Assignment 2 Final Report

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1 Major Challenges

One major challenge encountered during this project was related to the dataset itself. According to the data documentation, "Electric Range is no longer maintained for BEVs because new BEVs have an electric range of 30 miles or more. Zero (0) will be entered where the electric range has not been researched."

We originally planned to visualize the changes in pure electric range across various brands over the past decade. However, due to missing data from 2021 to 2025, we chose to focus on the range evolution of Tesla models prior to 2021, and supplemented the analysis with the latest range data published on Tesla's official website in 2025.

2 Potential Improvements

If given more time and resources, we aim to create choropleth maps based on brands or models, as well as choropleth maps covering the past decade to more intuitively illustrate spatial distribution and temporal trends. In addition, we intend to collect electric range data for different BEV models from 2021 to 2025 through online sources, integrate it into the dataset, and conduct a more comprehensive visualization analysis.

This multi-level spatial visualization helps users intuitively understand the distribution of electric vehicle brands and market preferences across different regions. In addition, integrating the 2021–2025 BEV range data will enable a more complete analysis of range trends.

3 Acknowledgements

During the development of this project, we would like to express our sincere gratitude to Dr. Pavel N. Krivitsky for his dedicated teaching and guidance.

His lectures on Aesthetics, Gestalt Principles [1], Data Storytelling, Persona Design, Visual Design [2], and Choropleth Mapping [3] helped us systematically understand the principles and logic of data visualization, improved our aesthetic sensibilities, and provided important theoretical guidance and practical inspiration for the visual design, narrative structure, and spatial visualization of this project.

In addition, this project made appropriate use of the generative AI tool ChatGPT to assist with text refinement, optimization of visualization layout and sizing, adjustment of interactive control positions, enhancement of choropleth map performance, debugging of incompatibilities or missing area issues in maps, and refinement of map scaling, fixed

layout, and 'hovermode' functionalities. It was also used as a learning aid to better understand the use of "piping" in R. AI was solely used to improve linguistic expression and technical understanding, while all data analysis, design decisions, data processing, coding implementation, and visualization work were independently completed and verified by the authors.

We also acknowledge Leaflet for providing a powerful and user-friendly open-source mapping library used to create the choropleth maps in this project. The basemap data were provided by OpenStreetMap contributors and styled by CARTO.

Finally, we are grateful to Our World in Data for the inspiration in visualization style and color scheme [4], as well as to other visualization sources for creative inspiration [5, 6, 7]. We also appreciate the Washington State Department of Licensing (DOL) for providing the open dataset [8] and acknowledge the data.wa.gov platform for its support of open data for education and research.

References

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