and generates reports, which improves transparency and smooth operation.

In the future, this system can be improved by adding features such as mobile apps, AI-based demand prediction, and cloud technology, making it a more advanced and smart fuel management platform.

## **VII. ACKNOWLEDGMENT**

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