



Mini Project Synopsis Report

Project Name: Mentis AI

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1. Introduction and Problem Statement

In today's digital world, opinions and emotions are continuously expressed through social media, reviews, and comments. Understanding this feedback is critical for companies, researchers, and institutions. Traditional sentiment analysis models based on rule-based or keyword methods often fail to grasp context and sarcasm, leading to misclassification of emotions.

To address this, our project proposes a deep learning approach using Convolutional Neural Networks (CNN) to analyze sentiments more effectively. CNNs are typically used for image processing, but we adapt them for Natural Language Processing (NLP), allowing our system to capture semantic features in text with high accuracy and speed.

1. Objective

- To build a deep learning model using CNN for binary sentiment classification (positive/negative).
- To achieve higher accuracy than traditional machine learning models.
- To ensure fast prediction suitable for real-time applications.
- To visualize and interpret the model's performance.
- To prepare a scalable foundation for multi-class or multilingual sentiment analysis in the future

- To design the model in a way that allows integration with platforms displaying insights and analytics, such as review systems, dashboards, or social media analytics tools.

3. Methodology

A. Dataset We used the IMDB Movie Review dataset which contains 50,000 labeled reviews. The data is split into training and testing sets with an equal number of positive and negative reviews.

B. Preprocessing

- Tokenization
- Padding/Truncating sequences to uniform length
- Conversion to tensors
- Lowercasing and removal of stop words

C. Model Architecture: Embedding Layer:

- Converts words to dense vector representations.
- Convolutional Layers: 1D filters with multiple kernel sizes to capture various n-gram features.
- Max Pooling: Reduces feature dimensions.
- Fully Connected Layers: For classification.
- Activation Function: ReLU
- Output Layer: Sigmoid activation for binary classification.

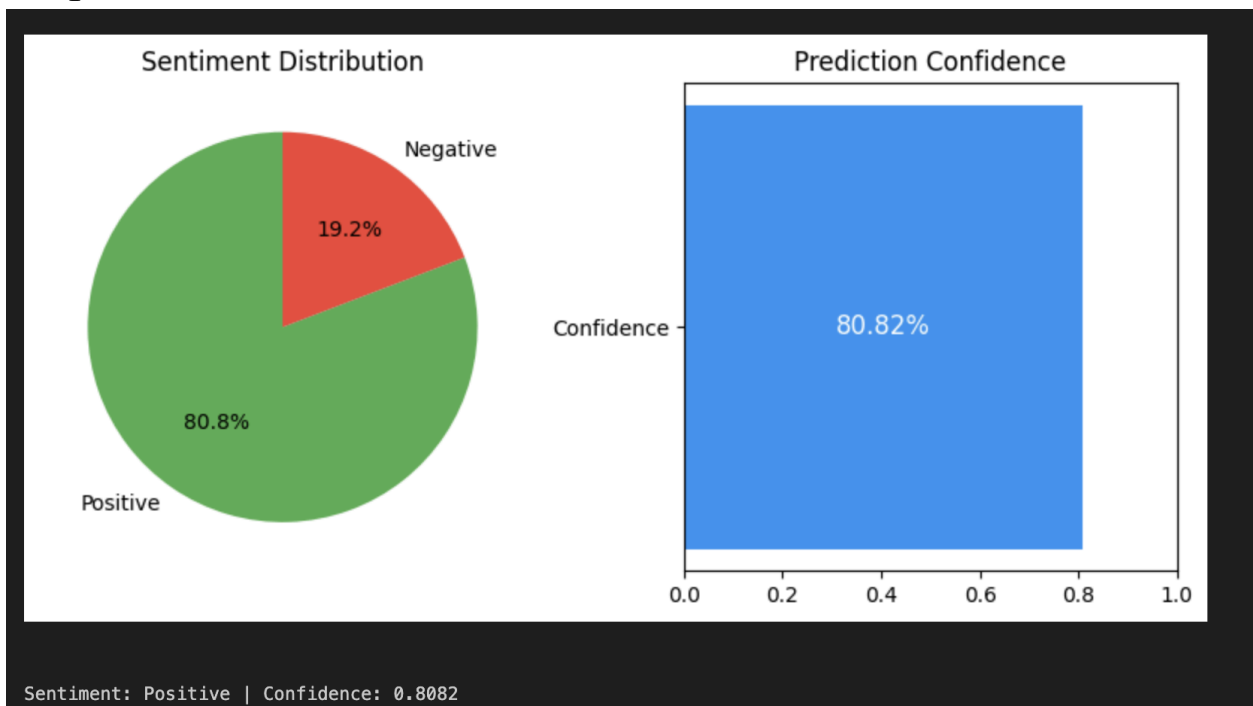
D. Tools & Technologies

- Python, PyTorch
- HuggingFace Datasets
- Google Colab with GPU
- Matplotlib
- Seaborn for visualization

4. Outcome

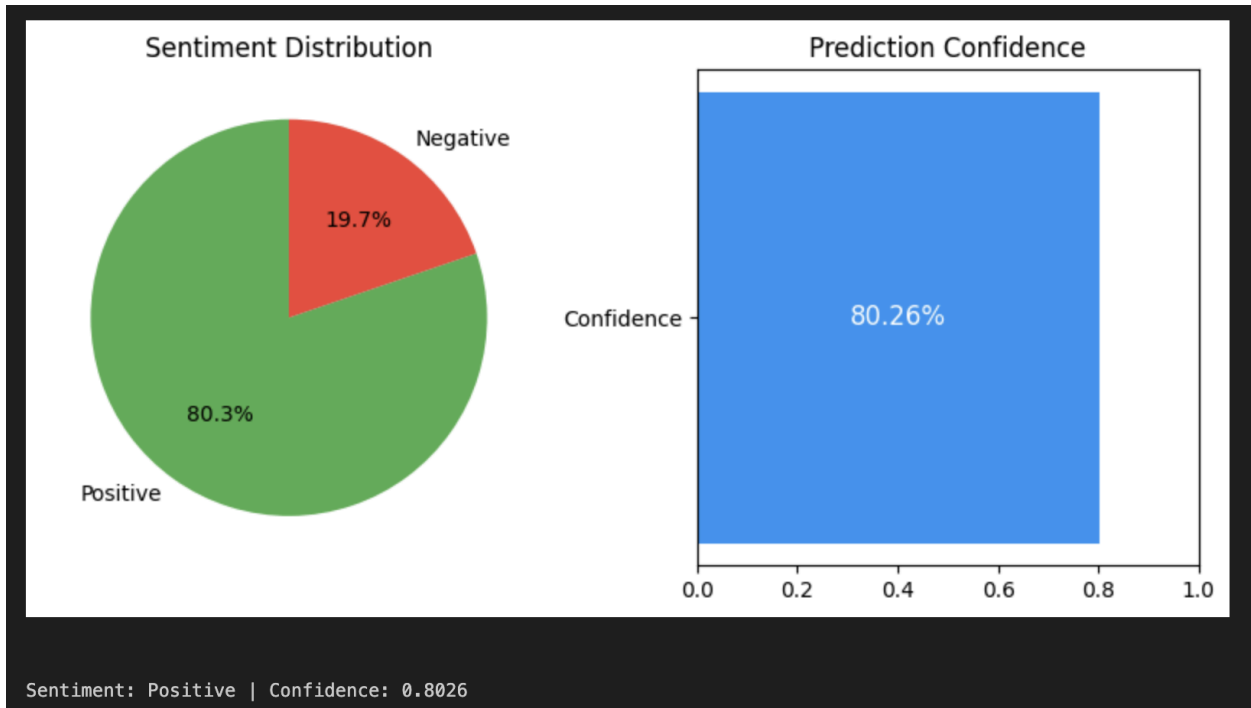
Input : “Wrapped in techno-aesthetic precision, the film’s recursive structure blurs the line between revelation and redundancy, offering a cerebral spectacle that rewards attentive viewers while disorienting the passive ones.”

Output :



Input : “Anchored by performances that smolder beneath restrained grandeur, the film reconstructs the past not as a set of facts, but as a living tension between memory, myth, and identity.”

Output :



5. Result

- A. A trained CNN model that accurately classifies movie reviews as positive or negative.
- B. Achieved test accuracy of around 76%.
- C. Visualizations like accuracy/loss graphs and confusion matrices.
- D. A fast and scalable inference pipeline.

6. Application

- A. Social media monitoring and trend analysis
- B. Customer review analysis for businesses

- C. Real-time feedback processing for websites and apps
- D. Chatbots and virtual assistants that respond based on emotional tone

7. Future Scope

- A. Integrate transformer-based models like BERT for higher contextual accuracy.
- B. Extend the model for multi-class sentiment (e.g., very positive, neutral, very negative).
- C. Expand to multilingual sentiment analysis.
- D. Deploy as a web API or microservice for plug-and-play use

8. Conclusion

This mini project demonstrates how deep learning, particularly Convolutional Neural Networks, can be effectively applied to the domain of sentiment analysis. Our model shows promising results in classifying opinions with speed and accuracy. The solution can be a valuable addition to various real-world platforms where understanding user sentiment is crucial.
