ADVANCING EMOTION DETECTION IN TEXT: INTEGRATING ADVANCED FEATURE EXTRACTION TECHNIQUES WITH DEEP LEARNING MODELS

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Detecting emotions in textual data is a vital task in natural language processing, with applications including sentiment analysis, recommendation systems, and humancomputer interaction. Emotion classification plays a crucial role in providing valuable insights into user sentiments and behaviors. This research investigates the efficacy of various deep learning models combined with different feature extraction techniques for emotion classification in text data, using a dataset of news articles. While past research has primarily focused on either a single feature extraction method or a limited set of models, this work explores the efficacy of three different feature extraction techniques—TF-IDF, Word2Vec, and GloVe—integrated with five distinct deep learning models: CNN, RNN, LSTM, MLP, and Transformer. Unlike previous studies that often overlook the issue of data imbalance, this research includes specific steps to balance the dataset, thus enhancing model training and performance. Furthermore, comprehensive hyperparameter tuning was conducted, adjusting parameters such as learning rate, batch size, epochs, dropout rate, and dense layer units. This extensive tuning resulted in a significant accuracy of 79% with the Transformer model using GloVe embeddings. The combination of exploring multiple feature extraction methods, addressing data imbalance, and fine-tuning model parameters distinguishes this study from existing works, providing a more robust benchmark for future research in emotion classification in natural language processing.

Keywords*: Deep Learning Models, Emotion Classification, Feature Extraction Techniques, Natural Language Processing, TF-IDF.*