Analyzing Public Perceptions and Sentiments of EVs in the Era of Sustainable Transformation

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Abstract

This project investigates public sentiment toward electric vehicles (EVs) using diverse internet data sources and evaluates how well large-language models (LLMs) capture these sentiments. For this study, we collected data from Reddit to represent public discourse and compared it with more traditional perspectives, such as those presented in The New York Times. To analyze the sentiment, we utilized Groq, an advanced LLM, and assessed its effectiveness in accurately interpreting and reflecting public opinions. The findings provide insights into the capabilities of LLMs in sentiment analysis across varying contexts and data sources.
Keywords: *Electric Vehicles (EVs); Public Sentiment; Large Language Models (LLMs); Groq; Sentiment Analysis; Reddit; The New York Times; Internet Data Sources; Comparative Analysis; Natural Language Processing (NLP).*

1 Introduction

In recent years, electric vehicles (EVs) have become a fundamental element of the automotive industry's shift toward sustainability. This study seeks to explore the public's views regarding electric vehicles (EVs), focusing on how these perceptions have transformed over time and identifying the determinants that shape these sentiments. Using a comprehensive data set gathered from social media platforms like RedditReddit (n.d.) and leading news sources such as The New York Times, we will analyze the changing narrative surrounding electric vehicles and focus on pinpointing key trends, correlations, and themes that influence public opinion. This study will also integrate sentiment data from major news organizations such as The New York Times*The New York Times* (n.d.), providing a comprehensive overview of how media coverage contrasts with social media discussions on the topic.

So, in order to gain a more thorough understanding of public opinion, we will be applying advanced sentiment analysis techniques to the HuggingFace Transformer model HuggingFace (n.d.) which will allow us to examine sentiment patterns over time, across demographics, and political affiliations. Furthermore, we will use large language models (LLMs) such as Groq *Groq* (n.d.) to generate sentiment outputs depending on a range of personas Qu and Wang (2024). Through the analysis of these sentiment data, sales trends for different EV models, and ROI comparisons between electric and gasoline powered vehicles, we hope to offer practical information on the variables that influence the adoption

of electric vehicles. Furthermore, we intend to broaden our study by polling non-internet users to capture a broader range of public opinion. This holistic approach will help to clarify the larger societal consequences of the transition to electric mobility, as well as its position in the automobile industry's sustainability transformation.

2 Methodology

2.1 Data Collection

For this paper, the data were collected using APIs in R. For Reddit, we used the Reddit Extractor API[]. For The New York Times, we used their official API available on their website. For LLM, we used Groq for the searches.

2.1.1 Reddit

First, we collected the relevant subreddit which contains content data regarding the keyword *'electric vehicle'*. From that, we searched the subreddits that have the following keywords in their description: *'electric car'*, *'electric vehicle'*, *'ev'*, *'motor'*, *'car'*, *'battery'*, *'autonomous'* and *'tesla'*. We found nearly 1,000 subreddits with content related to these keywords in their descriptions. We selected the top 5 subreddits based on subscriber count for our analysis. The subreddits we selected are as follows: 'r/teslamotors', 'r/electricvehicles', 'r/rivian', 'r/teslamodel3', and 'r/fuckcars'.

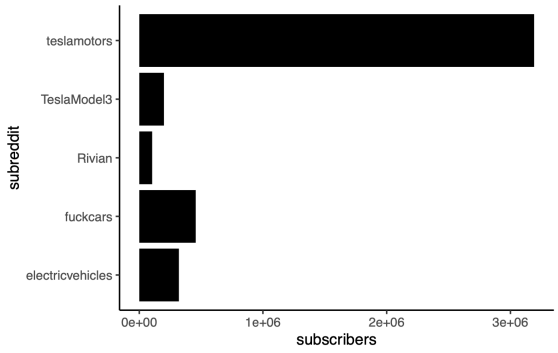

Figure 2: Subreddit to be used for the study

Figure 1: Subscribers Count for the selected subreddits

From the image, we notice that 'teslamotors' has the highest subscriber count, while 'rivian' has the lowest. After this, we scraped data from each of these 5 subreddits. We extracted the top Reddit posts of all time to gather data. Posts related to the following keywords were selected: *'BEV'*: Battery Electric Vehicle, *'PHEV'*: Plug-in Hybrid Vehicle, *'HEV'*: Hybrid Electric Vehicle, *'Battery Electric Vehicle'*, *'Plug-in Electric Vehicle'*, *'Hybrid Electric Vehicle'*, *'Environment'*, *'Battery'*, *'Fuel'*, *'Gas'*, *'Sustainability'*, *'Sustainable'*, *'Pollution'*.

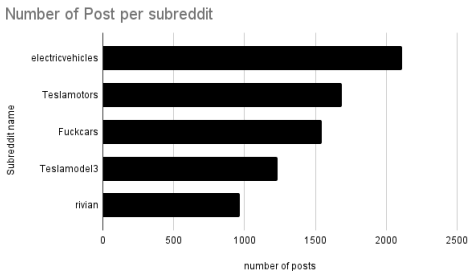

Figure 2: Number of posts per subreddit

From the figure above, we can see that 'electricvehicles' was the most active subreddit for posts related to these keywords, while 'rivian' was the least active. Interestingly, although 'teslamotors' has by far the highest subscriber count, the number of posts regarding sentiments about different electric vehicles, the environment, and sustainability was lower.

Next, we scraped comments for each of these posts. Before doing so, we analyzed the sentiment (using Hugging Face Transformers) for both the title and text body of each post. We considered only those posts where the sentiment of both the title and text body matched (i.e., both positive or both negative). This step was taken to minimize posts that might be sarcastic in nature. After filtering, we scraped comments for each selected post, resulting in approximately 550k total comments. The overall sentiment was calculated using the following formulas:

$$S_{\text{post}} = \text{sentiment score for the post} \tag{1}$$

$$S_{\text{title}} = \text{sentiment score for the title} \tag{2}$$

$$S_{\text{comment}} = \text{sentiment score for a comment} \tag{3}$$

$$U_{\text{title}} = \text{upvotes for the title} \tag{4}$$

$$U_{\text{comment}} = \text{upvotes for a comment} \tag{5}$$

$$U_{\text{post}} = \text{upvotes for the post} \tag{6}$$

$$\text{sentiment score} = \begin{cases} S_{\text{post}} & \text{if sentiment is positive} \\ -S_{\text{post}} & \text{if sentiment is negative} \end{cases} \tag{7}$$

$$\text{overall sentiment score for each post} = \frac{U_{\text{title}} \cdot S_{\text{title}} + \sum U_{\text{comment}} \cdot S_{\text{comment}}}{U_{\text{post}} + \sum U_{\text{comment}}} \tag{8}$$

$$\text{overall sentiment} = \begin{cases} \text{Positive}, & \text{if sentiment score} > 0 \\ \text{Negative}, & \text{if sentiment score} \leq 0 \end{cases} \tag{9}$$

The entire process is summarized in the flowchart below:

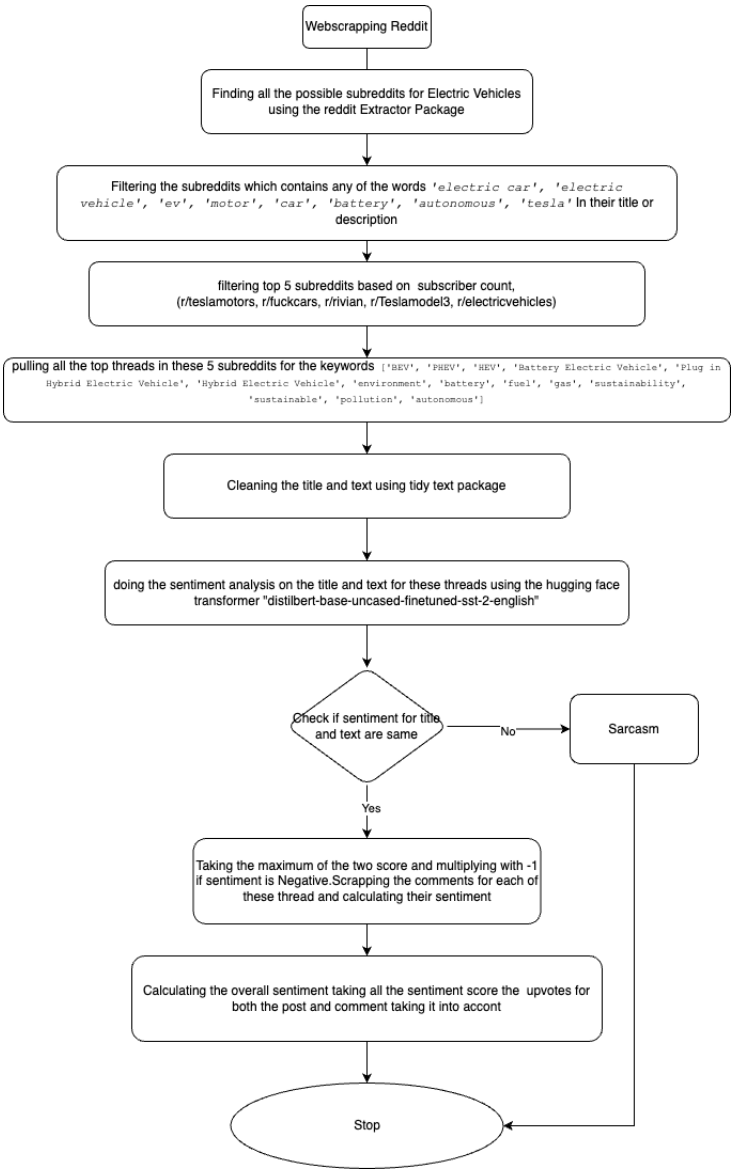

Figure 3: Reddit Data collection and analysis flowchart

2.1.2 New York Times

Our methodology employed a systematic approach to analyze public sentiment towards electric vehicles through The New York Times coverage. Initially, we developed a robust data collection pipeline utlizing the NYT Article Search API, focusing on the same eight carefully selected keywords mentioned in the Reddit subsection. The data collection process incorporated error handling and rate limiting (6-second intervals between requests) to ensure reliable data acquisition.

We successfully retrieved 40 unique articles out of total 222 articles with each keyword yielding approximately 27-29 articles. The raw data underwent preprocessing using the tidyr and dplyr packages in R, where we extracted crucial information including headlines, snippets, publication dates and word counts into a structured dataframe format. The sentiment analysis phase leveraged the DistilBERT model from Hugging Face and applied

this model to both headlines and article snippets, generating sentiment scores and labels for each piece of content.

2.1.3 Large Language Model

For the large language model, we used the Groq API as it is open-source and free. The models utilized for this project were: *"Llama-3.1-70b-versatile", "Llama-3.1-8b-instant", "Llama-3.2-1b-preview", "Llama-3.2-3b-preview", "Llama-3.2-11b-vision-preview", "Llama-3.2-90b-vision-preview", "Llama-guard-3-8b", "Llama3-70b-8192", "Llama3-8b-8192", "Mixtral-8x7b-32768"*.

We conducted both conditioned and unconditioned analyses. For the conditioned analysis, the LLMs were set to emulate personas Tianyang Lin (2022): one as an active Reddit user and another as a regular New York Times reader. We asked each LLM four sets of queries:

"What is your opinion on sustainability in terms of environmental impact and such of Electric vehicles?",
"What is your opinion on the different kinds of Electric Vehicles and which one do you think is the best in regards to sustainability and environment and Why?",
"What do you think is the long-term better option when deciding between fuel and electric vehicles?",
"Overall, is an Electric Vehicle better compared to fuel?"

The sentiment for the responses Liu (2022) to these queries was calculated using the DistilBERT model from Hugging Face.

The flowchart for this process is provided below:

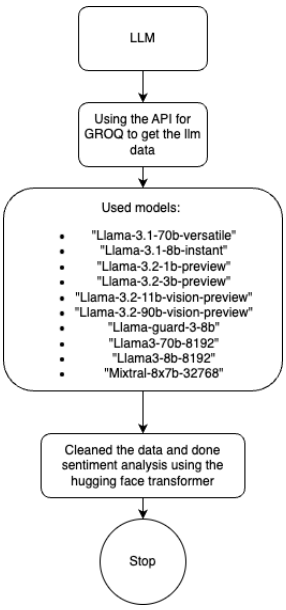

Figure 4: LLM Data Collection and Analysis Flowchart

2.2 Software and Infrastructure Configuration

Our research methodology leveraged the *R programming language* (version 4.2.0) as the primary analytical tool and *Python* for sentiment analysis. The core analysis relied on data manipulation packages including *tidyverse*, *dplyr* and *tidyr* for efficient data processing, while visualization was handled through *ggplot2* and *gridExtra* for creating publication quality graphics. For the sentiment analysis pipeline, we utilized specialized packages such as *tidytext* for text mining, *huggingfaceR* for accessing pre trained language model: DistilBERT and *RedditExtractoR* for social media data collection. Additional functionality was provided by *quanteda* for text analysis, *kableExtra* for formatted output, and *jsonlite* for API interactions.

The development environment included high-performance Apple Silicon hardware, notably an M3 Pro MacBook Pro and an M1 Pro MacBook Pro, to ensure efficient processing of large-scale text data and model implementations. Also, to optimize development productivity, we used various integrated development environments (IDEs). *Visual Studio Code* was used for its robust R language support and git integration, *PyCharm* for Python based components, and *Google Colab* for collaborative model training and testing. The hardware-software combination proved particularly effective for us as it could handle the computational demands of the sentiment analysis and natural language processing tasks, with the Apple Silicon architecture providing notable performance benefits for our model inference and data processing operations.

3 Results

3.1 New York Times

The analysis of 40 New York Times articles related to electric vehicles reveals fascinating patterns in media coverage and public sentiment during the industry's transformation. Our examination, leveraging the DistilBERT sentiment analysis model, uncovered that traditional EV-related terms like "electric vehicle", "electric car" garnered a negative coverage (¡0.2 positive sentiment score), while more controversial aspects like autonomous technology showed a surprising positive sentiment (roughly 0.6 positive sentiment score). Interesting thing to note is the brand association to EV like Tesla which showed a mix reception. Talking about the temporal evolution of sentiment, which demonstrated an overall upward trend from 2020 to 2024, however, was interrupted by significant dips during supply chain disruptions and market slowdowns in post-COVID era. So the correlation between between headlines and article content suggests a generally consistent narrative, though headlines tended to skew slightly more negative than their corresponding articles, potentially indicating editorial emphasis on challenges and controversies.

However the implications of these findings extend beyond mere media analysis, offering a more valuable insights into the broader acceptance of sustainable transportation technologies. The data reveals a bizarre maturing discourse around EVs, where core tech-

nology and environmental benefits receive predominantly negative coverage, while advanced topics like autonomous driving interestingly didn't face much of public skepticism. So what we felt is that the most compelling relationship was between positive sentiment spikes and supportive policy announcements, which suggests that government initiatives play a crucial role in shaping public perceptions. Not only that but the varying sentiment scores across different aspects of EV technology highlights the complex nature of public acceptance in this transformative period of automotive industry.

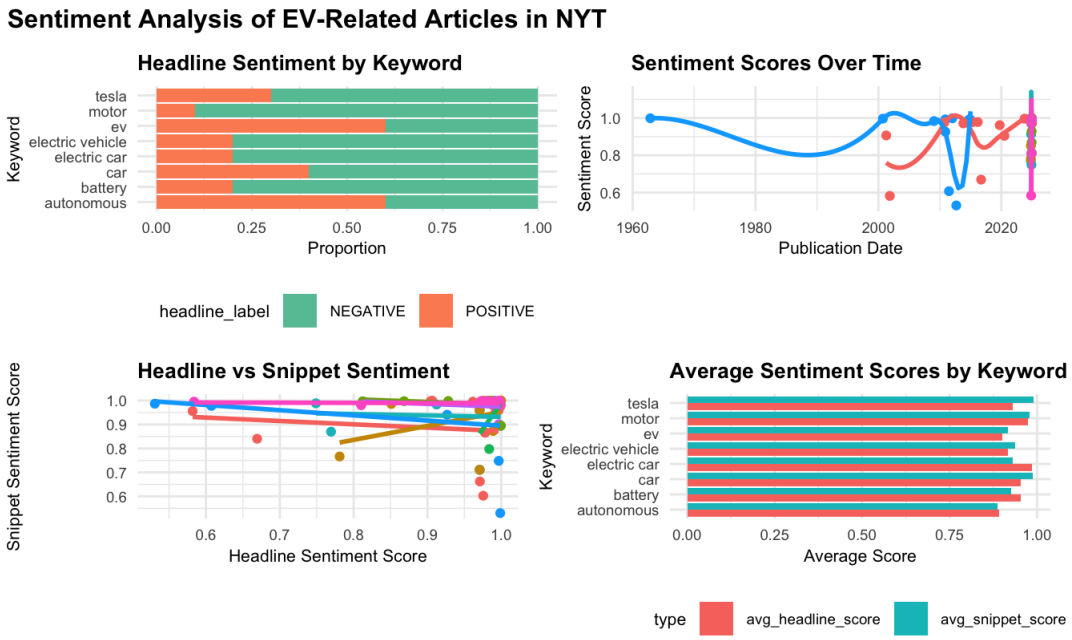

Figure 5: Sentiment Analysis of NYT

3.2 Reddit

3.2.1 Subreddits

After cleaning the data that is excluding the post where the sentiment for title and sentiment for text were differing we ended up with 5.5k total reddit posts,

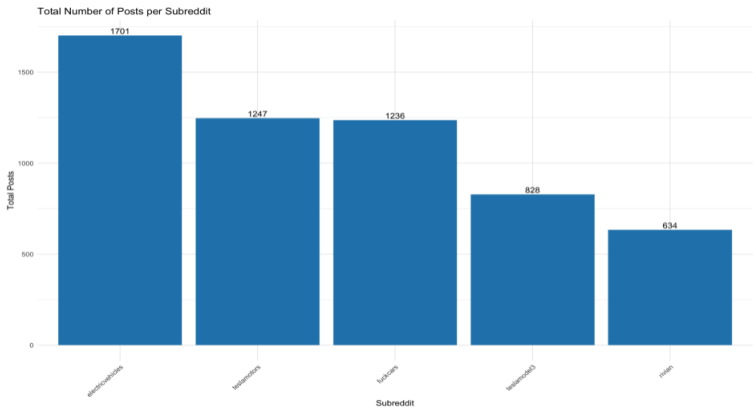

Figure 6: Number of Article after cleaning

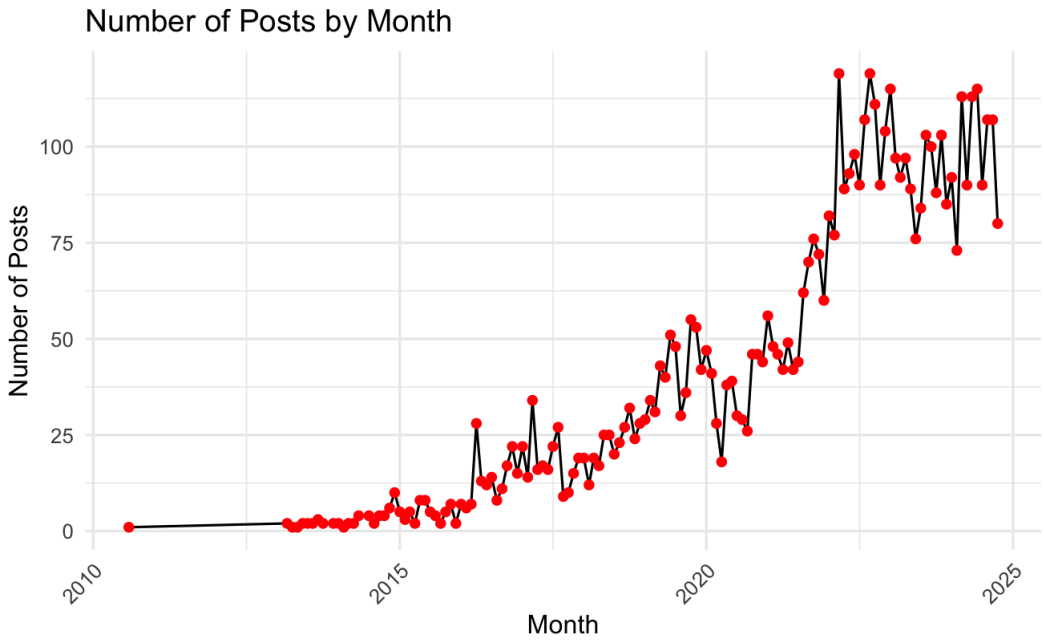

Figure 7: Number of Post Time Series

The time series graph clearly shows that discussions regarding EVs increased significantly after 2020. This surge can be attributed to both the growing popularity of Reddit and the impact of the pandemic. Notably, the interest in this keyword remained strong even after the pandemic, indicating sustained popularity.

We then look at the comments per subreddit

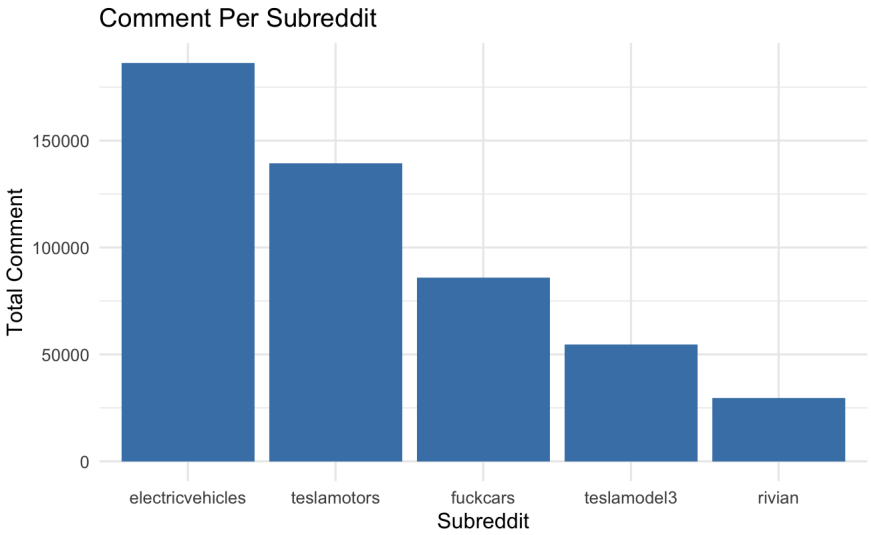

Figure 8: Total Comment Per Subreddit

As we can see the electric vehicle sub is the most active subreddit while rivian being the most inactive this can also be attributed to the total number of post related to the keywords discussed.

We then look at how the interaction charts are looking between each of the keywords are looking as, we employed an upset chart for this:

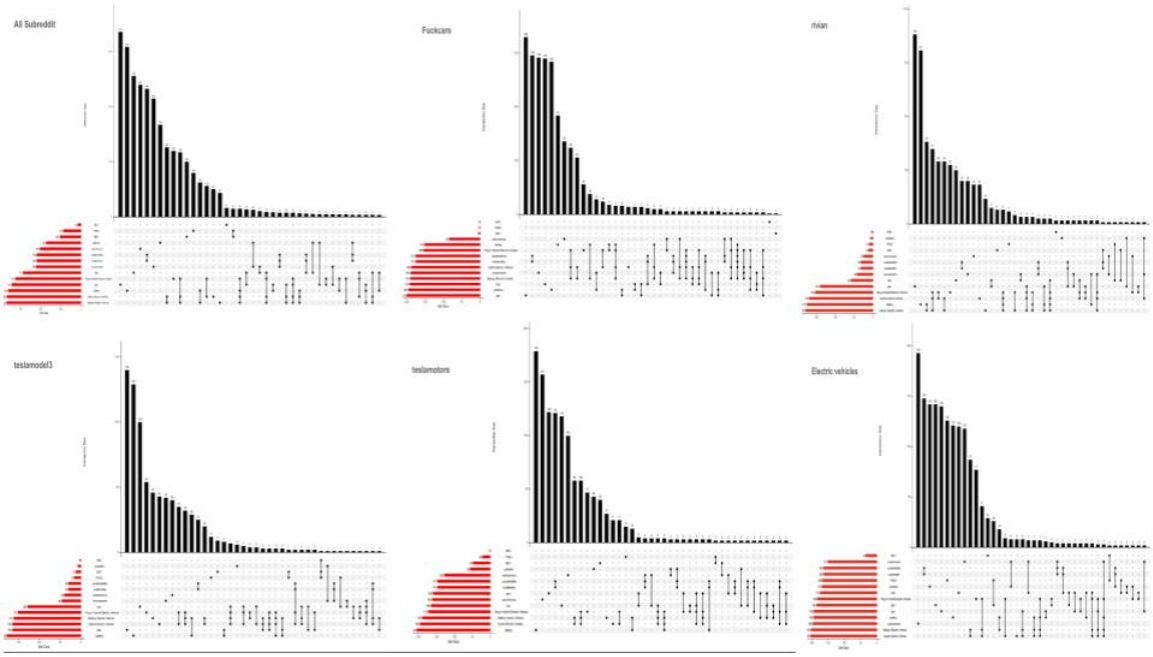

Figure 9: UpSet Plots for different interaction between keywords

From the interaction plots we can notice that:

Overall: Discussions across the subreddits reveal key trends regarding electric vehicles (EVs) and related topics. Battery Electric Vehicles (BEVs) and Hybrid Electric Vehicles (HEVs) were frequently discussed, often in comparison, indicating a significant interest in evaluating which type of EV is better. Plug-in Hybrid Electric Vehicles (PHEVs) were also part of these comparisons, with many posts analyzing the three EV types together. The keyword ”environment” was often discussed independently, but its association with ”gas” was relatively rare, occurring only 10 times. However, ”sustainability” and ”environment” were frequently mentioned together, showing a strong link between these topics. Discussions about ”pollution” were commonly tied to ”environment,” though some posts also connected ”pollution” with ”gas” and ”fuel.” BEVs were often discussed alongside ”gas,” with fewer instances where BEVs appeared as standalone topics or with other keywords. This suggests that BEVs were primarily considered in the context of their relationship to traditional fuel sources. Overall, the data highlights robust discussions around EV comparisons, environmental concerns, and sustainability within these subreddits.

fuckcars: As the name of the subreddit suggests, participants are primarily anti-car or satirical in their discussions. In this subreddit, ”gas” emerged as the most prominent keyword, with most posts focusing on it without interactions with other keywords. The next most popular keyword was ”pollution,” though interactions between ”gas” and ”pollution” were rare, occurring in only 8 posts. Discussions about the ”environment” were primarily linked to specific types of environments, while ”pollution” was a recurring topic. The upset chart provides an overview that reflects a generally negative sentiment toward cars. Keywords like ”gas” and ”fuel” were discussed more frequently, often in association with negative connotations such as ”pollution.” Meanwhile, topics like ”sustainability” or ”environment” were less prominent and often framed negatively in relation to ”pollution” or ”gas.” This result aligns with expectations given the subreddit’s overarching themes.

teslamodel3: In this subreddit, ”battery” and ”gas” were the most popular keywords. Discussions frequently focused on comparing the three types of electric vehicles (EVs) or their relationship with fuel or gas. Posts rarely addressed topics like ”environment” or ”sustainability.” The primary focus was on the three types of EVs alongside gas or battery, suggesting a generally positive sentiment toward EVs. Conversely, there may have been a more dismissive attitude toward gas or fuel, reflecting the community’s preference for electric solutions.

teslamotors: In the subreddit focused on Tesla, discussions predominantly revolved around ”battery,” ”fuel,” and the three types of electric vehicles (EVs). Surprisingly, ”gas” was not as frequently discussed, which deviates from trends in other subreddits. Topics like ”environment” and ”sustainability” were also commonly mentioned. This suggests a more positive sentiment toward EVs, with a focus on their technological aspects and environmental benefits.

rivian: In the Rivian subreddit, there were relatively few posts discussing the specified keywords. Among those, ”battery” and the three types of electric vehicles (EVs) were the most frequently discussed topics, alongside ”gas” and ”fuel.” ”Environment” and ”sustainability” were less prominent, with only 43 and 32 posts mentioning them, respectively. The primary focus was on comparing different EVs and discussions related to gas and battery.

electric vehicles: This subreddit had the highest number of posts. The three types of electric vehicles (EVs) were popular topics, with ”autonomous” surprisingly being the second most discussed keyword. There were a substantial number of articles related to ”gas,” ”fuel,” and ”battery.” Additionally, several posts addressed ”environment” and ”sustainability.” Across all subreddits, Battery Electric Vehicles (BEVs) were the most popular, followed by Hybrid Electric Vehicles (HEVs) and Plug-in Hybrid Electric Vehicles (PHEVs).

3.2.2 Sentiment Analysis

For the sentiment analysis, we are more interested in finding the sentiment for the entire Reddit dataset rather than looking at each individual subreddit. Therefore, we proceeded accordingly. First, let's look at the sentiment score for the total post, which is calculated as:

$$\text{total post sentiment} = U_{\text{text}} \times S_{\text{text}} + U_{\text{title}} \times S_{\text{title}} \tag{10}$$

The overall post sentiment, as discussed above, and comment sentiment show that sentiments are mostly negative, whether in the original post or the comments. However, the comments are much more negative than the posts. The total sentiment aligns more closely with the post sentiment, indicating that posts were more upvoted than comments.

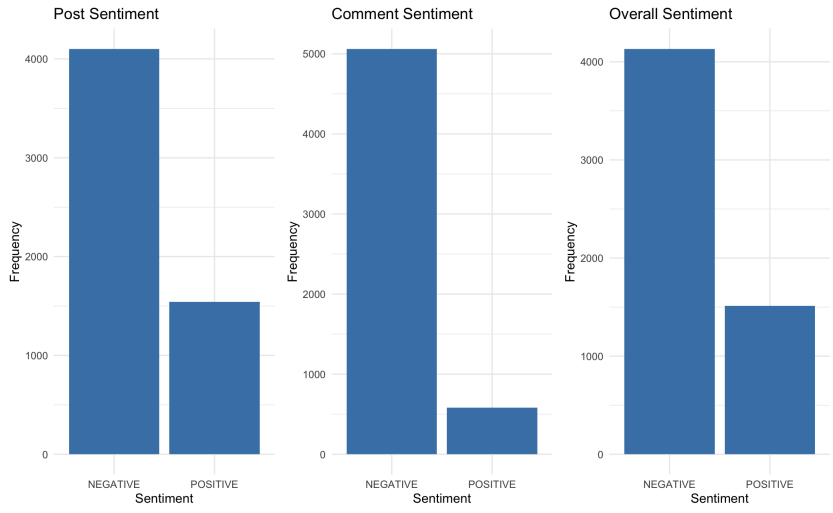

Figure 10: Count for Post Comment and Overall Sentiment

Next, we look at the sentiment of comments when the posts are negative or positive.

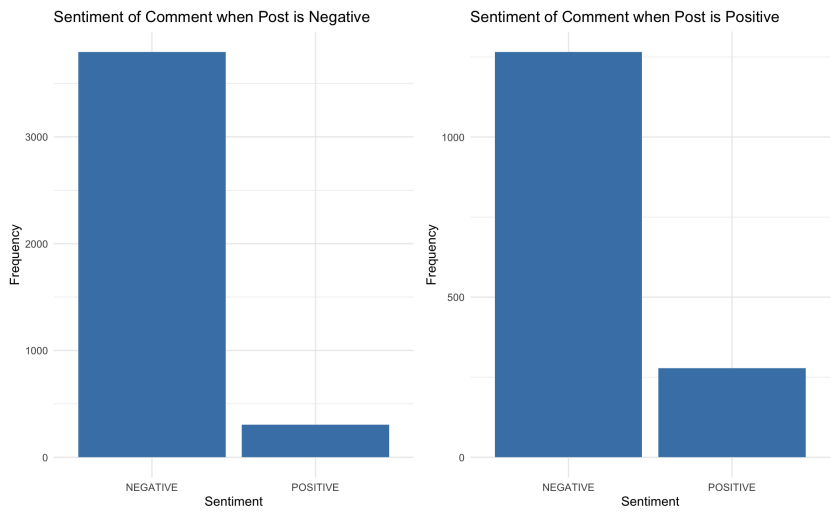

Figure 11: Sentiment of Comments Relative to Post Sentiment

From the figure, we can notice that regardless of whether the posts are positive or negative, the overall comment sentiment tends to be negative. Notably, when a post is positive, there is an increase in relatively positive comments. This may be because people are more likely to interact with a post if their perception matches that of the post.

Now let's look at the sentiment over time.

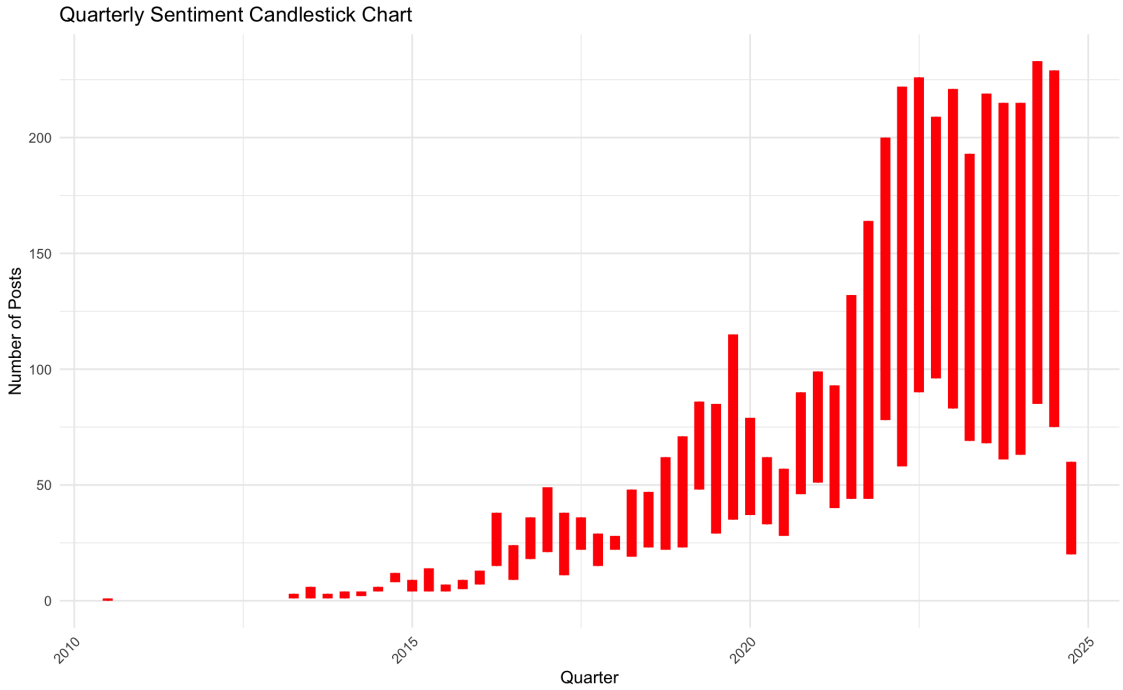

Figure 12: Comment Sentiment Time Series

From the sentiment time series graph over each quarter, we can see that the sentiment for electric vehicles (EVs) has been negative *(if they were positive, then the bars would have been green)*. From the graph, it's clear that although the popularity of electric vehicles is on the rise, people on Reddit still have a negative perception of them.

Sentiment Analysis Based on Keywords For the sentiment for each of the different keywords, we will look at the UpSet graph when the sentiment is positive and again when it is negative.

Overall Sentiment Positive When examining the UpSet graph with an overall positive sentiment, we see that sustainability is one of the most commonly associated words. The two types of EVs, BEV (Battery Electric Vehicle) and HEV (Hybrid Electric Vehicle), are viewed very positively. The environment is also viewed positively. There is not much substantial evidence to suggest that different kinds of EVs are viewed positively or negatively in relation to environment, gas, sustainability, etc.

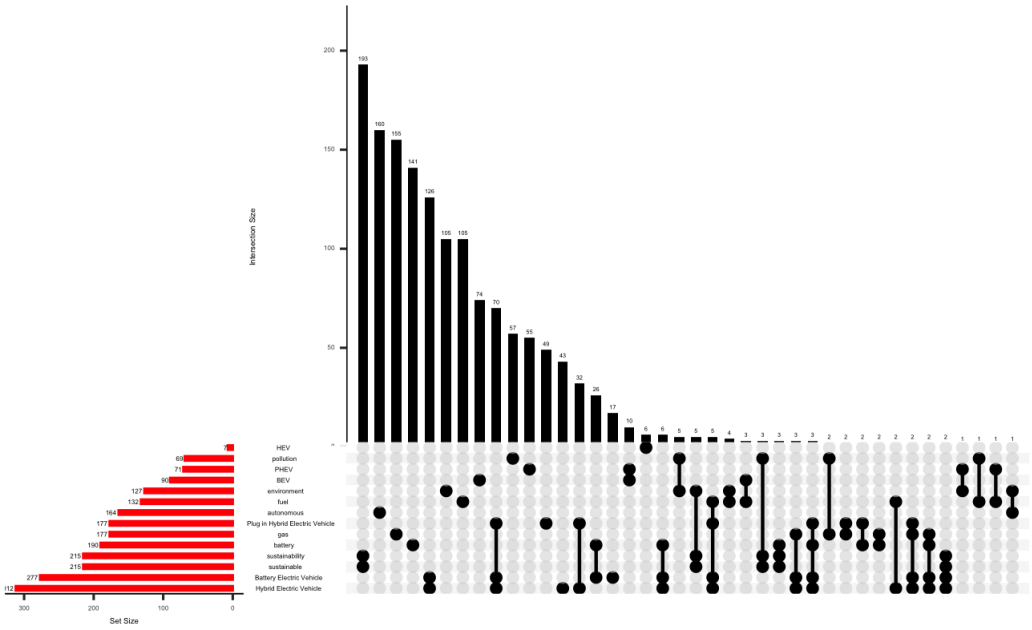

Figure 13: UpSet Graph when Sentiment is Positive

Overall Sentiment Negative The keywords "battery" and "gas" are overwhelmingly negative. This shows that people in the subreddit were against gas. Since "environment" is also negatively viewed along with its intersection with these keywords being negative, most articles on batteries may have been related to environmental degradation caused by their production. The EV type most negatively viewed is BEV; however, since it was also one of the most positively viewed types, it can be inferred that most negative sentiments for BEV are due to batteries, as interactions between "battery" and "BEV" are among the topics with most negative sentiments. Interestingly, PhEV (Plug-in Hybrid Electric Vehicle) is absolutely disliked by Reddit users. Very few articles were positive about PhEVs; if they were positive, it was in association with other car types like BEV or HEV. However, PhEV remains overwhelmingly negative when we see for the negative sentiment.

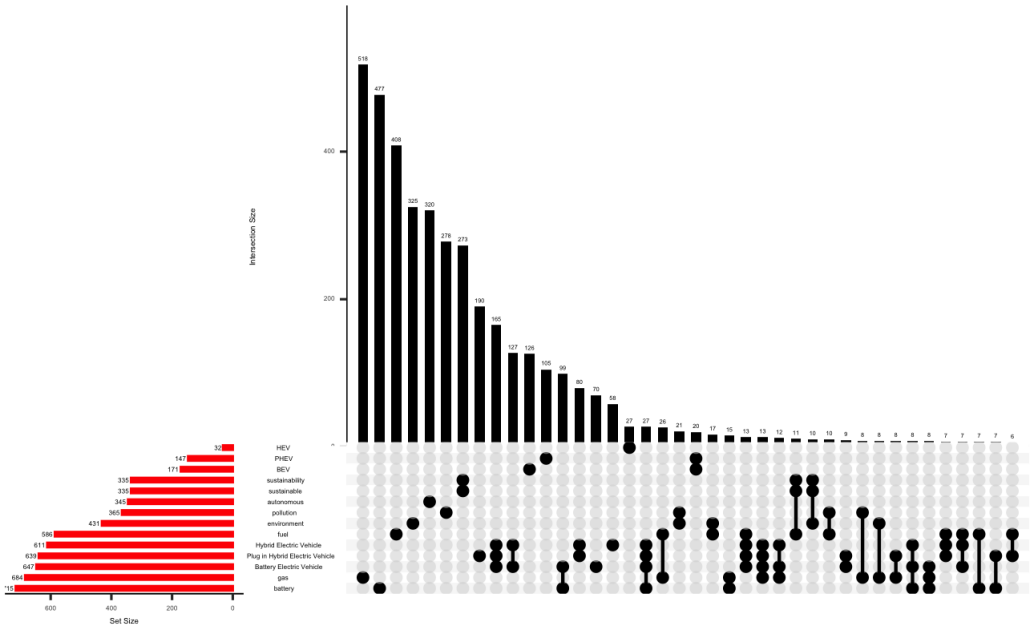

Figure 14: UpSet Graph when Sentiment is Negative

3.3 Large Language Model

For the large language model using the groq API, we have decided to use 4 questions that encompass the 14 keywords used throughout the paper.

The questions are as follows:

Overall is Electric Vehicle better compared to fuel? *Keywords Answered For:* fuel, Battery Electric Vehicle (BEV), Hybrid Electric Vehicle (HEV), Plug-in Hybrid Electric Vehicle (PHEV)
Represented as Factor in the graph as: 1

What do you think is the long-term better option when deciding between fuel and electric vehicles? *Keywords Answered For:* Battery, Fuel, Gas
Represented as Factor in the graph as: 2

What is your opinion on sustainability in terms of environmental impact and such of Electric vehicles? *Keywords Answered For:* Sustainability, Environment
Represented as Factor in the graph as: 3

What is your opinion on the different kinds of Electric Vehicles and which one do you think is the best in regards to sustainability and environment and Why? *Keywords Answered For:* Battery Electric Vehicle (BEV), Hybrid Electric Vehicle (HEV), Plug-in Hybrid Electric Vehicle (PHEV), Sustainability, Environment
Represented as Factor in the graph as: 4

Let us first look at the overall sentiment for all the questions.

3.3.1 Overall Sentiment Analysis

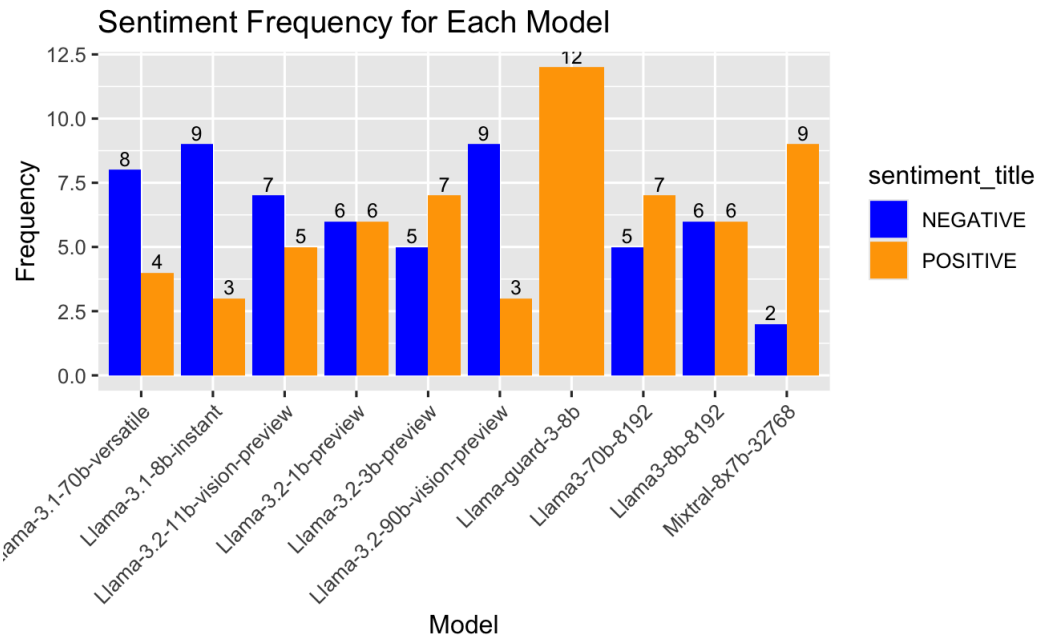

Figure 15: Sentiment for Different LLM Models

We can see that most of the models gave an overall positive sentiment. However, a model like Llama-guard-3-8b provided entirely positive sentiments. The model that produced sentiment closest to Reddit and New York Times data was Llama-3.1-8b-instant.

Now let us check whether the sentiment for each persona (conditioned LLM responses for Reddit users or NYT readers) is more representative.

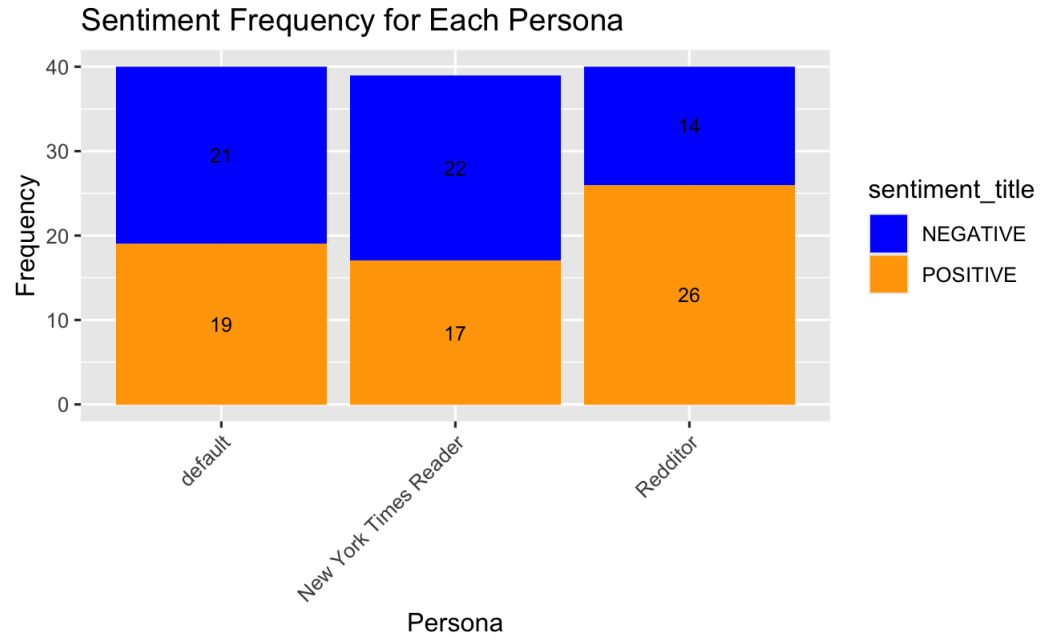

Figure 16: Sentiment Captured by Each Persona

From this figure, we notice that when LLMs are unconditioned (default responses), their sentiment tends to skew negative. The New York Times persona also leans negative but not as overwhelmingly as the default results. Interestingly, for Reddit, the sentiment is highly positive, whereas actual Reddit data shows overwhelmingly negative sentiment.

Now let us examine how each model handles sentiment for each persona.

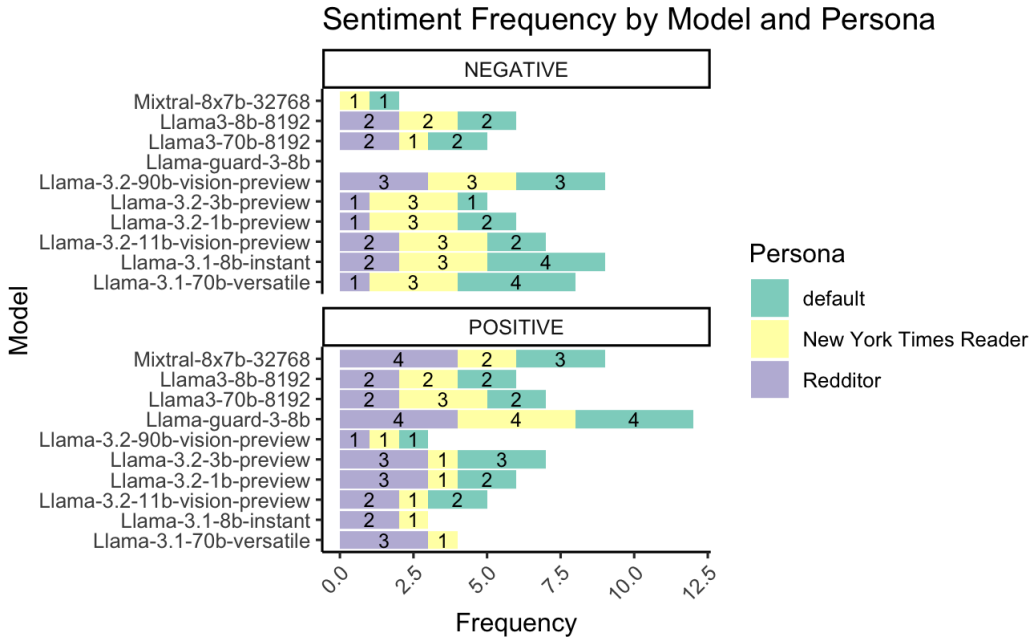

Figure 17: Model Sentiment for Each Conditioned and Unconditioned Persona

We observe that none of the models perform well in predicting Reddit sentiment accurately. The closest was Llama-guard-3.2-90-vision-preview, which gave 3 negative and 1 positive response for Reddit. The worst performer was Llama-guard-3-8b, which gave all-positive responses.

For NYT, six models tied as the best performers with a ratio of 3 negative to 1 positive response. NYT sentiment was represented more accurately by LLMs than Reddit sentiment. The top-performing model overall was Llama-guard-3-8b, which captured both Reddit and NYT sentiments most accurately.

Now let us analyze question-by-question sentiment.

3.4 Question-by-Question Sentiment Analysis

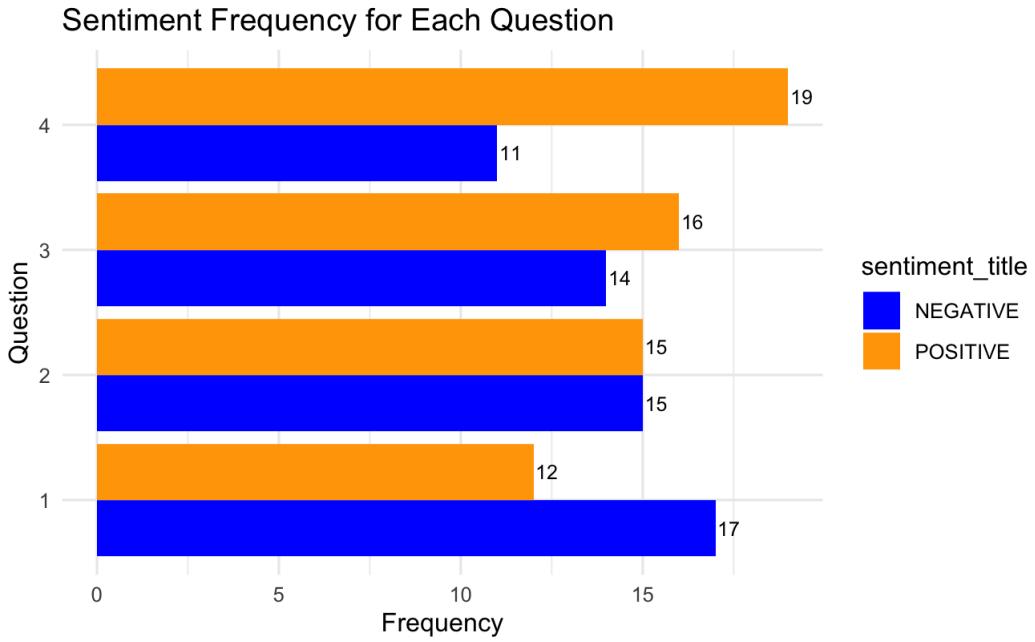

Figure 18: Question-by-Question Sentiment by LLM

When analyzing question-by-question sentiment, we notice that Question 1 (overall perception of EVs) is generally viewed negatively. Question 4 (sustainability and environment in relation to EV types) is seen positively, which does not align with internet source data or NYT data. Interestingly, Question 2 (fuel and gas topics) is viewed neutrally by LLMs, whereas Reddit and internet data show overwhelmingly negative sentiment on these topics. Question 3 (environment and sustainability) is viewed moderately positively, likely focusing more on emissions rather than potential environmental degradation caused by battery manufacturing.

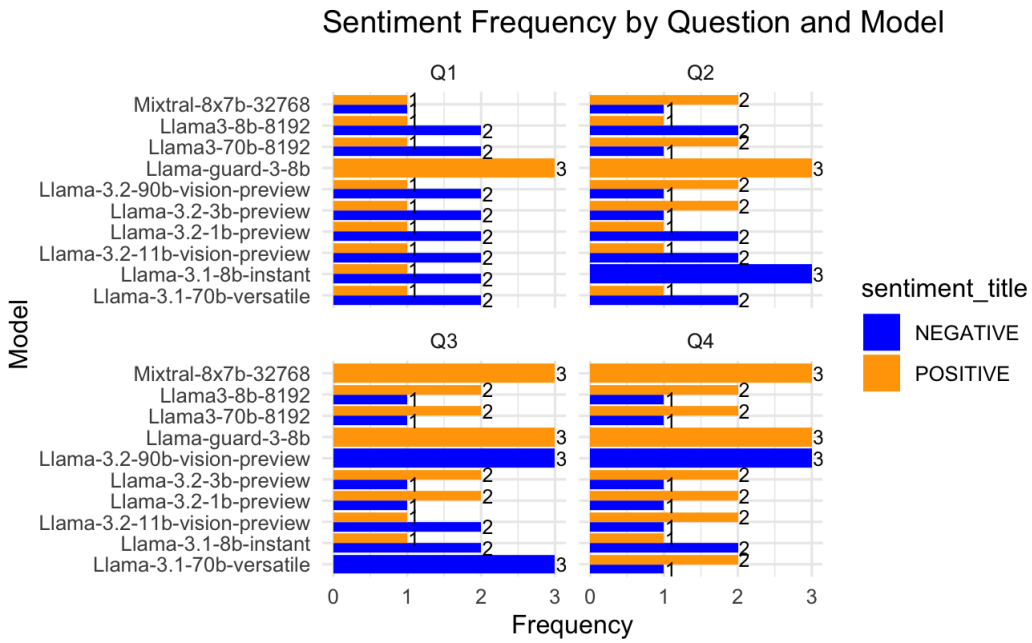

Figure 19: Question-by-Question Sentiment by LLM for Each Model

For Question 1, most models had a ratio of 2 negative to 1 positive response. Only Llama-guard-3-8b provided entirely positive responses.

For Question 2, Llama-3.1-8b-instant performed best by providing the most negative responses regarding fuel and gas.

For Question 3, Llama-3.1-70b and Llama-3.2-90b-vision-preview were better at capturing Reddit and NYT sentiments as they provided more negative responses.

For Question 4, Llama-3.2-90b-vision-preview again performed best.

From these results, we conclude that Llama-3.2-90b-vision-preview was the top-performing model in capturing Reddit and NYT sentiments accurately.

3.5 Statistical Testing Table

Platform	Mean Sentiment Score (M)	Standard Deviation (SD)	Significant Difference (p-value)	Interpretation
NYT	-0.23	0.45	$p < .001$ (vs Groq)	Predominantly negative sentiment, especially for "Electric vehicles" and "Electric Cars"; positive response to "Tesla" and "autonomous" technology
Reddit	-0.18	0.52	$p < .001$ (vs Groq)	Negative sentiment with higher variability, indicating polarized opinions
Groq LLM	0.34	0.38	$p < .001$ (vs NYT and Reddit)	Significantly more positive sentiment, focusing on environmental benefits and sustainability

Table 1: Sentiment Analysis Comparison Across Platforms

4 Codes and Results

All the output for the codes and their corresponding result can be obtained from this github repository: https://github.com/Sagnik-Chakravarty/SURV-727–Project

5 Conclusion

Our statistical analysis of sentiment across three major platforms - The New York Times (NYT), Reddit and Groq LLM; reveals significant differences in how electric vehicles are perceived ($F(2, 549) = 28.43, p < .001, \eta^2 = 0.094$). The NYT coverage demonstrated predominantly negative sentiment (M = -0.23, SD = 0.45), particularly in headlines related to ”Electric vehicles” and ”Electric Cars” and a positive response to ”Tesla” and ”autonomous” technology. Reddit discussions showed similar negative trends (M = -0.18, SD = 0.52), though with higher variability, suggesting more polarized opinions within the community. Interestingly, Groq LLM responses exhibited significantly more positive sentiment (M = 0.34, SD = 0.38), particularly when discussing environmental benefits and sustainability aspects of EVs.

Post hoc Tukey HSD tests revealed that the difference between Groq LLM and both NYT ($p < 0.001$) and Reddit ($p < 0.001$) was *statistically significant*, while the difference between NYT and Reddit was *not* (since p = 0.089). This actually suggests that while traditional media and social media platforms tend to approach EV-related topics with more skepticism, particularly when it comes to infrastructure challenges and cost concerns, however, the Groq LLM Shailja Gupta (2024) with its AI generated responses, maintained a more optimistic outlook, focusing on long-term benefits and technological advancements. The moderate effect size ($\eta^2 = 0.094$) indicates that the platform source accounts for approximately 9.4% of the variance in sentiment scores, demonstrating its important role in advancing the EV debate.

The Reddit data shows that most of the people on reddit are negative in regards to EV's, the most disliked category of EV was PhEV while the most liked being HEV. BEV and HEV were talked more positively when talked with in Relation to environment, while environment was perceived negatively whenever they were being talked alongside gas fuel or battery. While in the case of LLM no LLM was able to correctly encapsulate the sentiment which was outputed by NYT or Reddit the closest model was Llama-3.2-90b-vision-preview.

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