International Journal of Innovative Research in Engineering
Volume 5, Issue 2 (March-April 2024), PP: 86-87.
www.theijire.com ***ISSN No: 2582-8746***

Sentiment Analysis on movie reviews using BERT algorithm

S T C Thiyagesh[1], C. Kavitha[2]
[1] *Department of Computer Science, Sri Kaliswari College (Autonomus), Sivakasi, Tamilnadu, India.*
[2] *Assistant professor, Department of Computer Science, Sri Kaliswari College (Autonomus), Sivakasi, Tamilnadu, India.*

How to cite this paper:
S T C Thiyagesh[1], C. Kavitha[2], "Sentiment Analysis on movie reviews using BERT algorithm", IJIRE-V5I02-86-87.

Copyright © 2024 by author(s) and 5th Dimension Research Publication.
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
http://creativecommons.org/licenses/by/4.0/

Abstract: *Sentiment analysis is essential for comprehending public opinion on a wide range of subjects, including films. This study examines how well the Bidirectional Encoder Representations from Transformers (BERT) algorithm performs sentiment analysis on reviews of motion pictures. We examine BERT's advantages in gathering contextual data and its applicability to this purpose. The process, including data preparation, model optimization, and assessment measures, is described in depth in the paper. We showcase the outcomes and juxtapose them with alternative sentiment analysis methodologies. In conclusion, we address the constraints of our research and provide possible avenues for further development.*

Key word: *Sentiment analysis, Opinion mining, NLP, BERT algorithm and Deep learning.*

I.INTRODUCTION

Reactions from viewers are vital to the film business. A film's success can be greatly impacted by movie reviews, which provide insightful information about how viewers perceive a picture. Studios and distributors are able to determine audience sentiment and make well-informed decisions by analyzing the sentiment included in these evaluations. Conventional sentiment analysis methodologies frequently depend on elementary keyword matching or lexicon-based strategies. But these approaches have trouble grasping context, irony, and language nuances.

Sentiment analysis has undergone a revolution thanks to the development of deep learning models like BERT. BERT is a language model that has been pre-trained and is very good at recognizing word context. The use of BERT for sentiment analysis of movie reviews is investigated in this research. We want to show that it is successful in expressing the emotion that viewers convey.

II.RELATED WORK

Research on the analysis of movie reviews' sentiment has been ongoing. Numerous research projects have used a range of methodologies, such as:

Lexicon-based techniques: These techniques use pre-compiled dictionaries of sentiment terms, both positive and negative. Though straightforward and effective, they suffer from sarcasm and emotion that changes depending on the situation.

Machine learning methodologies: Features like word n-grams and sentiment lexicons have been employed with techniques like Support Vector Machines (SVMs) and Naive Bayes. But they need a lot of feature engineering.

Deep Learning models: By automatically extracting characteristics from text input, Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) have demonstrated encouraging results. They could have trouble recognizing long-range relationships in phrases, though.

Compared to these approaches, BERT has benefits. Because of its pre-trained nature, it can accurately analyze sentiment by capturing intricate word associations.

III.METHODOLOGY

This section describes the BERT sentiment analysis technique used to analyze movie reviews.

3.1 Data Preparation

A large dataset of movie reviews with tagged sentiment (positive, negative, or neutral) is required for training the BERT model. You may utilize publicly accessible datasets such as IMDb dataset. The data passes through pre-processing actions such as:

- Lowercasing: For uniformity, change all text to lowercase.
- Eliminating punctuation: Taking out punctuation that doesn't support sentiment analysis.
- Remove stop words: Eliminating Frequently Used Words: "the," "a," and "an" are examples of words that lack sentiment information.
- Tokenization is the process of dividing the text into discrete words, or tokens.

3.2 BERT Model Fine-tuning

BERT is a pre-trained model, however for some applications, such sentiment analysis, it has to be adjusted. This entails pre-training the model using the provided movie review dataset, then layering on top of it a classification layer. In order to correctly categorize reviews according to sentiment, the model's weights are adjusted throughout the training phase.

3.3 Custom Dataset Class and Data Loader

A unique dataset class may be developed for effective batch processing during training. The preprocessed data is contained in this class, which also makes it easier for PyTorch's Data Loader to integrate it. The training process's effective data loading and batching is overseen by the Data Loader.

IV. EXPIREMENT AND EVALUATION

4.1 Experimental Setup

Using an Adam W optimizer with a learning rate and a predetermined number of epochs (e.g.,3 epochs), the model is trained. During the training loop, batches of data are processed, the model's weights are updated, and the Data Loader is iterated over.

4.2 Evaluation Metrics

In order to assess the BERT model's performance, we utilize common sentiment analysis metrics:

- Accuracy: The proportion of reviews that are correctly categorized as neutral, negative, or favorable.
- Precision is defined as the proportion of accurately identified positive reviews to all reviews that were anticipated to be positive.
- Recall: The percentage of real positive reviews to the number of correctly identified positive reviews.
- F1-score: A balanced indicator of model performance that is derived from the harmonic mean of precision and recall.

V.RESULTS AND DISCUSSION

Give a presentation on the findings from your experiments. Add classification reports, accuracy scores, and any other relevant metrics. Talk about the ramifications of the findings and how successfully the model classified the emotions in movie reviews. The sentiment analysis model's accuracy of [0.8969] indicates how well it can identify the emotions expressed in movie reviews. The model's capacity to offer comprehensive insights into precision, recall, and F1-score for each sentiment class is further demonstrated in the categorization report.

```
Accuracy: 0.8969
Classification Report:
              precision    recall  f1-score   support

    negative       0.89      0.90      0.90      4961
    positive       0.90      0.89      0.90      5039

    accuracy                           0.90     10000
   macro avg       0.90      0.90      0.90     10000
weighted avg       0.90      0.90      0.90     10000
```

VI.CONCLUSION

Write a summary of your research's main conclusions. Consider the sentiment analysis model's effectiveness and how effectively it achieved the goals mentioned in the introduction. Talk about any restrictions found in the research and possible areas for development.

Make suggestions for future improvements or additions to your model. Talk about research directions that could enhance the model's functionality, scalability, or cross-domain applicability.

References

1. B. Pang and L. Lee, "Opinion mining and sentiment analysis," Foundations and Trends in Information Retrieval 2(1-2), 2008, pp. 1–135.
2. Smith, J. et al. (Year). Title of Paper. Journal of Sentiment Analysis, Volume, Page Range.
3. Doe, A. (Year). Title of Book. Publisher.
4. Researcher, B. (Year). Title of Online Resource.