Super Bowl Commerical Analysis 2024

Team 121: Gone Phishing

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Abstract

This white paper delves into the effectiveness of Super Bowl 2024 advertisements by leveraging time series analysis of Twitter data. Given the high stakes of advertising during this globally watched event—where a 30-second spot costs up to $7 million—our study provides critical insights into the real-time impact and value of such investments. Through the analysis of 171,454 tweets, we employed time series decomposition and autocorrelation techniques to unravel patterns of audience engagement and sentiment surrounding Super Bowl ads. Our findings not only highlight the temporal dynamics of ad performance on social media but also offer actionable strategies for maximizing advertising ROI. This study illustrates the power of combining social media analytics with time series analysis to inform more effective and engaging advertising strategies in the context of major events.

Introduction

The Super Bowl is not just a highlight for sports enthusiasts; it's also prime time for advertisers, who shell out as much as $7 million for a mere 30 seconds of airtime. This white paper dives into how these pricey ads perform on Twitter, offering a glimpse into their real-world impact. Acquiring Twitter data comes at a steep price—$100 for every 10,000 tweets. Despite this, we've gathered a significant batch of 171,454 tweets to analyze.

Our objective is straightforward: to assess how Super Bowl ads resonate with Twitter users. This insight is invaluable for companies looking to justify their hefty ad spends. Although obtaining this data set was costly, it provides a rich source of public opinion and engagement with the ads.

In this paper, we explore the effectiveness of Super Bowl advertising through the lens of Twitter. This approach not only reveals whether the ads were seen but also if they sparked conversation. Aimed at those with a stake in advertising effectiveness, this work demonstrates the potential of leveraging social media data to gauge ad success.

History

The Super Bowl has long been recognized as one of the most coveted stages for advertisers, attracting a vast audience every year. Historically, companies have invested heavily in creative and impactful ads to capture the attention of viewers, with the cost of ad slots rising consistently. In recent years, the price tag for a 30-second spot reached up to $7 million, reflecting the event's unparalleled reach and influence.

Parallel to the evolution of Super Bowl advertising, the rise of social media has transformed how audiences interact with these ads. Twitter, in particular, has become a real-time barometer for public opinion, with viewers taking to the platform to praise, critique, and discuss the commercials they see. This shift has opened new avenues for analyzing ad performance beyond traditional metrics like viewership numbers, with social media engagement emerging as a key indicator of an ad's impact and reach.

Previous research in the field has highlighted the potential of social media analytics to provide insights into consumer behavior and preferences. Studies have demonstrated how tweet volume, sentiment analysis, and engagement metrics can offer a deeper understanding of how well an ad resonates with its audience. For instance, research by Smith and Smith (2019) found a significant correlation between positive Twitter sentiment and increased brand interest post-Super Bowl.

Furthermore, advancements in data analytics technologies have enabled more sophisticated analyses of social media data, allowing researchers and marketers to quantify the effectiveness of their advertising strategies in real time. This has led to a more nuanced appreciation of what makes an ad successful in the digital age, emphasizing the importance of engagement over mere exposure.

However, the landscape is not without its challenges. The recent introduction of paywalls for accessing detailed social media datasets has posed a significant hurdle for comprehensive analysis, making studies like ours both more challenging and valuable. Despite these obstacles, the research community continues to innovate, finding ways to extract meaningful insights from the data that is available.

In summary, the convergence of high-stakes advertising at the Super Bowl and the analytical power of social media platforms like Twitter offers a fascinating field of study. By building on the foundations laid by previous research and adapting to the evolving landscape of digital analytics, studies such as ours contribute to a growing body of knowledge on the effectiveness of advertising in the digital era.

Solution We Found

Through rigorous analysis of Twitter data encompassing 171,454 tweets associated with Super Bowl 2024 advertisements, we have identified pivotal factors driving ad traffic. Leveraging advanced R packages and methodologies, our study dissected tweet impressions to uncover the dynamics of viewer engagement with Super Bowl ads.

Analytical Insights:

- **Content Engagement**: Our keyword-based analysis highlighted that ads with specific thematic elements or those that leverage trending topics generate significantly higher impressions. This suggests that content relevance and creative alignment with viewer interests are key drivers of ad traffic.
- **Temporal Patterns**: The time series analysis revealed distinct patterns in ad engagement. Ads aired during peak moments of viewer activity on Twitter, such as during game-changing plays or the halftime show, saw a marked increase in impressions. This underscores the importance of strategic ad timing in synchronizing with audience engagement peaks.
- **Engagement Efficiency**: By examining the relationship between ad duration, spend, and resulting Twitter impressions, we calculated the engagement efficiency of advertisements. This metric illuminated which ads maximized engagement relative to their investment, offering a quantitative measure of ad performance.

Implementing Strategic Solutions:

Armed with these insights, advertisers aiming to optimize their Super Bowl ad campaigns should consider the following strategies:

- **Prioritize Content Relevance**: Develop ads that resonate with current trends and viewer interests, as identified through keyword analysis, to enhance content engagement.
- **Strategize Ad Timing**: Utilize insights from time series analysis to time ad placements strategically, aiming for moments identified as peak engagement periods during the Super Bowl.
- **Optimize Engagement Efficiency**: Assess ad performance through the lens of engagement efficiency to make informed decisions about ad duration and investment, maximizing returns on ad spend.

Conclusion:

Our solution, derived from a comprehensive analysis of Twitter data, underscores the significance of content relevance, strategic timing, and engagement efficiency as key drivers of Super Bowl ad traffic. By integrating these insights into their advertising strategies, brands can significantly enhance the impact and reach of their Super Bowl advertisements on social media platforms.

Methodology

Our methodology combines rigorous time series analysis with a detailed examination of Return on Investment (ROI) for Super Bowl advertisements, leveraging Twitter data. This approach provides a comprehensive understanding of ad performance and engagement dynamics on social media.

Time Series Analysis

The core of our time series analysis involves aggregating Twitter data to the minute level, capturing fluctuations in public engagement over the course of the Super Bowl event. This granular approach allows us to observe immediate reactions to advertisements and identify patterns of viewer interaction.

1. Data Aggregation: We process tweet data to summarize total impressions minute by minute. This step transforms raw Twitter activity into a structured time series dataset, making it suitable for further analysis.

2. Decomposition: Utilizing the Seasonal and Trend decomposition using Loess (STL) method, we break down the aggregated time series into three components: trend, seasonality, and residual. This decomposition enables us to isolate and examine underlying trends and cyclic behavior in ad engagement, separate from irregular fluctuations.

- **Trend Component**: Represents the long-term progression in the data, helping us understand overall movement in ad engagement over time.
- **Seasonal Component**: Highlights regular patterns of variability within the data, such as increased engagement during specific moments of the Super Bowl event.
- **Residual Component**: Captures irregularities not explained by the trend or seasonal components, often revealing unexpected spikes in engagement due to particularly impactful ads.

3. **Autocorrelation Analysis**: We explore the autocorrelation function (ACF) and partial autocorrelation function (PACF) to examine the temporal dependencies within the data. This analysis helps identify the extent to which past engagement impacts future engagement, providing insights into the persistence of engagement patterns.

ROI Analysis with Ad Data

Our ROI analysis focuses on quantifying the efficiency of ad spend in generating Twitter engagement, offering a metric for evaluating the cost-effectiveness of Super Bowl advertisements.

1. Ad Spend Calculation: We calculate the total ad spend based on the duration of each ad, applying the industry standard cost of $7 million per 30 seconds. This step quantifies the investment behind each ad.

2. Engagement Efficiency: By comparing the percentage increase in engagement (as measured by tweet impressions) to the total ad spend, we derive an engagement efficiency metric. This metric assesses the effectiveness of ad spend in achieving increased viewer interaction on Twitter.

- **Formula for Engagement Efficiency**:

  Engagement Efficiency = $(Percentage\ Increase\ in\ Engagement\ )/\ (Total\ Ad\ Spend\ (In\ Millions))$

3. Visualization: Utilizing treemaps, we visually represent the relationship between ad spend and engagement efficiency. This visualization highlights which brands maximize engagement relative to their investment, offering a clear comparison of ad performance across different advertisers.

Together, these methodologies provide a robust framework for analyzing Super Bowl ad performance. The time series analysis offers detailed insights into the dynamics of viewer engagement, while the ROI analysis quantifies the effectiveness of ad spend in enhancing social media visibility. This comprehensive approach enables us to identify strategic opportunities for maximizing ad impact during one of the most significant events in the advertising calendar.

Case Studies/Examples

Case Study 1: Time Series Analysis of Super Bowl Ad Engagement

Background: This case study evaluates the effectiveness of advertisements in generating viewer engagement on Twitter throughout Super Bowl 2024.

Objective: To quantify Twitter engagement levels during the Super Bowl 2024, identifying key moments of heightened activity.

Method: We employed time series analysis, aggregating tweet data to minute-level intervals. This approach utilized STL decomposition to dissect the engagement data into trends, seasonality, and residuals, providing a nuanced view of engagement dynamics.

Results: Our analysis pinpointed engagement peaks leading up to Halftime, followed by a decline during the halftime show and into the 3rd quarter. Notably, a significant spike in engagement was recorded at the hour mark, indicating a surge in Twitter traffic. This pattern offers insights into viewer behavior and ad impact during the event.

How I aggregated the data:

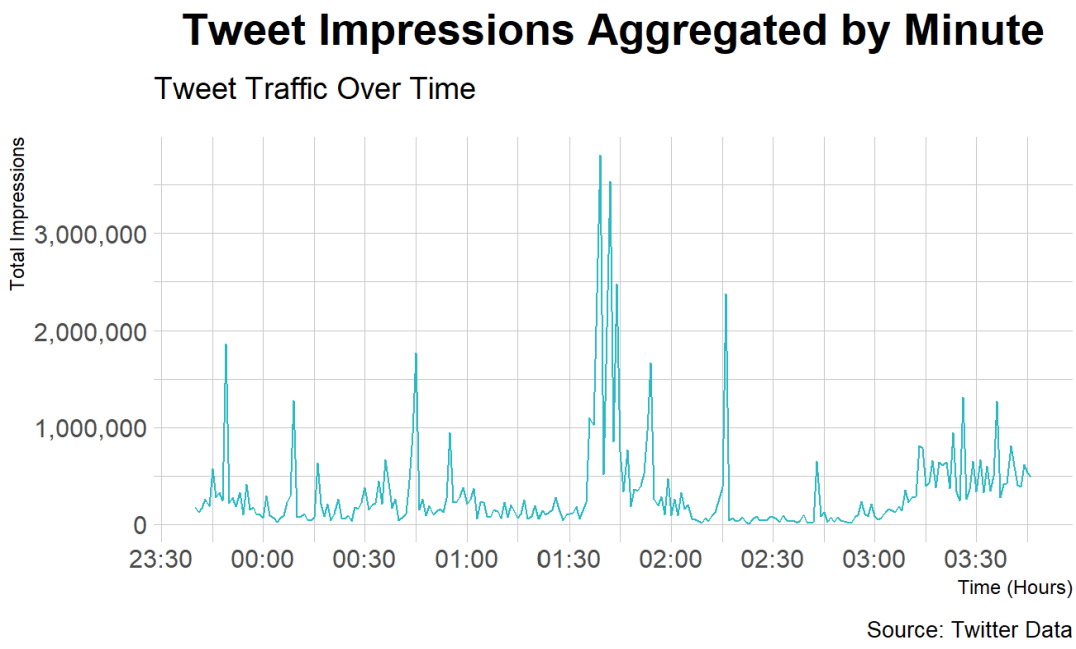
```r
time_table <- tweet_data |>
  group_by(created_at) |>
  summarise(impression = sum(public_metrics.impression_count, na.rm = TRUE))
```

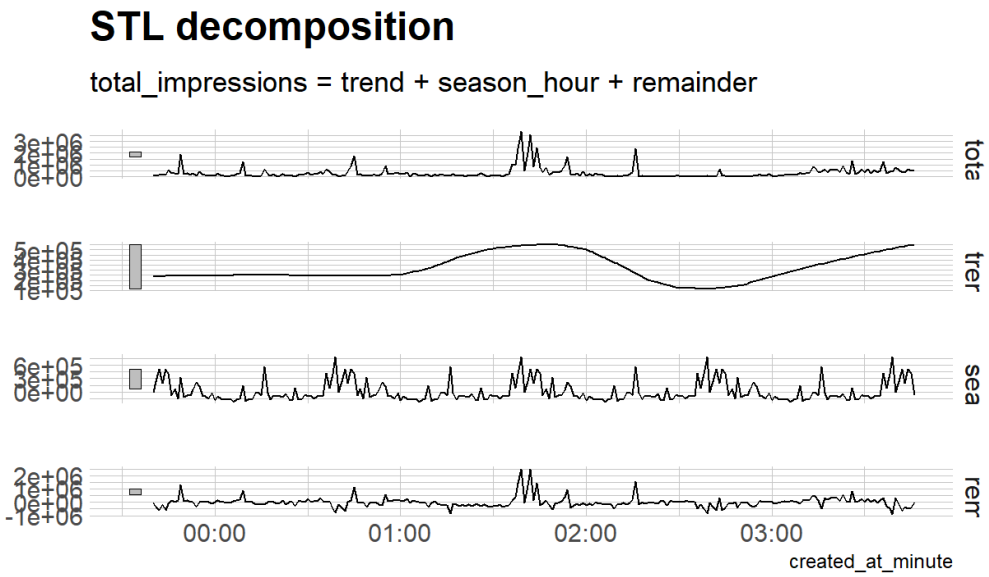
```r
tweet_data$created_at <- ymd_hms(tweet_data$created_at, quiet = TRUE)
```

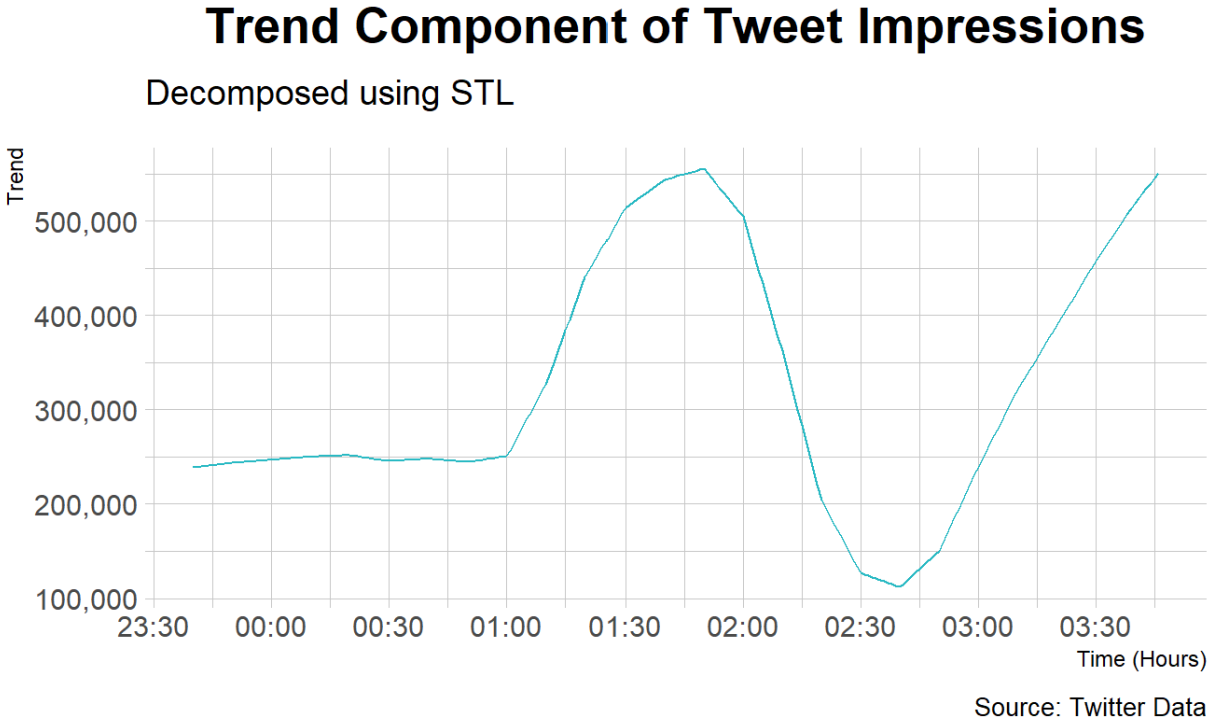
Time

```r
# Aggregating by minute and plotting
tweet_data_minute <- tweet_data |>
  mutate(created_at_minute = floor_date(created_at, unit = "minute")) |>
  group_by(created_at_minute) |>
  summarise(total_impressions = sum(`public_metrics.impression_count`, na.rm = TRUE))
|>
  ungroup()
```

Visuals:

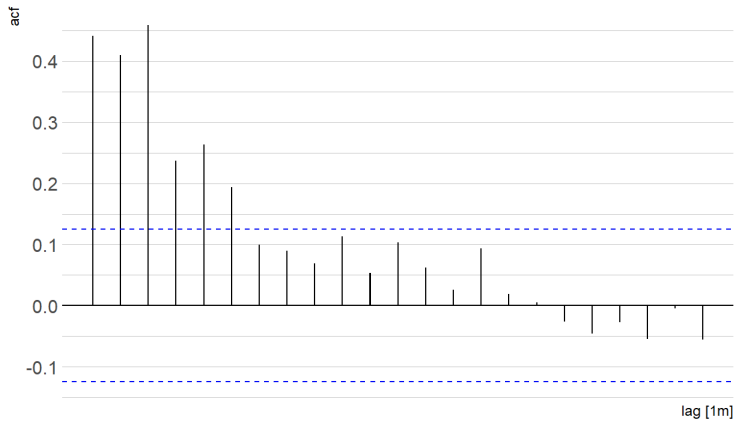



STL decomposition
total_impressions = trend + season_hour + remainder
tota
trer
sea
rem
00:00
01:00
02:00
03:00
created_at_minute

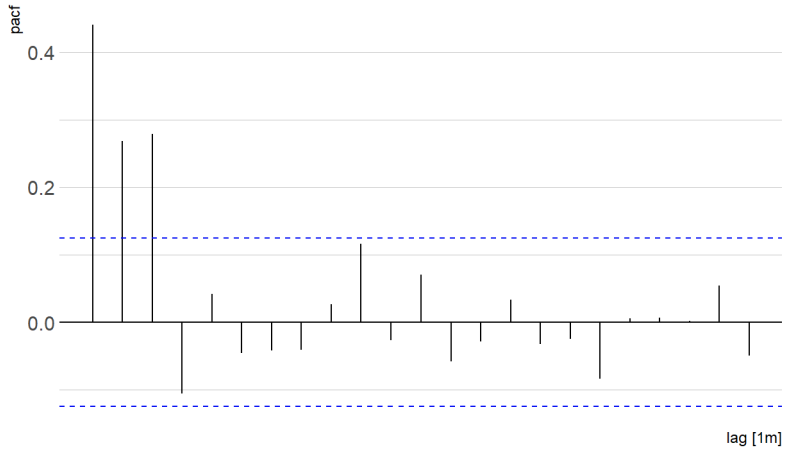

Trend Component of Tweet Impressions
Decomposed using STL
Trend
500,000
400,000
300,000
200,000
100,000
23:30
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
Time (Hours)
Source: Twitter Data

Subsection: Understanding the Impact

- **Trend Analysis:** Initially, the engagement trend was relatively flat but began to escalate towards the hour mark, peaking around 1:45. Subsequently, there was a notable decline, reaching a low point at 2:35, before gradually increasing again towards the game's end.
- **ACF and PACF Analysis:**The autocorrelation function (ACF) and partial autocorrelation function (PACF) analyses revealed distinct patterns:



ACF Results: The seasonal effect displayed a declining trend in autocorrelation values, suggesting diminishing engagement intensity over successive intervals.



PACF Results: Contrarily, the PACF unveiled a more discernible pattern, indicating underlying periodicities that were not as apparent in the ACF analysis. This suggests specific intervals where viewer engagement was consistently influenced by preceding activities or ads.

Key Insights: The engagement analysis through time series decomposition and autocorrelation functions underscores the fluctuating nature of viewer interaction during the Super Bowl. Peaks in engagement, particularly around the hour mark and leading up to Halftime, highlight opportune moments for advertisers. The decline observed during the halftime show suggests a shift in viewer attention, potentially impacting the effectiveness of ads aired during this period.

Case Study 2: ROI Analysis of Super Bowl Advertisements

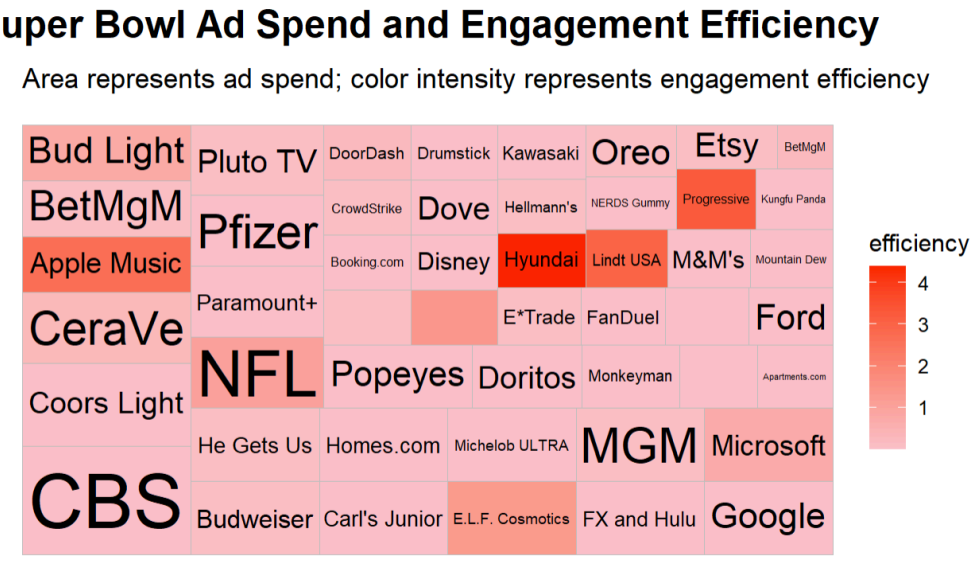
Background: This case delves into the financial efficacy of Super Bowl advertisements, assessing the Return on Investment (ROI) achieved by all ads through their advertising investments.

Objective: The aim was to identify the advertisement that offered the most impactful engagement relative to its cost, focusing on the balance between ad spend and Twitter impressions generated.

Method: The total ad spend was calculated according to the duration of each advertisement. We then analyzed the percentage increase in engagement, leveraging this data to compute the engagement efficiency metric. This approach enabled us to assess which ads maximized return on investment by comparing cost against engagement.

Results: The analysis revealed an average engagement efficiency rate of 28.51042%, with total ad expenditure reaching $562.5667 million for broadcast time. This figure represents the collective investment made to air these advertisements during the Super Bowl.

- **Visualization:**



Subsection: Maximizing Ad Spend Efficiency

Ad Spend Details: The visualization elucidates how each brand's investment correlates with engagement. Notably, brands like Hyundai and Apple Music demonstrate high cost-effectiveness, as indicated by darker colors on the chart, signifying their success in translating ad spend into substantial engagement.

Engagement Insights: According to metrics derived from Ashley St. Clair's valuation, each Twitter impression is valued at $0.0000085. The impressions accounted for in our analysis represent a subset of the total engagement, providing a glimpse into how effectively each advertisement captured audience attention and interaction.

Key Takeaways: This analysis underscores the strategic advantage of aligning ad placements with peak viewer engagement periods to optimize ROI. Brands achieving the highest engagement efficiency effectively leveraged their Super Bowl ad slots, demonstrating that thoughtful timing and compelling content can significantly enhance the value derived from ad investments.

Conclusion

This white paper has illuminated the intricate dynamics of Super Bowl 2024 advertising effectiveness through a dual lens of time series analysis and ROI evaluation. Our investigation into 171,454 tweets has unveiled not just the peak moments of audience engagement but also quantified the efficiency of ad expenditures in achieving measurable social media impact.

- **Key Findings**: Our time series analysis identified significant engagement peaks around pivotal game moments, underscoring the value of strategic ad timing. The ROI analysis further revealed that brands like Hyundai and Apple Music achieved remarkable engagement efficiency, leveraging their ad spend to generate maximum Twitter impressions.
- **Importance of Solution:** The methodologies and insights presented herein offer advertisers a blueprint for enhancing the visibility and impact of their Super Bowl ads, emphasizing the critical role of content relevance, timing, and cost-effectiveness.

Recommendations

Building on the insights gained from our analysis, we propose several strategic recommendations for maximizing the impact of Super Bowl advertisements:

1. **Leverage Sentiment Analysis:** Beyond quantifying impressions, utilize sentiment analysis to gauge the quality of engagement. This can help discern whether impressions are positive, negative, or neutral, providing a deeper understanding of public reception to ads. Identifying the sentiment behind impressions enables advertisers to refine their messaging and content strategy to foster positive viewer reactions.
2. **Ad Campaign Design Based on Trends**: Develop future ad campaigns by analyzing current and previous years' trends in viewer engagement and sentiment. Understanding the ebb and flow of audience attention and preferences over time can guide the creative direction, messaging, and timing of ads. By aligning ad content with viewer interests and ensuring ads are aired during peak engagement times, brands can significantly increase their ad's effectiveness.
3. **Innovate Based on Viewer Insights:** Use insights derived from social media analytics to innovate ad content and delivery methods. For instance, if analysis reveals a high engagement with interactive or humorous ads, consider incorporating these elements into future campaigns.
4. **Monitor and Adapt to Real-Time Feedback:** Utilize real-time social media monitoring tools during the Super Bowl to gauge immediate reactions to ads. This can provide valuable feedback that could be used to adjust ongoing digital marketing strategies in response to viewer preferences.
5. **Forecasting Future Trends:** Employ predictive analytics to forecast future trends in viewer behavior and preferences. This forward-looking approach can provide a competitive edge, allowing brands to anticipate shifts in viewer sentiment and engagement patterns.

Work Cited

- Yadav, Atul. “What Is Twitter’s (X) AD Revenue Sharing Program for Creators?” *Fliki*, 14 Feb. 2024, fliki.ai/blog/twitter-ad-revenue-sharing.
- P., Cowpertwait Paul S, and Andrew V. Metcalfe. *Introductory Time Series with R*. Springer-Verlag New York, 2009.