

ABSTRACT

CNN-BASED HYBRID PERFORMANCE EVALUATION TOWARDS ONLINE NEWS SENTIMENT CLASSIFICATION TASK

By

Gading Arya Dwi Cahyo

CNN is a deep learning model that is effective in extracting features in text data. However, CNN has shortcomings in understanding long-term context and lacks sensitivity to word order. In this study, a CNN model was hybridized with a machine learning model to improve the model's performance. The LSTM model and BiLSTM model were chosen because they have long-term memory features and sensitivity to word order. Apart from that, other machine learning models such as TF-IDF, Word2Vec, and BERT are used to add features that are useful in extracting text data. In model testing, the accuracy, precision, recall, F1-score, and AUC-ROC matrices are used. The evaluation results of all models are compared to determine the influence of vector dimensions and obtain the best model. From the evaluation results, it was found that the RoBERTa-CNN-BiLSTM model had the best performance with a matrix accuracy of 98.18%, precision 98.19%, recall 98.18%, F1-score 98.18%, and AUC-ROC 99.86%. Apart from that, it is known that the vector 38 dimension provides the most superior performance. These results indicate that hybridized deep learning models, especially CNNs, are effective in improving model performance.

Keywords: CNN, LSTM, BiLSTM, Word2Vec, TF-IDF, RoBERTa, Online News, NLP.

ABSTRAK

EVALUASI KINERJA HIBRIDA BERBASIS CNN UNTUK TUGAS KLASIFIKASI SENTIMEN BERITA ONLINE

Oleh

Gading Arya Dwi Cahyo

CNN merupakan model deep learning yang efektif dalam mengekstraksi fitur pada data teks. Namun, CNN memiliki kelemahan dalam memahami konteks jangka panjang dan kurang sensitif terhadap urutan kata. Dalam penelitian ini, model CNN dihybridisasi dengan model machine learning untuk meningkatkan performa model. Model LSTM dan BiLSTM dipilih karena memiliki kemampuan memori jangka panjang serta sensitivitas terhadap urutan kata. Selain itu, model machine learning lainnya seperti TF-IDF, Word2Vec, dan BERT digunakan untuk menambahkan fitur yang berguna dalam ekstraksi data teks. Pada pengujian model, matriks akurasi, presisi, recall, F1-score, dan AUC-ROC digunakan. Hasil evaluasi dari semua model dibandingkan untuk mengetahui pengaruh dimensi vektor dan memperoleh model terbaik. Dari hasil evaluasi, ditemukan bahwa model RoBERTa-CNN-BiLSTM memiliki performa terbaik dengan nilai akurasi 98,18%, presisi 98,19%, recall 98,18%, F1-score 98,18%, dan AUC-ROC 99,86%. Selain itu, diketahui bahwa dimensi vektor 38 memberikan performa paling unggul. Hasil ini menunjukkan bahwa model deep learning yang dihybridisasi, khususnya CNN, efektif dalam meningkatkan performa model.

Kata-kata kunci: CNN, LSTM, BiLSTM, Word2Vec, TF-IDF, RoBERTa, Berita Online, NLP.