TECHNICAL REPORT

Aspect-Based Opinion Mining for Headphone Reviews

1. Project Summary

This work develops a complete aspect-based sentiment analysis system to uncover the most discussed product features and the emotions associated with them.

2. Data Preparation

All reviews were normalized to lowercase, cleaned using regular expressions, tokenized, and filtered with stopwords while keeping negation terms.

3. Custom RAKE Implementation

The RAKE algorithm was written from scratch to gain transparency over keyword scoring and adapt it for code-mixed user reviews.

4. Negation Strategy

A proximity-based rule was applied to reverse adjective polarity when preceded by negation words.

5. Sentiment Estimation

Only adjective synsets from SentiWordNet were considered to avoid misleading sentiment signals.

6. Aspect Linking

Aspect phrases were matched with surrounding adjectives and their sentiment was averaged.

7. Weakness Discovery

Low-rated reviews were analyzed separately to highlight true problem areas.

Processing Flow: Cleaning → RAKE → Negation → SentiWordNet → ABSA → NSS

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