Sentiment Analysis of YouTube Comments on Samsung S24 Ultra

1. Introduction

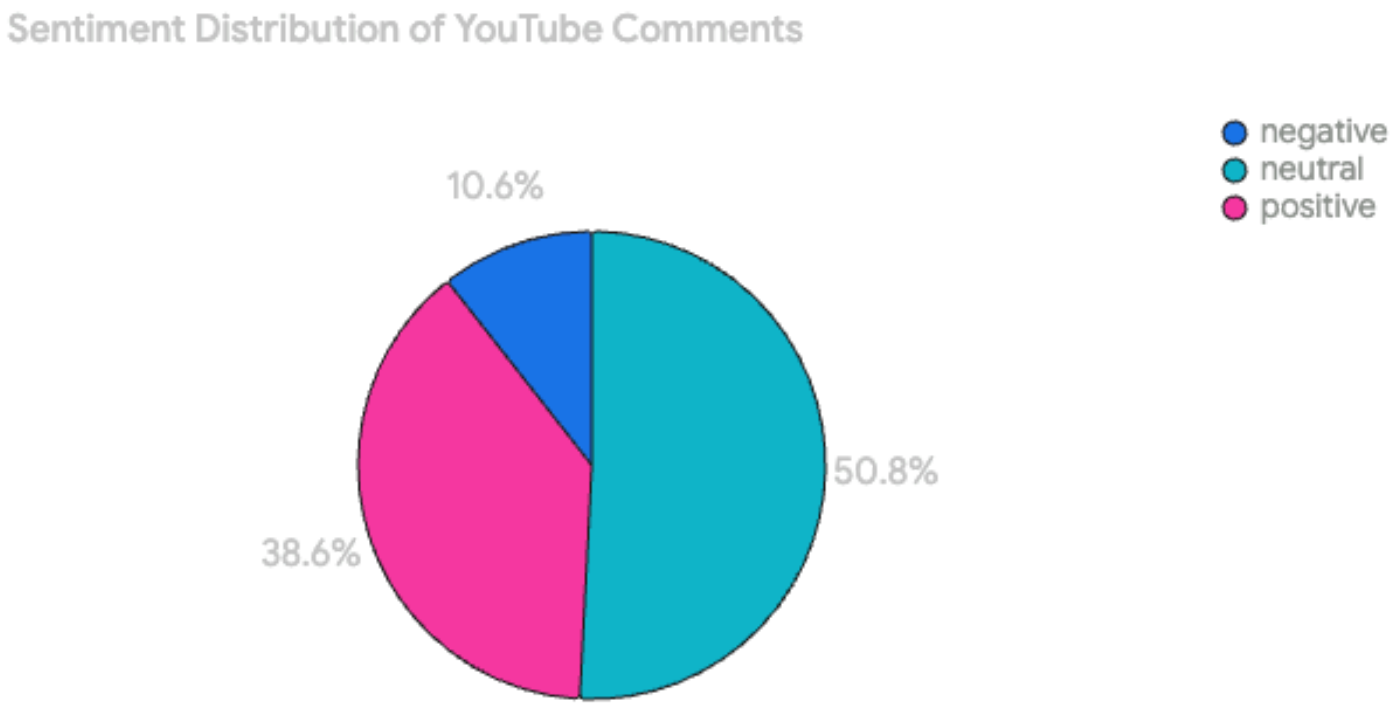
- **Overview of the Dataset and Business Problem:**
  - The dataset comprises YouTube comments on videos related to the Samsung S24 Ultra. This data reflects public opinion and immediate reactions to the product.
  - The business problem is to understand customer sentiment towards the S24 Ultra, identifying key areas of satisfaction and dissatisfaction. This analysis can inform product improvement, marketing strategies, and customer service.
  - **Predictive Task:** To predict the sentiment (positive, negative, neutral) of YouTube comments regarding the Samsung S24 Ultra. This allows for automated monitoring of public opinion and a proactive response to emerging trends.

2. Methodology

- **Data Collection:**
  - YouTube comments were scraped from relevant videos.
- **Data Preprocessing:**
  - **Removing Duplicates:** Ensured each comment is unique, preventing bias.
  - **Handling Missing Values:** Rows with missing data were removed to ensure reliability.
  - **Tokenization:** Comments were split into individual words (tokens) for analysis.
  - **Lemmatization/Stemming:** Words were reduced to their base form (e.g., "running" to "run") for standardization.
  - **Removing Stop Words and Special Characters:** Common words (e.g., "the", "and") and special characters were removed to focus on meaningful terms.
- **Sentiment Analysis:**
  - **NLTK and TextBlob:** Employed for text preprocessing and sentiment scoring (polarity and subjectivity).
  - **Sentiment Categorization:**
    - Positive: Polarity score > 0
    - Negative: Polarity score < 0
    - Neutral: Polarity score = 0
- **Model Building:**
  - **Logistic Regression:** A statistical model used to predict the probability of a comment belonging to a particular sentiment category.
  - **Decision Tree:** A tree-like model that splits data based on features to classify sentiment.
- **Model Validation:**
  - **Accuracy, Precision, Recall, F1-score:** Standard metrics were used to evaluate the performance of both models.

3. Findings

- **Model Performance:**
  - **Logistic Regression:** Achieved an accuracy of 87.73%. Showed strong performance across all sentiment categories, especially for neutral and positive sentiments.
  - **Decision Tree:** Achieved an accuracy of 84.34%. Performed well but slightly lower than logistic regression, particularly in identifying negative sentiment.
- **Sentiment Distribution:**



  - Sentiment Distribution: Analysis revealed that 50.8% of the comments were neutral, 38.6% were positive, and 10.6% were negative.
- **Key Insights:**
  - **Positive Comments:**
    - Users frequently praised the camera quality, highlighting its improvements over previous models and its ability to capture stunning photos and videos.
    - The new AI features, particularly the live translate function, were well-received, with many comments expressing excitement about their potential applications.
    - The overall design and performance of the phone were also commended.
    - Example: "This camera is a game-changer! The low-light photos are incredible."
  - **Negative Comments:**
    - Concerns were raised about the battery life, with some users reporting that it drains quickly with heavy usage.
    - The price point was a barrier for some, with comments comparing it unfavorably to competitors like Apple.

        - A few comments mentioned software glitches or issues with the user interface.
        - Example: "Battery life is a real letdown. I have to charge it twice a day."
    - **Neutral Comments:**
        - Many neutral comments were questions about specific features or comparisons with other phone models.
        - Some neutral comments expressed a wait-and-see approach, indicating that users were interested in the phone but wanted to see more reviews before making a decision.
        - Example: "How does the S24 Ultra's camera compare to the iPhone 15 Pro?"

4. Recommendations

- **Product Development:**
    - Address the concerns about battery life by investing in research and development to enhance battery performance.
    - Continue to innovate and improve the camera, building on the positive feedback received.
    - Ensure software updates are timely and reliable to address any glitches or user interface issues.
- **Marketing and Communication:**
    - Emphasize the strengths of the S24 Ultra, such as the camera and AI features, in marketing campaigns.
    - Acknowledge the concerns about battery life and price and proactively address them through clear communication and customer support.
- **Customer Service:**
    - Use sentiment analysis to identify and prioritize customer service requests.
    - Develop targeted responses to address common issues and concerns.
    - Invest in improving the responsiveness and effectiveness of customer service teams.
- **Continuous Monitoring:**
    - Implement a system for ongoing sentiment analysis of YouTube comments and other social media platforms to track changes in public opinion and adapt strategies accordingly.