Slide script

Title Slide:

Good [morning/afternoon], everyone. My name is Tyler M. Abrahams, and today I'll be presenting my project: *Creating a System for Smart and Real-Time Location of Electric Vehicle Recharge Stations.* This initiative aims to revolutionize how EV owners locate charging stations by enhancing real-time accuracy.

Introduction:

The adoption of EVs is rapidly increasing, but a key barrier remains: range anxiety. My project addresses this by focusing on usability, accuracy, and accessibility, ensuring EV users can locate recharge stations efficiently.

My research question is simple: *How can automated systems enhance the real-time accuracy of recharge station locations?*

Aims and Objectives:

The project has three key goals:

1. Understand what EV users need when searching for recharge stations.
2. Develop a user-friendly interface for effective station location.
3. Ensure accurate data integration for distance estimation and route optimization.

Literature Review and Research Gap:

Despite existing solutions, significant gaps remain:

- Many lack real-time data and accurate route planning.
- Interfaces often require extensive searching before users see available stations. This project proposes a system addressing these issues through real-time data integration, user-centric design, and automated routing.

Methodology:

I used a mixed-method approach:

1. **Qualitative Research**: Conducted interviews and focus groups with EV owners to identify their pain points and preferences.
2. **Quantitative Research**: Leveraged GIS analysis and statistical data to map coverage gaps and identify patterns.

On the technical side:

- **Frontend Development**: Created an interactive map with real-time route descriptions.
- **Backend Development**: Integrated APIs for mapping and charging station data.
- **Database Design**: Optimized for user profiles and usage history.

Development Tools and Technologies

The EV charging station locator system was developed using a combination of the following Technologies:

Frontend
- **HTML:** For building the structure of the UI
- **CSS:** Cascading Style Sheets for styling and formatting the user interface elements.
- **JavaScript:** The primary programming language used for developing the frontend components and logic.

Backend
- **Firebase Auth:** For creating the authentication flow - sign up and sign in
- **Firestore:** For storing data

Map API

Mapbox: The Mapbox API was used to provide accurate location information, mapping capabilities, and navigation features.

Results and Discussion:

Key findings include:

- Ensuring data accuracy and reliability is crucial.
- Real-time updates significantly improve user satisfaction.
- Efficient algorithms are vital for optimizing performance.

However, challenges persist:

- Maintaining data consistency across third-party APIs.
- Synchronizing real-time data effectively.
- Continuously refining the user interface.

Future Directions:

Looking ahead, this system could:

- Include personalized recommendations based on user profiles.
- Integrate vehicle-specific data directly from EV manufacturers.
- Use predictive analytics for proactive route planning, enhancing both convenience and efficiency.

Conclusion:

This project contributes to advancing sustainable transportation by addressing key challenges faced by EV users. By enhancing urban mobility and fostering innovation, it aligns with the global push toward a greener future.

Closing:

Thank you for your attention. I’m happy to answer any questions.
