Project #2

Submitted by:

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Title: A Comprehensive Exploration of Tesla's Electric Vehicle Domination in Oregon

The worldwide movement toward sustainable transportation has made the rise in popularity of electric cars (EVs) into a captivating tale and Tesla is making its way to lead it. Oregon stands out as a significant case study in the United States for its forward-thinking approach to supporting greener, low-carbon transportation options. In-depth examination of statistics on the rise of electric cars in Oregon is provided in this paper, with an emphasis on the distribution and types of EVs as well as the regional infrastructure facilitating this change.

The Oregon Department of Energy (ODOE) created an interactive dashboard that serves as our main data source. The battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) categories and county breakdowns of the total number of electric cars in the state are presented in this dashboard. additional information is revealed via additional investigation, including the the number of EVs and PHEVs, and the typical travel time for each county. The dashboard also offers information on the deployment of EVs by electric utility and census tract using interactive maps.

The dashboard's capacity to estimate potential savings for various EV models and power bills is one of its distinctive features, giving prospective EV purchasers useful information. It's important to remember that the data set only includes vehicles that plug in to charge their batteries with electricity, leaving out hybrid models that don't have this option.

Together with Oregon zero emission car activists and other State of Oregon partners, ODOE summer interns created this data-rich display. This program fits well with the overarching goal of encouraging vehicle electrification to achieve Oregon's high EV adoption targets. The U.S. Department of Energy State Energy Program formula grant, which is intended to promote increasing use of alternative fuel vehicles and carbon reduction in the transportation industry, provided financing for the project.

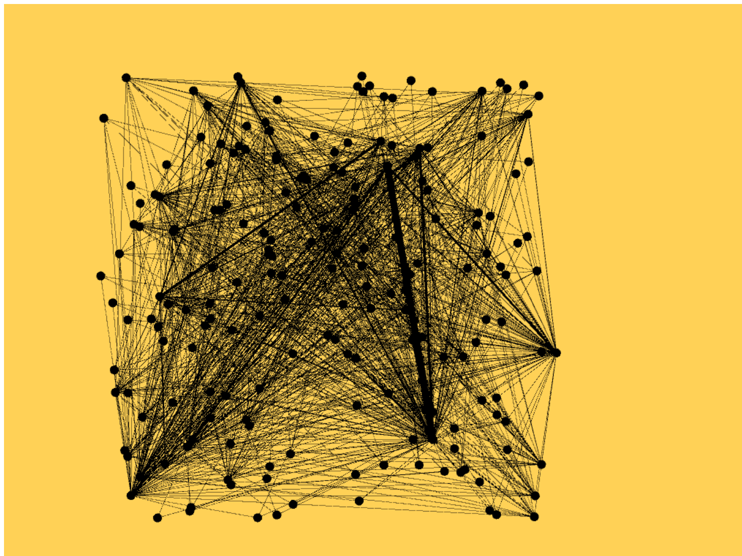
The data used in ODOE's dashboard comes from a variety of sources, including internal agency data, the Oregon Department of Transportation's Driver & Motor Vehicle Services, the Oregon Department of Environmental Quality's Clean Fuels Program, Portland State University, U.S. Census Bureau, U.S. Department of Energy, Hyundai USA, U.S. Energy Information Administration, and the Federal Highway Administration.

Our comprehensive research makes use of this information, paying close attention to the specifics of the EVs, such as their kind, model year, make, and model, as well as the county where they are registered. For instance, a brief scan of the data indicates that Multnomah County, Portland, has a higher percentage of newly registered **Tesla Model 3** vehicles. In order to glean important insights and trends concerning the EV environment in Oregon, this research delves further into such particular data points.

In conclusion, the adoption of electric vehicles in Oregon is a complex process influenced by multiple factors. This report aims to unpack this complexity through detailed data analysis and network visualizations, providing valuable insights that can help shape the future of sustainable transportation in the state.

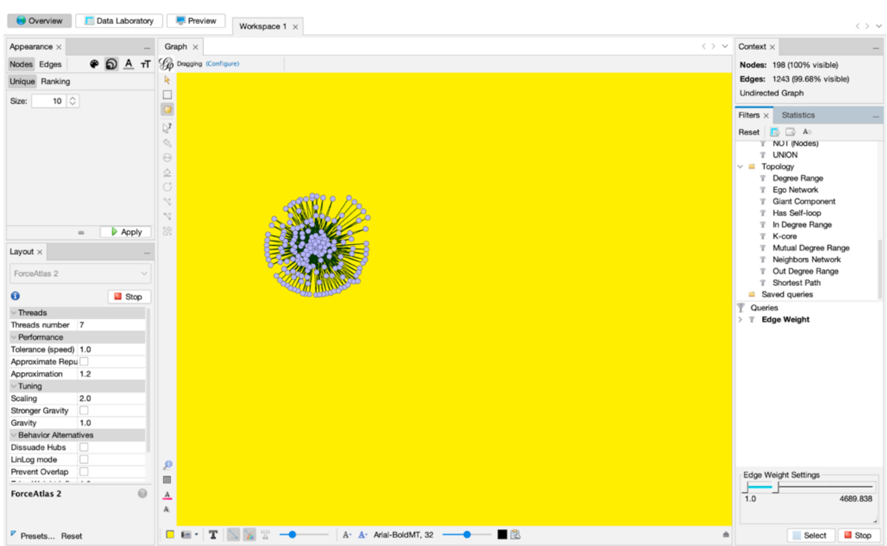
1. Initial Gephi Network Diagram:

Initial visualization of the network data in Gephi. Each node represents an vehicle brand, and the edges represent relationships or interactions.



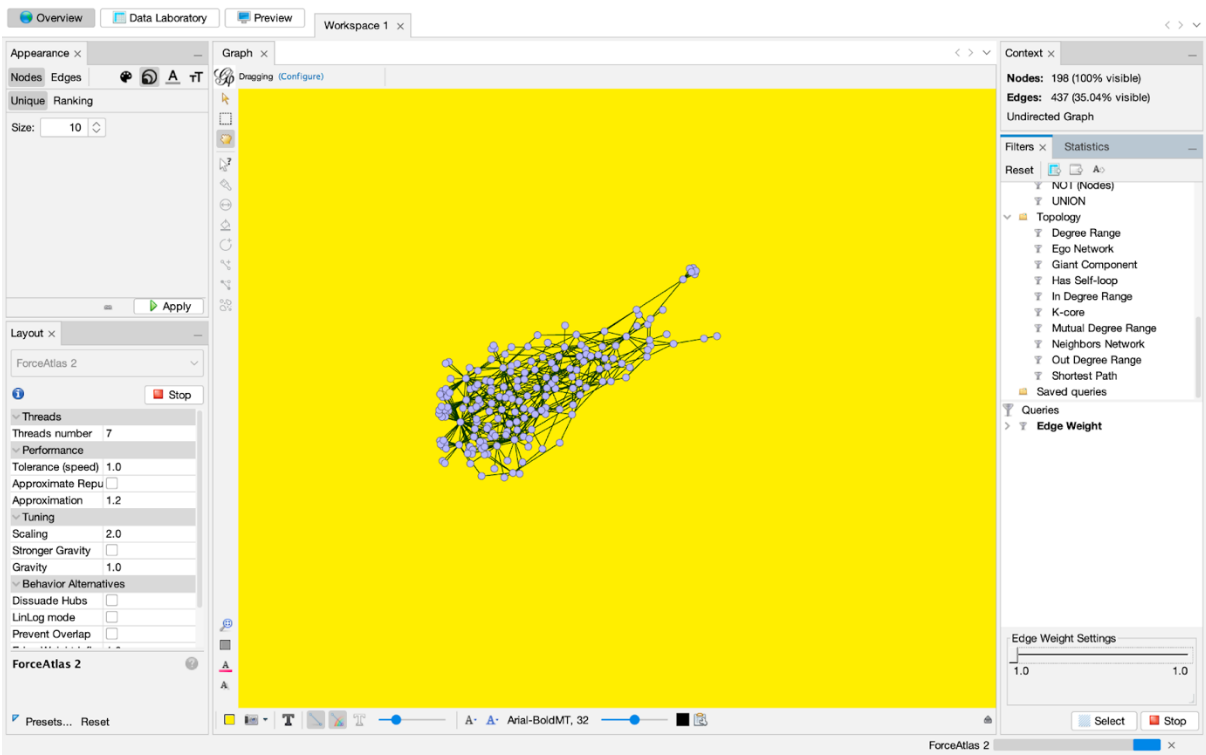
2. Gephi results with Force Layout:

Application of the ForceAtlas2 layout in Gephi. It is revealing the inherent structure of the network. Node placement is based on their connections, allowing for an intuitive understanding of the network structure.



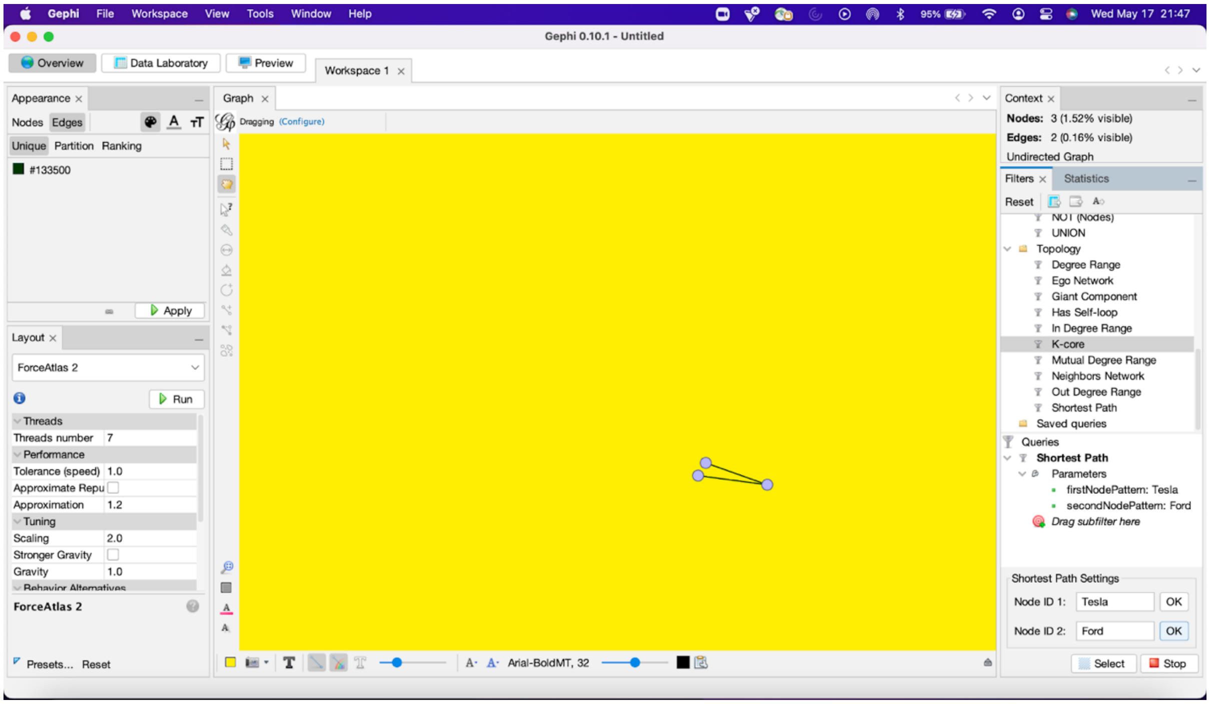
3. Filter according to edge weight:

Filtered network visualization based on edge weights, highlighting the most significant interactions or relationships in the network.



4. Filter to find the Tesla-Ford shortest distance.

A focused view of the network showing the shortest path between Tesla and Ford, illustrating the closest relationships between these two entities in the network.



Glyphs Description:

As we analyze the registration data of Tesla vehicles compared to other brands in Oregon, one key property that could require a customized glyph is the count of new registrations. This represents a major trend in the Electric Vehicle (EV) market which is crucial for understanding consumer preferences and market dynamics.

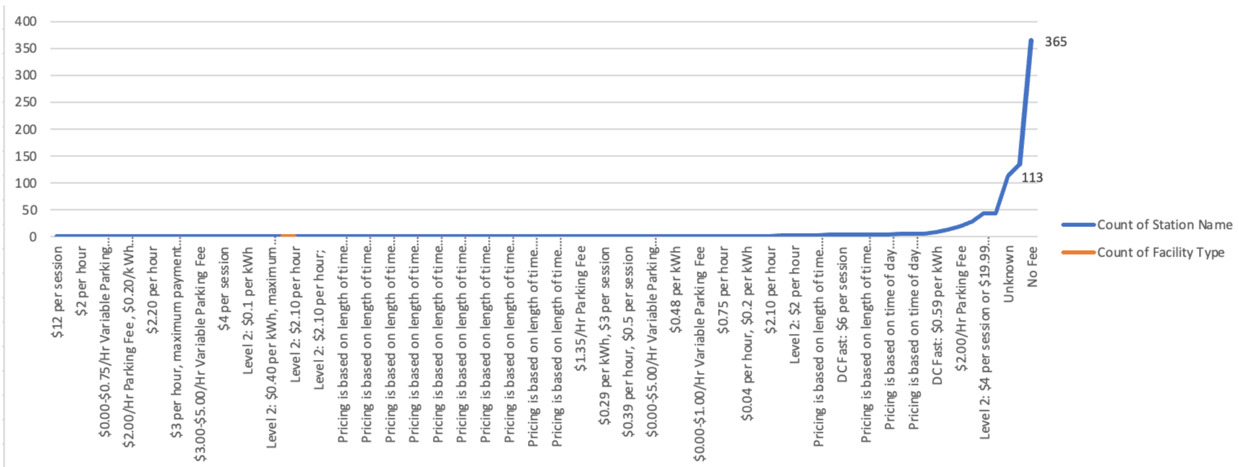
Comparing the new registrations of Tesla with other brands can provide us insights about the popularity and adoption rates of these brands. The quantity of registrations in a given period can also help us track growth and identify trends in the EV market.

We can represent this property using a customized glyph in a scatter plot where each point represents a brand, with the x-axis as the model year and the y-axis as the number of new registrations. For Tesla, we can use a distinct glyph, perhaps a star or a different color, to easily differentiate it from other brands. The size of the glyph could represent the number of new registrations, and thus it will be larger for brands with more new registrations.

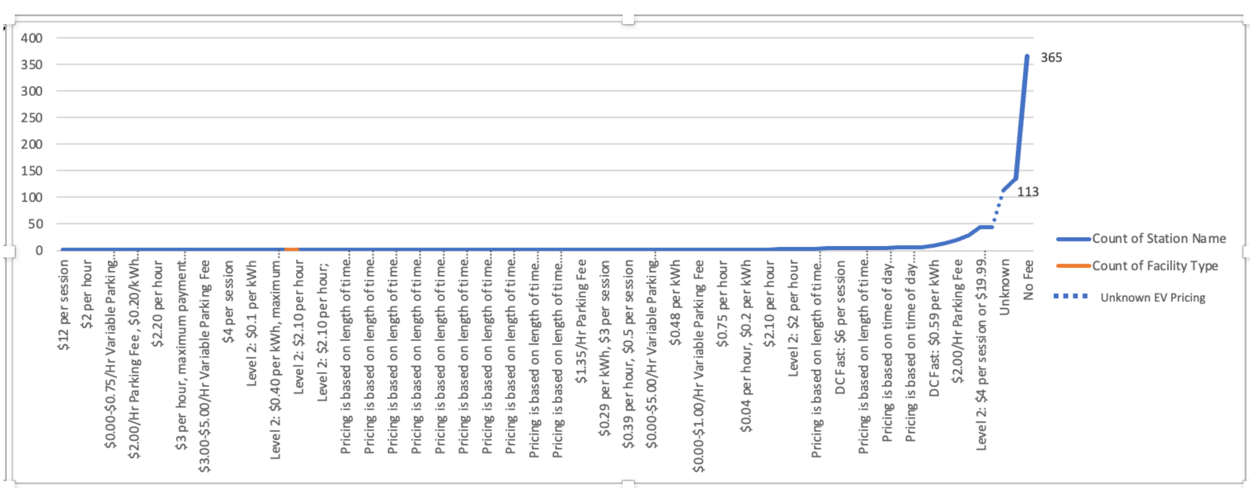
This customized glyph for Tesla not only allows for easy identification and comparison but also adds an extra layer of information to the visualization - specifically, the new registrations of Tesla vehicles. This data visualization technique enhances our understanding of how Tesla's market performance compares to other brands in the Oregon EV market.

Uncertainty Identification:

The unknown cost of certain EV charging stations is a source of intrinsic uncertainty in the data analysis of EV charging stations. There is a significant amount of uncertainty in the information since 113 charging stations across the US, or a sizeable chunk of it, lack reported charging fees.



The number of charging stations broken down into pricing ranges would normally be shown as a bar graph as the dataset's primary visualization. The 'Unknown' part, however, adds a degree of ambiguity. This can be accommodated by using a different visual representation for the uncertain data to produce the same bar graph. To easily distinguish it from the other categories, the segment corresponding to the 'Unknown' category might be represented using dotted lines or a different pattern.



Principles of Designing Uncertainty Visualizations:

The ideas listed below served as a guide in creating the a forementioned uncertainty visualization in accordance with the assignment's requirements:

1. **Clarity**: The altered visual interpretation of the 'Unknown' category clearly highlights the existence of ambiguity in the dataset. It is simple to identify the ambiguous facts because to the distinct depiction's obvious separation.
2. **Accuracy**: The fraction of the data that is unclear is properly represented by the size of the 'Unknown' section in the bar graph.
3. **Completeness**: The graph visually separates the 'Unknown' category to make sure that all key sources of uncertainty, in this example the unknowable price of EV charging stations, are represented in the depiction.
4. **Usability**: The distinction between certain and uncertain data is clear to viewers and doesn't give the impression that the data is not definite. The uncertainty representation adheres to usability criteria since it doesn't call for a complicated interpretation.
5. **Aesthetic Considerations:** The general appearance and readability of the graph are preserved despite the addition of uncertainty representation. A logical and compelling visual story is ensured by the changed depiction's seamless integration with the remainder of the presentation.

By following these guidelines, we may produce uncertainty visualizations that effectively convey the viewers' doubt about the data while simultaneously properly representing the facts.