

Project Report: Emotion Classification of Given Text

1. Motivation and Objectives

The motivation behind this work is to develop a deep learning model for text-based emotion classification. The objective of this project is to accurately classify text data into different emotional categories, such as sadness, joy, love, anger, fear, and surprise.

2. Methods and Models

Data Preprocessing:

- Text cleaning and preprocessing, including removing HTML tags, lowercasing, punctuation removal, and stemming.
- Tokenization of text data.
- Padding sequences to ensure uniform length for model input.

Models Trained:

- Bidirectional LSTM
- LSTM
- Stacked LSTM
- GRU
- Bidirectional GRU
- Stacked GRU

3. Results

The performance of each model is evaluated using the following metrics:

Model Name	Accuracy Score	F1 Score(macro)	Recall Score(macro)	Precision Score(macro)	F1 Score(micro)	Recall Score(micro)	Precision Score(micro)
Bidirectional LSTM	0.88	0.827042398	0.812755883	0.85127391	0.88	0.88	0.88
LSTM	0.6245	0.413398703	0.443108207	0.391500727	0.6245	0.6245	0.6245
Stack LSTM	0.3475	0.085961657	0.166666667	0.057916667	0.3475	0.3475	0.3475
Bidirectional GRU	0.8795	0.832661111	0.84382817	0.826515506	0.8795	0.8795	0.8795
GRU	0.3475	0.085961657	0.166666667	0.057916667	0.3475	0.3475	0.3475
Stack GRU	0.889	0.840590809	0.847347019	0.837427151	0.889	0.889	0.889

4. Dataset Issues

- The dataset contained some duplicate entries that were removed during preprocessing.
- Class imbalance was observed, with varying numbers of samples for each emotion.

5. Challenges Faced

- Facing challenges in feature engineering to represent text data effectively.
- Handling class imbalance in the dataset.
- Fine-tuning hyperparameters for model performance.
- Ensuring efficient text preprocessing for large datasets.

6. Conclusion and Future Work

In conclusion, this project successfully explored the application of deep learning models for text emotion classification. The Bidirectional LSTM model, Bidirectional GRU model and Stack GRU model demonstrate high accuracy and overall performance.

For future work, the following improvements can be considered:

- Further data augmentation to address class imbalance.
- Experimentation with more advanced deep learning architectures.
- Deployment of the model in real-world applications for emotion detection in text data.

This project contributes to the field of Natural Language Processing (NLP) and opens avenues for emotion analysis in various applications, such as sentiment analysis and chatbot interactions.