

ABSTRAK

Kemajuan teknologi memberikan pengaruh signifikan terhadap berbagai sektor kehidupan, termasuk sektor perbankan. Dalam menghadapi era digital, institusi perbankan berupaya meningkatkan kualitas layanan dan produk melalui inovasi yang membedakan diri dari para kompetitornya. Analisis sentimen terhadap ulasan pengguna aplikasi mobile banking menjadi sangat penting untuk mengevaluasi kualitas layanan dan kepuasan pengguna.

Penelitian ini bertujuan untuk mengkaji efektivitas penerapan metode *Word2Vec* dan algoritma *Random Forest* dalam mengklasifikasikan sentimen ulasan pengguna aplikasi *Livin' by Mandiri*. Data yang digunakan sebanyak 60.000 ulasan berbahasa Indonesia yang diperoleh melalui teknik *web scraping* dari *Google Play Store*. Proses *preprocessing* dilakukan melalui tahapan *cleansing*, *case folding*, *tokenization*, *word normalization*, *stemming*, *negation handling* dan *stopword removal*. Selanjutnya, data diubah menjadi representasi *vector* menggunakan dua arsitektur *Word2Vec*, yakni *Continuous Bag of Words (CBOW)* dan *Skip-Gram*, dengan berbagai kombinasi parameter seperti *vector size*, *window*, dan *epochs*. Representasi *vector* tersebut menjadi input bagi model *Random Forest* untuk klasifikasi sentimen ke dalam kelas positif dan negatif.

Hasil penelitian menunjukkan bahwa kombinasi *Word2Vec* dan *Random Forest* secara umum mampu menghasilkan performa klasifikasi yang baik. Arsitektur *Skip-Gram* menunjukkan performa yang sedikit lebih tinggi dibandingkan *CBOW*, dengan akurasi terbaik dengan *accuracy* 87.31%, *f1-score* 87.28% dan *k-fold cross validation* 86.98% pada kombinasi *vector size* 200, *window* 15, dan *epoch* 5. Sedangkan *CBOW* mencapai akurasi terbaik dengan *accuracy* 86.70%, *f1-score* 86.68% dan *k-fold cross validation* 86.79% pada kombinasi *vector size* 300, *window* 5, dan *epoch* 10. *Skip-Gram* terbukti lebih unggul dalam menangkap konteks semantik terutama pada ulasan pendek yang mengandung negasi atau opini implisit. Secara keseluruhan, pemilihan parameter *Word2Vec* memiliki pengaruh signifikan terhadap kinerja model klasifikasi. *Vector size* yang besar meningkatkan kualitas representasi pada *Skip-Gram*, tetapi dapat memperburuk performa pada *CBOW* jika terlalu kompleks. *Window* kecil cenderung memberikan hasil terbaik karena sesuai dengan konteks pendek dalam ulasan aplikasi. Sementara itu, *epoch* yang terlalu tinggi berisiko menyebabkan *overfitting*, khususnya pada *Skip-Gram*. Dengan demikian, efektivitas metode *Word2Vec* dan *Random Forest* dalam analisis sentimen sangat dipengaruhi oleh kombinasi parameter yang digunakan, yang perlu disesuaikan dengan karakteristik dataset secara spesifik.

Kata Kunci: Analisis Sentimen, *Word2Vec*, *Random Forest*, *Livin' by Mandiri*, Ulasan Pengguna

ABSTRACT

Technological advances have had a significant impact on various sectors of life, including the banking sector. In the digital age, banking institutions are striving to improve the quality of their services and products through innovations that differentiate them from their competitors. Sentiment analysis of user reviews of mobile banking applications has become very important for evaluating service quality and user satisfaction.

This study aims to examine the effectiveness of applying the Word2Vec method and Random Forest algorithm in classifying the sentiment of user reviews of the Livin' by Mandiri app. The data used consists of 60,000 Indonesian-language reviews obtained through web scraping from the Google Play Store. The preprocessing process was carried out through the following stages: cleansing, case folding, tokenization, word normalization, stemming, negation handling, and stopword removal. Next, the data was converted into vector representations using two Word2Vec architectures, namely Continuous Bag of Words (CBOW) and Skip-Gram, with various parameter combinations such as vector size, window, and epochs. These vector representations were used as input for the Random Forest model to classify sentiment into positive and negative classes.

The results of the study indicate that the combination of Word2Vec and Random Forest generally produces good classification performance. The Skip-Gram architecture showed slightly higher performance than CBOW, with the best accuracy of 87.31%, f1-score of 87.28%, and k-fold cross validation of 86.98% in the combination of vector size 200, window 15, and epoch 5. Meanwhile, CBOW achieved the best accuracy with 86.70%, f1-score 86.68%, and k-fold cross validation 86.79% in the combination of vector size 300, window 5, and epoch 10. Skip-Gram proved to be superior in capturing semantic context, especially in short reviews containing negation or implicit opinions. Overall, the selection of Word2Vec parameters has a significant impact on the performance of the classification model. A large vector size improves the quality of representation in Skip-Gram, but can worsen performance in CBOW if it is too complex. A small window tends to yield the best results because it aligns with the short context in app reviews. Meanwhile, an excessively high epoch risks causing overfitting, especially in Skip-Gram. Thus, the effectiveness of the Word2Vec and Random Forest methods in sentiment analysis is greatly influenced by the combination of parameters used, which must be tailored to the specific characteristics of the dataset.

Keywords: Sentiment Analysis, Word2Vec, Random Forest, Livin' by Mandiri, User Reviews