ABSTRACT

SENTENCE PAIR CLASSIFICATION FINE-TUNING OF BIDIRECTIONAL ENCODING

REPRESENTATION FROM TRANSFORMER (BERT) FOR ASPECT-BASED

SENTIMENT ANALYSIS (ABSA) ON IMDB MOVIE REVIEWS

By

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Aspect-Based Sentiment Analysis (ABSA) offers a more detailed analysis compared to sentiment analysis by identifying and evaluating sentiments towards specific aspects within a text. This research explores the fine-tuning of Bidirectional Encoder Representations from Transformers (BERT) for ABSA on IMDb movie reviews. By implementing sentence pair classification, this study incorporates auxiliary sentences representing predefined aspects such as, acting, plot, directing, visual, and audio. The dataset consists of 2,000 unique IMDb movie reviews expanded into 10,000 sentence pair sequences. Two models were developed: one utilizing the base BERT model directly trained on the IMDb dataset and the other fine-tuned on the SemEval 2014 dataset before being applied to IMDb reviews. Both models were evaluated on their ability to classify aspects and determine sentiment polarity, with performance metrics such as accuracy, F1-score, recall, and precision used for comparison.

The constructed auxiliary sentence for sentence pair classification approach succeeds in detecting aspects and classifying sentiment polarity within reviews, which provides better analysis compared to traditional sentiment analysis approach. The transfer learning approach from a fine-tuned BERT model on SemEval 2014 dataset managed to retrieve good results even on a low training data scenario. The model achieved an F1-Score of 0.88 for aspect detection task and sentiment classification accuracy of 80%, 82%, and 89% for 4-way, 3-way, and binary classification settings respectively. The transfer learning approach provides a more stable performance compared to the BERT baseline model in low-resources scenarios.

Keywords : Aspect-Based Sentiment Analysis, BERT, Transfer Learning, IMDb Reviews, Aspect Detection, Sentiment Classification, Natural Language Processing, Sentence-Pair Classification