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Deep Learning-Based Social Media Sentiment Analysis: Insights from User-Generated Content

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Abstract: *Social media platforms generate vast amounts of user-generated content, reflecting public opinions on various topics. Sentiment analysis, a subfield of natural language processing (NLP), aims to classify this content into positive, negative, or neutral sentiments. This study compares traditional machine learning techniques (Naïve Bayes, Support Vector Machine) with deep learning models (LSTM, CNN, BERT) for sentiment classification. We preprocess social media text using tokenization, word embeddings, and transformer-based feature extraction. Experimental results on Twitter, Facebook, and Reddit datasets demonstrate that BERT outperforms conventional models in capturing contextual sentiment, achieving a classification accuracy of 92.7%. Challenges such as sarcasm detection, multilingual processing, and noisy data are discussed. The findings highlight the effectiveness of deep learning in real-time sentiment analysis, paving the way for advanced applications in business intelligence, political analysis, and customer feedback systems.This study employs multiple NLP techniques, including tokenization, stop-word removal, lemmatization, and word embeddings such as Word2Vec and GloVe, to preprocess and enhance text data quality. We use publicly available datasets, including Twitter, Facebook, and Reddit, to evaluate the performance of different sentiment analysis models. Experimental results indicate that transformer-based models outperform traditional ML algorithms in accuracy, precision, recall, and F1-score, demonstrating their ability to handle challenges like sarcasm, slang, and multilingual sentiment analysis.Additionally, this paper discusses the practical applications of sentiment analysis in various domains, such as business intelligence, political forecasting, healthcare monitoring, and crisis management. Challenges such as noisy data, ethical concerns, bias in sentiment classification, and the need for real-time processing are also examined. The findings of this study highlight the growing significance of deep learning in analyzing user sentiments on social media and provide insights into future advancements in sentiment analysis research.*

Keywords: Sentiment Analysis, Social Media Analytics, Natural Language Processing (NLP), Machine Learning, Deep Learning, Opinion Mining, Transformer Models, User-Generated Content, Contextual Sentiment Analysis, Text Classification

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