

# Final Project Report

## Title: Visualization Tool for Electric Vehicle Charge & Range Analysis

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### 1. INTRODUCTION

#### 1.1 Project Overview

Electric Vehicles (EVs) are gaining increasing attention due to environmental concerns and technological advancements. This project focuses on creating a comprehensive dashboard and story using Tableau to analyze EV data from both India and globally. The tool visualizes charge station distribution, vehicle specs, price comparisons, and range analytics through an interactive web interface hosted at <https://prasanna1945.github.io/ev-analysis/>.

#### 1.2 Purpose

To build a data-driven visualization platform that enables users to understand the trends, infrastructure, and performance of electric vehicles using real-world datasets.

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### 2. IDEATION PHASE

#### 2.1 Problem Statement

Analyze different datasets from multiple sources related to electric cars in India and globally to create visual dashboards and a data story using Tableau.

#### 2.2 Empathy Map Canvas

- Think & Feel: Users want easy access to EV trends and insights.
- Hear: Media and government promoting EV adoption.
- See: Fragmented and complex data sources.
- Say & Do: Search for reliable EV data.
- Pain: Difficulty interpreting technical data.
- Gain: Simplified, visual insights.

#### 2.3 Brainstorming

- Compare EV prices and ranges
- Analyze Indian vs global EV trends
- Locate charging stations regionally
- Build interactive Tableau dashboards

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### **3. REQUIREMENT ANALYSIS**

#### **3.1 Customer Journey Map**

- Data collected → Cleaned → Analyzed → Visualized → Shared

#### **3.2 Solution Requirement**

- Cleaned datasets (CSV)
- Tableau Public account
- Internet hosting (GitHub)

#### **3.3 Data Flow Diagram**

User → Tableau Dashboard → EV Visual Insights

#### **3.4 Technology Stack**

- Tools: Tableau, HTML/CSS, Bootstrap
- Hosting: GitHub Pages
- Data Source: EVIndia.csv, Charging Station list, ElectricCarData\_Clean.csv, CheapestElectricCars.csv

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### **4. PROJECT DESIGN**

#### **4.1 Problem Solution Fit**

Users face data overload in EV research. Tableau provides a simple, interactive way to analyze this data.

#### **4.2 Proposed Solution**

Develop a Bootstrap-based web page embedding Tableau dashboard and story, enabling stakeholders to interact with and understand EV data.

#### **4.3 Solution Architecture**

CSV Files → Tableau Dashboards & Story → Embedded HTML Web Page → Hosted Online

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### **5. PROJECT PLANNING & SCHEDULING**

#### **5.1 Project Planning**

- Week 1: Requirement gathering & ideation
- Week 2: Data cleaning and preparation
- Week 3: Dashboard creation
- Week 4: Web design & embedding

- Week 5: Final testing and hosting
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## 6. FUNCTIONAL AND PERFORMANCE TESTING

### 6.1 Performance Testing

Tested rendering of Tableau embeds across browsers (Chrome, Edge, Firefox). All visualizations load within 5 seconds on average.

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## 7. RESULTS

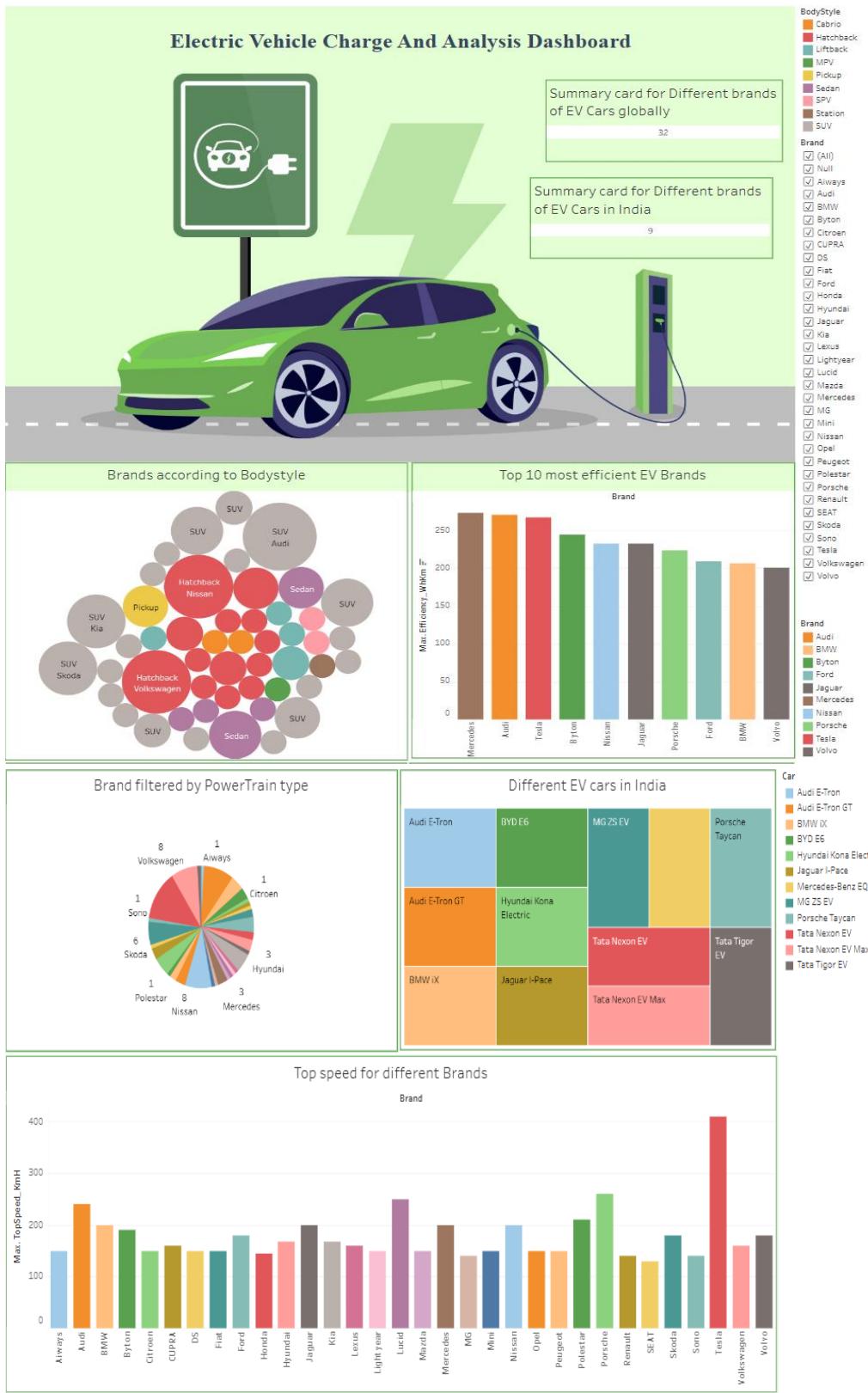
The project successfully analyzed multiple datasets to present key insights through interactive visualizations. The dashboard summarizes global and Indian EV data, offering insights into top electric cars, their specifications, price comparisons, and range analytics. The story visualization focuses on the state-wise distribution of electric vehicles and charging infrastructure in India, helping users understand the progress and gaps across regions.

The results support decision-making for EV enthusiasts, government bodies, and businesses aiming to contribute to electric mobility. Users can explore filters and interactive charts to derive customized insights tailored to their interests.

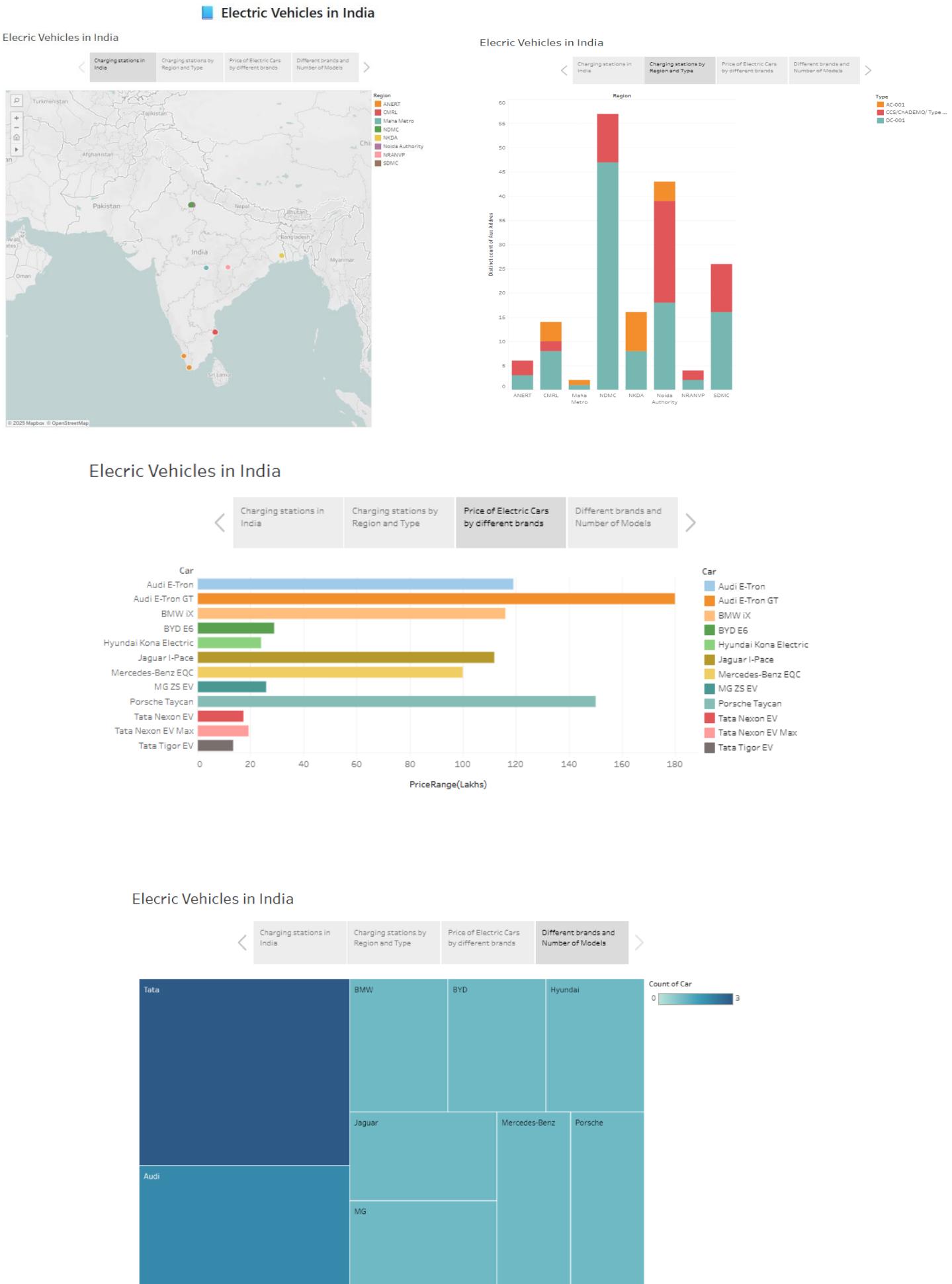
### 7.1 Output Screenshots

Below are screenshots from the live deployed Tableau visualizations:

# Dashboard – Overview



# Story - Electric Vehicles in India



## 8. ADVANTAGES & DISADVANTAGES

### Advantages:

- Interactive, visual storytelling
- Real-time access via web
- User-friendly navigation with Bootstrap

### Disadvantages:

- Dependent on Tableau Public uptime
  - Limited customization of Tableau UI elements
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## 9. CONCLUSION

This project effectively demonstrates how visualization tools like Tableau can transform complex electric vehicle data into engaging and actionable insights.

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## 10. FUTURE SCOPE

- Integrate real-time EV data via APIs
  - Add mobile responsiveness and filters
  - Expand dataset to include EV sales and adoption rates
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## 11. APPENDIX

### Source Code:

```
<!DOCTYPE html>

<html lang="en">
<head>
<meta charset="UTF-8" />
<meta name="viewport" content="width=device-width, initial-scale=1" />
<title>EV Charge & Range Analytics</title>
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet" />
<style>
body {
scroll-behavior: smooth;
```

```
}

.navbar {
    background-color: rgb(47, 148, 47);
}

.navbar-brand, .nav-link {
    color: white !important;
}

.hero {
    background-color: #e9f1ff;
    padding: 3rem 1rem;
    text-align: center;
}

.section-title {
    margin-top: 2rem;
    margin-bottom: 1rem;
    text-align: center;
}

.tableauPlaceholder {
    width: 100%;
    position: relative;
    margin-bottom: 3rem;
}

footer {
    background-color: #e9ecf;
    padding: 1rem;
    text-align: center;
}

</style>
</head>
<body>
```

<!-- Navbar -->

```
<nav class="navbar navbar-expand-lg sticky-top">  
  <div class="container">  
    <a class="navbar-brand" href="#">EV Analytics</a>  
    <button class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-target="#navbarNav">  
      <span class="navbar-toggler-icon bg-light"></span>  
    </button>  
    <div class="collapse navbar-collapse" id="navbarNav">  
      <ul class="navbar-nav ms-auto">  
        <li class="nav-item"><a class="nav-link" href="#about">About</a></li>  
        <li class="nav-item"><a class="nav-link" href="#dashboard">Dashboard</a></li>  
        <li class="nav-item"><a class="nav-link" href="#story">Story</a></li>  
      </ul>  
    </div>  
  </div>  
</nav>
```

```
<!-- Hero Section -->  
<section class="hero" id="about">  
  <div class="container">  
    <h1 class="mb-3">Visualization Tool for EV Charge & Range Analysis</h1>  
    <p class="lead">A Tableau-powered data visualization project analyzing Electric Vehicle trends, infrastructure, and range across India and globally using real-world datasets.</p>  
  </div>  
</section>
```

```
<!-- Dashboard Section -->  
<section class="container" id="dashboard">  
  <h2 class="section-title"> EV Analytics Dashboard</h2>  
  <div class='tableauPlaceholder' id='vizDashboard'>  
    <noscript>  
      <a href="#">
```

```

<img alt='Dashboard 1'
src='https://public.tableau.com/static/images/EI/ElectricCarAnalyticsDashboard_17509464915780/Dashboard1/1_rss.png' style='border: none' />
</a>
</noscript>
<object class='tableauViz' style='display:none;'>
<param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
<param name='embed_code_version' value='3' />
<param name='site_root' value="" />
<param name='name' value='ElectricCarAnalyticsDashboard_17509464915780&#47;Dashboard1' />
<param name='tabs' value='no' />
<param name='toolbar' value='yes' />
<param name='static_image'
value='https://public.tableau.com/static/images/EI/ElectricCarAnalyticsDashboard_17509464915780/Dashboard1/1.png' />
<param name='animate_transition' value='yes' />
<param name='display_static_image' value='yes' />
<param name='display_spinner' value='yes' />
<param name='display_overlay' value='yes' />
<param name='display_count' value='yes' />
<param name='language' value='en-US' />
<param name='filter' value='publish=yes' />
</object>
</div>
</section>
```

```

<!-- New Story Section -->
<section class="container" id="story">
<h2 class="section-title">▣ Electric Vehicles in India</h2>
<div class='tableauPlaceholder' id='viz1751025207084'>
<noscript>
<a href='#'>
<img alt='Electric Vehicles in India'
src='https://public.tableau.com/static/images/CH/CH5WMGGW3/1_rss.png' style='border: none' />
```

```
</a>

</noscript>

<object class='tableauViz' style='display:none;'>
  <param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
  <param name='embed_code_version' value='3' />
  <param name='path' value='shared&#47;CH5WMGGW3' />
  <param name='toolbar' value='yes' />
  <param name='static_image'
  value='https://public.tableau.com/static/images/CH/CH5WMGGW3/1.png' />
  <param name='animate_transition' value='yes' />
  <param name='display_static_image' value='yes' />
  <param name='display_spinner' value='yes' />
  <param name='display_overlay' value='yes' />
  <param name='display_count' value='yes' />
  <param name='language' value='en-US' />
  <param name='filter' value='publish=yes' />
</object>
</div>
</section>
```

```
<!-- Footer -->
<footer>
  <p>© 2025 EV Analytics Project | Created using Tableau, Bootstrap, and Real EV Datasets</p>
</footer>
```

```
<!-- Tableau Script Loader -->
<script type='text/javascript'>
  function loadVizScript(containerId, width, height) {
    var divElement = document.getElementById(containerId);
    var vizElement = divElement.getElementsByTagName('object')[0];
    vizElement.style.width = width;
    vizElement.style.height = height;
    var scriptElement = document.createElement('script');
```

```
scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);
}

loadVizScript('vizDashboard', '100%', '850px');      // Dashboard
loadVizScript('viz1751025207084', '100%', '950px'); // New Story
</script>
```

```
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/js/bootstrap.bundle.min.js"></script>
</body>
</html>
```

**Dataset Links:** [https://drive.google.com/drive/folders/13oJ6LcO3axYerDnLRp8L5GnGB-X5X\\_F7?usp=sharing](https://drive.google.com/drive/folders/13oJ6LcO3axYerDnLRp8L5GnGB-X5X_F7?usp=sharing)

**Live Project:** <https://prasanna1945.github.io/ev-analysis/>

**GitHub & Demo Link:** [prasanna1945/electric vehicle charge and range analysis](https://github.com/prasanna1945/electric_vehicle_charge_and_range_analysis)

**Tableau Public Dashboard Link:**

[https://public.tableau.com/views/ElectricCarAnalyticsDashboard\\_17509464915780/Dashboard1?:language=en-US&publish=yes&:sid=&:redirect=auth&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/ElectricCarAnalyticsDashboard_17509464915780/Dashboard1?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link)

**Tableau Public Story Link:**

[https://public.tableau.com/shared/FRS9J7RYK?:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/shared/FRS9J7RYK?:display_count=n&:origin=viz_share_link)