REVIEW V/S RATING ANALYSIS

A Flipkart Study

Understanding Consumer Sentiment and Rating Consistency in Flipkart Product Reviews

Introduction

In the age of digital commerce, customer reviews have become a critical component in shaping brand perception and influencing purchase decisions. However, relying solely on star ratings may not accurately reflect the true sentiment of users. This project aims to explore the differences between numeric ratings and textual sentiments expressed in Flipkart product reviews to gain deeper insights into customer satisfaction, sentiment mismatches, and behavioral trends.

Project Objectives

1. To extract structured insights from large-scale Flipkart review data.
2. To compare user-assigned ratings with the sentiment derived from review text.
3. To analyze mismatches between quantitative ratings and qualitative expressions.
4. To categorize review types and identify trends based on review length and sentiment.
5. To explore the correlation between review length and sentiment tone.
6. To detect specific products with high mismatch rates for targeted product feedback.
7. To identify common keywords in mismatched reviews for potential sarcasm or confusion detection.

Dataset Overview

- **Source**: Hugging Face (`ml-hub/flipkart-reviews-dataset`)
- **Files Used**: `train.parquet` and `test.parquet`
- **Total Records**: ~40,000 reviews
- **Data Format**: Parquet files converted into a unified CSV

Main Columns:

- `text`: The written review
- `Rate`: The user's star rating (1 to 5)
- `labels`: Pre-assigned sentiment class (0 = negative, 1 = neutral, 2 = positive)

Data Preparation Steps

The data preparation was performed using Python and pandas. The steps included:

1. **Merging Files**: Combined `train` and `test` datasets into a single DataFrame.
2. **Renaming Columns**: Standardized to snake_case for clarity.
3. **Derived Columns Added**:
    - `review_length`: Word count of the review text.
    - `review_type`: Classified as 'short' (<10 words), 'medium' (10-49 words), or 'long' (50+ words).
    - `rating_sentiment`: Categorized based on `Rate` (1-2: negative, 3: neutral, 4-5: positive).
    - `label_sentiment`: Converted from `labels` (0/1/2) to human-readable sentiment.
    - `sentiment_match`: Boolean value showing if `label_sentiment` matches `rating_sentiment`.

Analytical Objectives and Approaches

Sentiment Distribution

- Analyze the distribution of positive, neutral, and negative sentiments.
- Compare the proportions of text-labeled sentiment vs rating-based sentiment.

Review Type Analysis

- Investigate how review length correlates with sentiment.
- Hypothesis: Longer reviews tend to express dissatisfaction or detailed opinions.

Rating vs Text Sentiment Comparison

- Measure how often users give ratings that don't align with their review tone.
- Calculate mismatch rate: percentage of reviews where rating sentiment != text sentiment.

Mismatch Pattern Analysis

- Explore mismatch transitions: e.g., `positive` rating but `negative` text review.
- Group mismatches into patterns and visualize them.

Review Examples

- Showcase samples of short, medium, and long reviews for contextual understanding.
- Provide real data examples to support analysis.

Key Metrics and Insights

- **Mismatch Rate**: Percentage of reviews with differing text and rating sentiments.
- **Sentiment Match Distribution**: Proportion of matching vs mismatching reviews.
- **Average Rating per Sentiment Group**: Helps validate whether higher ratings always align with positive sentiment.
- **Most Common Mismatch Patterns**: Highlights emotional inconsistency or review-rater dissonance.

Tools and Technologies Used

- **Python**: Data processing, cleaning, transformation (pandas, numpy)
- **Jupyter Notebook**: Code execution and exploration
- **Parquet & CSV**: File formats for efficient data handling
- **Power BI**: Final dashboard and visualization

Deliverables

1. Final CSV Dataset
2. Python Codebase
3. Power BI Dashboard
4. Insights Report

Future Extensions

- Add aspect-based sentiment analysis (battery, delivery, quality, etc.)
- Include visual sentiment extraction from YouTube videos

Conclusion

This project not only identifies patterns in consumer sentiment but also critically examines the gap between how users rate and how they feel. These insights are invaluable for brands like Flipkart to understand consumer behavior at a deeper level, identify trust gaps, and improve their review systems.