Aspect Based Sentiment Analysis of Laptop

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What ?

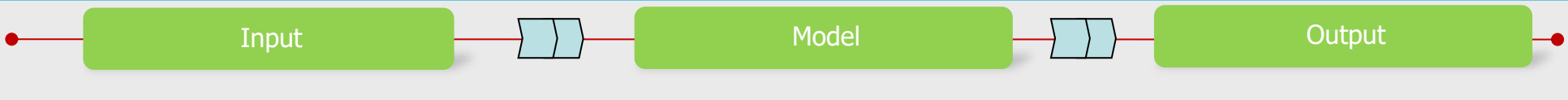
We introduce a framework for Aspect-Based Sentiment Analysis (ABSA) of laptops, where we:

- Built a high-quality dataset from real customer feedback, ensuring accuracy and diversity.
- Applied advanced machine learning, leveraging PhoBERT to enhance sentiment analysis in Vietnamese.
- Contributed to AI research by providing a standardized dataset and sentiment models for NLP.

Why ?

- Understanding customer sentiment is crucial for businesses to improve products, enhance services, and adapt to market trends.
- Traditional sentiment analysis focuses on overall text sentiment, lacking aspect-specific insights into individual product features.
- Existing studies primarily analyze English datasets, while **Vietnamese aspect-based sentiment analysis remains underexplored**.

Overview



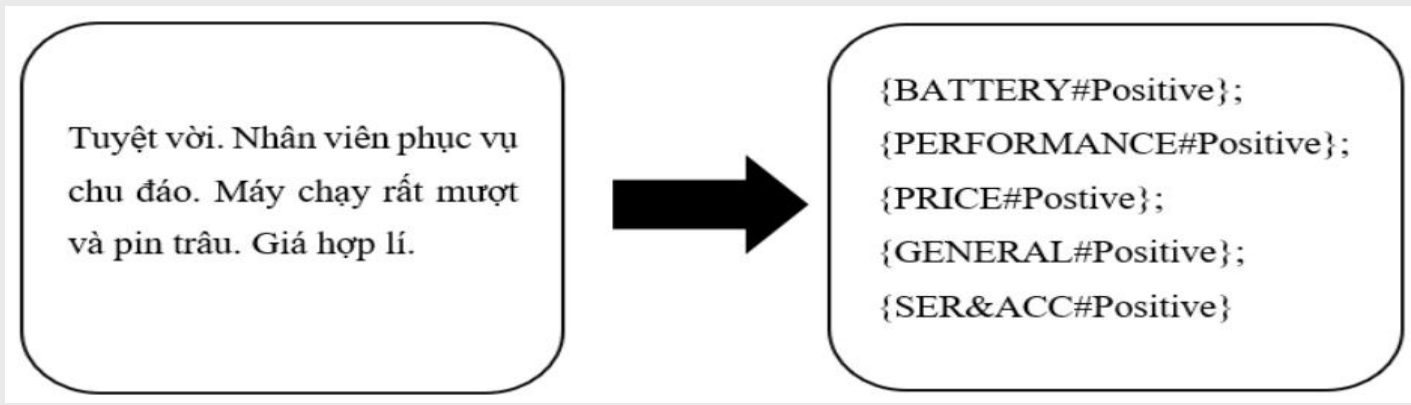


Figure 1. Input and output

Description

1. Data Collection

- Customer feedback was gathered from e-commerce platforms (e.g., Shopee, Lazada, Tiki) and social media.
- Data was cleaned and standardized to remove noise and ensure quality.
- Aspect-related keywords were extracted to identify key product features mentioned in reviews.

Figure 2. Comment on Shopee.

2. Aspect & Sentiment Analysis

- Key product aspects (e.g., performance, battery life, display, price, keyboard) were identified.
- Each review was manually labeled with aspect categories and sentiment polarity (positive, neutral, negative).
- Multiple annotators ensured high agreement to improve dataset reliability.
- Aspect co-occurrence analysis was conducted to identify common sentiment patterns in customer feedback.

3. Sentiment Analysis Model

- PhoBERT, a pre-trained deep learning model for Vietnamese, was used to extract semantic features from reviews.
- Evaluation Metrics: Performance was assessed using Precision, Recall, and F1-score to measure sentiment classification effectiveness.
- The model was compared with traditional approaches (e.g., SVM, LSTM) to highlight improvements in sentiment analysis.
- Explainability Analysis: SHAP (SHapley Additive exPlanations) was applied to interpret model predictions, helping to understand which words contributed most to sentiment classification.
- The final system enables automated, high-accuracy sentiment analysis, offering valuable insights for businesses.

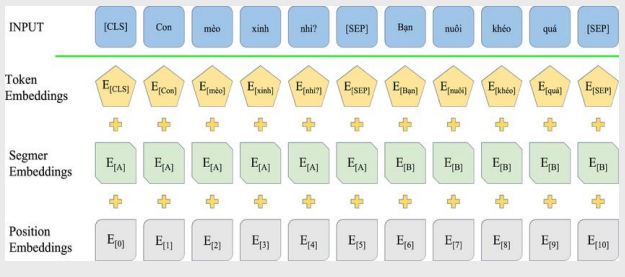


Figure 3. Model of phoBERT

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