Problem Statement 11
Intel Products Sentiment Analysis from Online reviews

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PROBLEM STATEMENT

Intel continuously evolves its processors, but capturing and addressing customer feedback remains challenging. Traditional review analysis methods often miss nuanced sentiments, limiting Intel's ability to enhance user satisfaction effectively.

Understanding customer sentiment towards these processors is crucial for Intel to improve their products, marketing strategies, and customer satisfaction. Analysing the sentiment of thousands of reviews manually is time-consuming and impractical. The objective is to develop a sentiment analysis model and carry out data analysis to provide insights.

UNIQUE BRIEF IDEA (SOLUTION)

- Advanced sentiment analysis was applied in this research to understand nuanced customer feedback.
- State-of-the-art NLP models—BERT and RoBERTa—are utilized for sentiment classification in particular, hence making them efficient at pointing out positive, negative, and even neutral sentiments from the customer reviews on Amazon.
- After extraction, analyzing the distribution of sentiments and extracting key insights enabled us to present Intel with actionable data on customer perception across different generations of processors.
- This, in turn, helps Intel identify improvement scopes in its products and therefore recruit more customers.

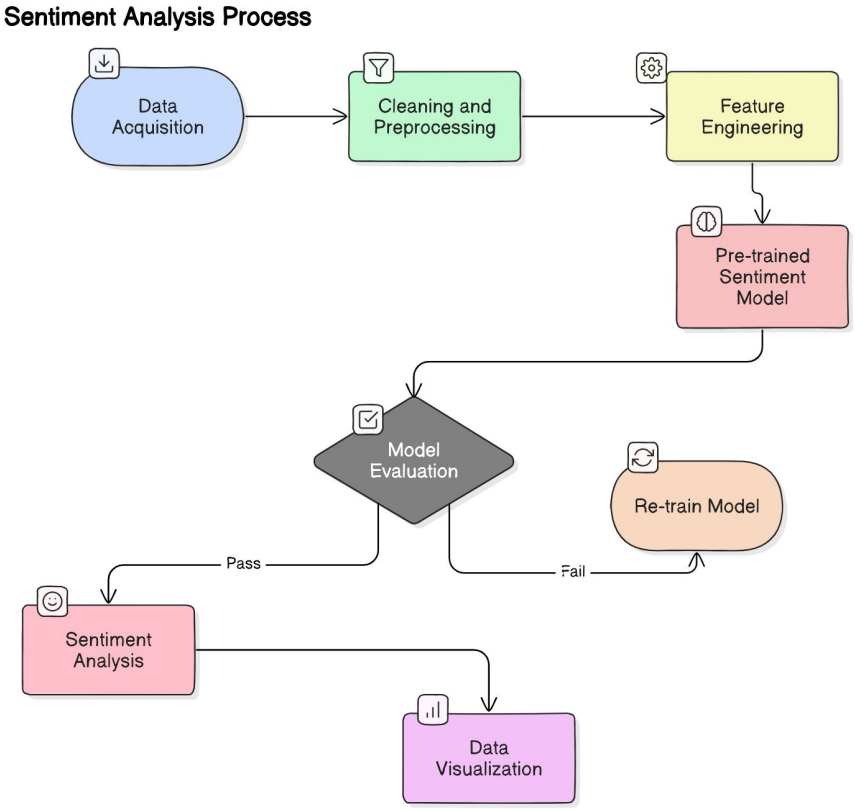
FEATURES OFFERED

- Advanced Sentiment Analysis - High accuracy using state-of-the-art NLP models (BERT, RoBERTa)
- Comprehensive Sentiment Distribution - Detailed analysis of positive, neutral, and negative sentiments
- Temporal Sentiment Analysis - Tracks sentiment trends over time
- Aspect Based Insights - Identifies strengths and areas for improvement in product features
- Visualization - Uses violin plots, word clouds, and bar charts for clear data presentation
- Model Performance Comparison - Evaluates multiple models (Naive Bayes, SVM, Random Forest, LSTM, BERT)
- Multi-Language Support - Analyzes reviews in multiple languages
- Actionable Recommendations - Provides insights for product improvement and marketing strategies

PROCESS FLOW

- Data Collection - Gathered customer reviews from Amazon for Intel processors (11th, 12th, 13th, and 14th Gen).
- Data Preprocessing - Cleaned and preprocessed text data: remove noise, tokenize, and normalize.
- Language Detection and Translation - Identified and translated non-English reviews to English for uniform analysis.
- Sentiment Analysis - Applied advanced NLP models (BERT, RoBERTa) for sentiment classification.
- Visualization - Created visualizations (violin plots, word clouds) to illustrate sentiment distributions.
- Model Comparison - Evaluated and compared model performances (accuracy, precision, recall) across generations.
- Insights and Recommendations - Extracted actionable insights to improve product features and customer satisfaction strategies.

ARCHITECTURE DIAGRAM



- Data Acquisition: This block represents where we acquired customer reviews: Amazon.
- Cleaning and Preprocessing: This stage involves cleaning the raw data from Amazon reviews.
- Feature Engineering: This step was optional and depends on the specific model we used.
- Pre-trained Sentiment Model: This represents the sentiment analysis model we used to classify the reviews.
- Model Evaluation (Optional): This step involves evaluating the performance of the sentiment model on a held-out test dataset.
- Sentiment Analysis: This block represents the core functionality where the pre-trained model classifies each cleaned review text as positive, negative, or neutral.
- Data Visualization: This stage involves analyzing and visualizing the classified data.

TECHNOLOGIES USED

- NLP Models - BERT and RoBERTa
- Machine Learning Algorithms - SVM, Naive Bayes, Random Forest and Gradient Boosting
- Data Preprocessing - Cleaning, Tokenization and Normalization
- Visualization Tools - Plotly and Matplotlib
- Language Processing - Language Detection and Google Translate API
- Big Data Tools - Pandas and NumPy
- Deep Learning - LSTM Long Short Term Memory

TEAM MEMBERS AND CONTRIBUTION

1. Alex Stanley Alenchery - 14th Generation - Data Collection ,Sentiment Analysis and Report.
2. Angeline A - 13th Generation - Data Collection ,Sentiment Analysis, Report and Ppt.
3. Aqshra Saji - 12th Generation - Data Collection ,Sentiment Analysis, Report and Ppt.
4. Vishnu E J - 11th Generation - Data Collection ,Sentiment Analysis and Report.
5. Gauri V Nair - Report and Ppt

TABLE - SENTIMENT DISTRIBUTION

GENERATION	TOTAL NO OF REVIEWS COLLECTED	CORES	SENTIMENT DISTRIBUTION
11th Gen	703	i5-11400, i5-11400F, i5-11600K, i7-11700, i7-11700K, i9-11900K	Positive Reviews: 350 out of 703(49.8%), Negative reviews: 353 out of 703(50.2%)
12th Gen	1050	i9-12900K, i9-12900KS i5-12400F, i5-12400,i5-12600K i7-12700K, i7-12700F, i7-12700	Positive Reviews: 70.66%, Negative reviews: 10.95%, Neutral Reviews: 18.38%
13th Gen	979	i3-13100, i3-13100F, i5-13400, i5-13400F, i5-13500, i5-13600K, i5-13600KF, i7-13700, i7-13700F, i7-13700K, i7-13700KF, i9-13900, i9-13900F, i9-13900K, i9-13900KF	Positive Reviews: 65.56%, Negative reviews: 24.34%, Neutral Reviews: 10.1%
14th Gen	502	i3-14100F, i3-14100, i5-14400F, i5-14500, i7-14700F, i7-14700K, i9-14900KS, i9-14900K	Positive Reviews: 350 out of 502(69.7%), Negative reviews: 99 out of 502(19.7%), Neutral Reviews: 53 out of 502(10.6%)

CONCLUSION - Recommendations and Suggestions

- **Enhance Packaging:** Improve product packaging to prevent damage and ensure quality.
- **Improve Compatibility:** Ensure wider motherboard and hardware compatibility.
- **Optimize Pricing:** Consider competitive pricing strategies against rivals.
- **Focus on Energy Efficiency:** Enhance energy efficiency to reduce power consumption complaints.
- **Address Performance Issues:** Resolve performance inconsistencies under heavy loads.
- **Boost Customer Support:** Strengthen support for early adopters to address initial bugs.
- **Highlight Strengths:** Market superior performance, gaming capabilities, and technological advancements.
- **Expand Localized Support:** Increase localized marketing and support efforts.
- **Monitor Feedback:** Regularly analyze customer feedback to improve product features.