# EVConnect – Intelligent EV Charging Point Locator & Route Optimizer

*by*

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**2025 - 2026**

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# Title Justification

**Project Title :**

EVConnect – Intelligent EV Charging Point Locator & Route Optimizer

**Title Justification :**

**1. EVConnect :** We chose EVConnect because the system connects EV users to the entire charging network. It represents a unified, seamless platform for navigation, discovery, and booking.

**2. Intelligent :** We used Intelligent to show that the system is not basic — it makes smart decisions by providing optimized routes, relevant charging points, and real-time suggestions.

**3. EV Charging Point :** We included EV because the system is designed specifically for electric vehicle users. It directly targets the growing need for EV charging support and trip planning. Charging Point highlights the most important user need – finding a slot, which shows that System locates actual charging points, not just stations.

**4. Route Optimizer :** The term Route Optimizer is chosen because the system not only guides users to their destination but also selects the best route with necessary charging stops.

# Abstract

- Efficient management of electric vehicle charging infrastructure remains a challenge, as most existing EV charging applications provide only station locations without real-time slot availability, waiting time estimation, or integrated route planning, resulting in inefficient travel planning and range anxiety for users.

- This research focuses on developing a smart EV charging station locator that addresses the problem of inefficient charging station utilization by providing real-time availability, advance slot booking, and optimized route planning.

- The main objective of this project is to design a user-friendly system that allows EV users to locate charging stations, book charging slots in advance, receive optimized routes, and reduce travel time and waiting time.

- The system is developed using ReactJS for the front end, Spring Boot for the back end, and MySQL for database management, consisting of an Admin module for managing cities, stations, charger types, pricing, and users, and a User module for station browsing, slot booking, and booking history.

- The proposed solution improves charging efficiency by minimizing waiting time and unnecessary travel, while enhancing user convenience through real-time data access and advance booking. This EVConnect provides a scalable and reliable smart charging solution that supports sustainable transportation.

# Problem Statement

➢ With the rise of electric vehicles, users face the persistent challenge of finding available charging stations, leading to wasted time and range anxiety.

➢ There is an urgent demand for a smart, reliable system that provides real-time charging station info and seamless access.

➢ **EV Connect** – a platform offering live updates on stations, easy reservations, route planning, and usage analytics.

➢ Empowers EV owners to travel confidently, save time, and supports the growth of sustainable electric mobility.

# Objectives of Project

**Research Objective 1:**

To create an intelligent EV charging platform that ensures instant access to available stations and optimizes route planning for users.

**Research Objective 2:**

To assess how the platform reduces range anxiety, minimizes waiting time, and promotes efficient, sustainable EV usage.

# Literature survey for objectives

## 1. EV Charging Station Location and Route Optimization Models

Patel & Reddy (International Journal of Electric Mobility, 2019) proposed a GPS-based EV charging station locator combined with route optimization algorithms, which improved the accessibility of charging points for urban EV users and reduced travel time. However, the model lacked real-time availability updates and booking functionality, limiting its effectiveness for dynamic user scenarios.

## 2. Smart EV Charging Management Systems

Li et al. (IEEE Transactions on Smart Grid, 2021) developed a smart charging management system that monitored charging load and predicted station occupancy using historical data. This approach enhanced station utilization and reduced peak-time congestion. Yet, the system did not incorporate user-centric features such as slot booking, personalized route planning, or mobile accessibility, reducing its practical convenience for EV owners.
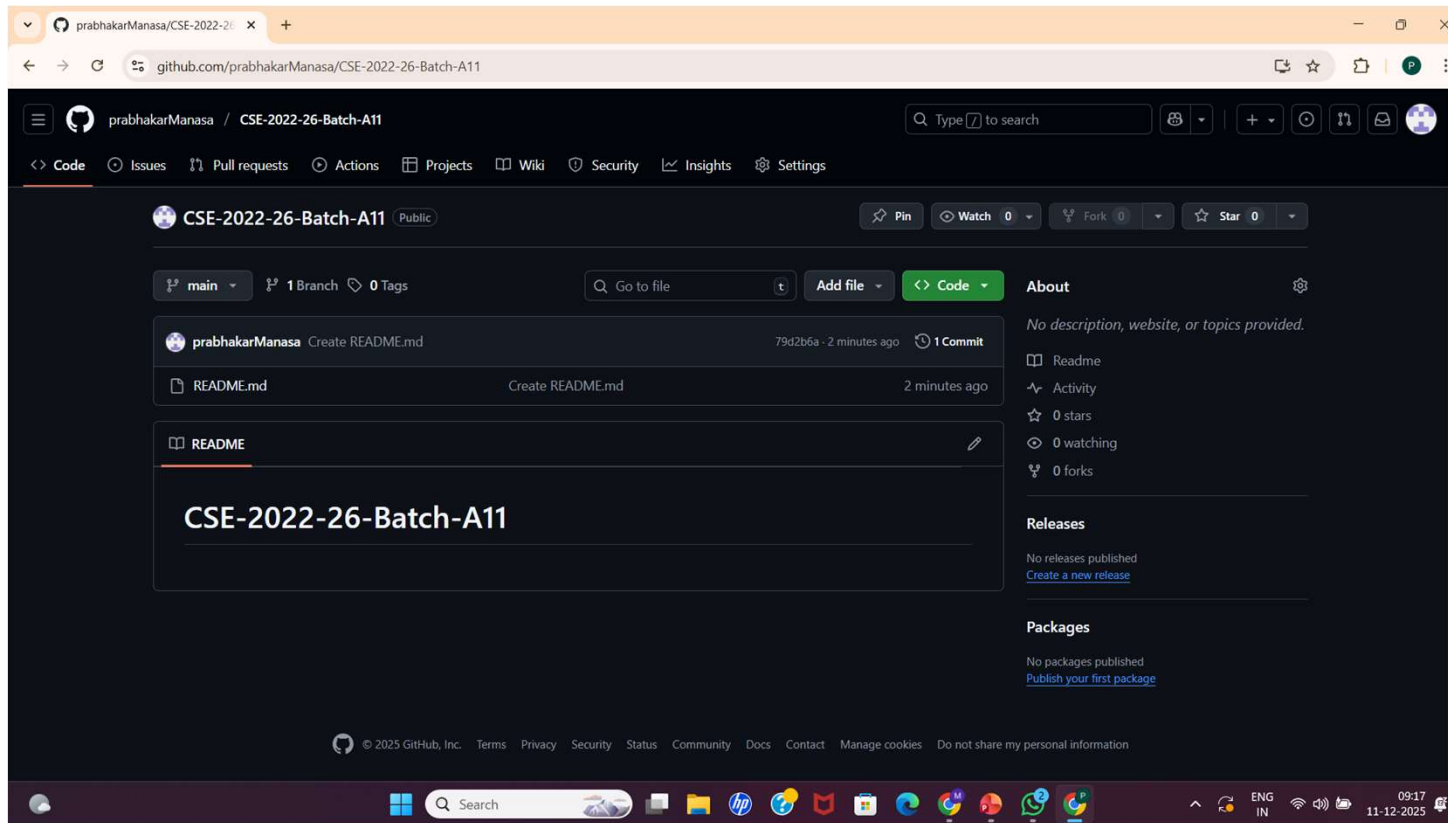
# Proposed System

➤ The proposed system **EV Connect** provides a smart platform that helps EV users locate nearby charging stations with real-time availability and occupancy status.

➤ A route optimization module suggests the most efficient paths based on station locations, traffic conditions, and user preferences to reduce travel time and range anxiety.

➤ A booking and reservation feature allows users to reserve charging slots in advance, minimizing waiting times and managing peak-hour congestion.

➤ A personalized dashboard provides insights such as charging history, preferred stations, and estimated travel costs, enhancing user convenience and adaptability.

➤ By optimizing EV usage and reducing idle charging time, the system encourages efficient electric vehicle adoption, lowers carbon emissions, and supports global sustainability goals.

# References

**[1]** S. Patel and R. Reddy, "GPS-Based EV Charging Station Locator with Route Optimization," *International Journal of Electric Mobility*, vol. 5, pp. 12-18, Mar. 2019.

**[2]** A. R. Singh, R. S. Kumar, K. R. Madhavi et al., "Optimizing demand response and load balancing in smart EV charging networks using AI integrated blockchain framework," *Scientific Reports*, vol. 14, Article 31768, 2024.

**[3]** "Proactive Route Planning for Electric Vehicles" – Saeed Nasehi Focuses on EV route planning considering charging decisions and travel time optimization, with heuristic algorithms.

# Git Hub Dashboards of each student



Link of the Github: https://github.com/prabhakarManasa/CSE-2022-26-Batch-A11

*Any Queries?*