Analisis kinerja model gabungan convolutional neural network dan bidirectional long short term memory pada permasalahan lifelong learning analisis sentimen berbahasa indonesia = Performance analysis of combined convolutional neural network and bidirectional long short-term memory model for lifelong learning indonesian sentiment analysis

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Abstrak

Analisis sentimen merupakan suatu proses untuk menentukan sikap atau sentimen dari penulis mengenai hal tertentu. Proses pengelompokan sentimen secara manual membutuhkan waktu cukup lama, sehingga diusulkan untuk menggunakan machine learning. Pada penelitian ini, model machine learning yang digunakan merupakan model CNN-BiLSTM (Convolutional Neural Network - Bidirectional Long Short-Term Memory) dan BiLSTM-CNN (Bidirectional Long Short-Term Memory - Convolutional Neural Network) yang menghasilkan kinerja yang lebih baik dibandingkan model CNN dan BiLSTM pada permasalahan analisis sentimen. Supaya model dapat belajar secara berkelanjutan dari beberapa domain data, model tersebut juga diimplementasikan lifelong learning. Hasilnya, model CNN-BiLSTM menunjukkan kinerja transfer of knowledge yang lebih baik dibandingkan oleh model BiLSTM-CNN maupun model dasarnya. Di sisi lain, model BiLSTM-CNN menunjukkan kinerja yang lebih buruk dibandingkan model dasarnya. Sedangkan, hasil loss of knowledge menunjukkan bahwa kinerja model CNN- BiLSTM lebih buruk dari BiLSTM-CNN. Selain itu, kedua model gabungan tersebut menunjukkan kinerja yang lebih baik dibandingkan model CNN, tetapi lebih buruk dibandingkan model BiLSTM. Untuk pengembangan lebih lanjut, diimplementasikan pula lifelong learning dengan pembaruan vocabulary. Dengan implementasi tersebut, model mampu mempelajari vocabulary dari domain data 2, 3, 4, dan 5. Pembaruan vocabulary ternyata meningkatkan kinerja model pada transfer of knowledge dan loss of knowledge.

.....Sentiment analysis is a process to determine the attitude or sentiment of the author regarding certain matters. The process of classifying sentiments manually takes a long time, so it is proposed to use machine learning. In this study, the machine learning model used is the CNN-BiLSTM (Convolutional Neural Network - Bidirectional Long Short-Term Memory) and BiLSTM-CNN (Bidirectional Long Short-Term Memory - Convolutional Neural Network) models which produce better performance than the CNN and BiLSTM models on the problem of sentiment analysis. In order for the model to learn continuously from several data domains, the model is also implemented lifelong learning. As a result, the CNN-BiLSTM model shows better transfer of knowledge performance compared to the BiLSTM-CNN model and its base model. On the other hand, the BiLSTM-CNN model shows a worse performance than its base model. Meanwhile, the results of loss of knowledge show that the performance of the CNN-BiLSTM model is worse than the BiLSTM-CNN model. In addition, the two combined models show better performance than the CNN model, but worse than the BiLSTM model. For further development, lifelong learning is also implemented with an update to vocabulary. With this implementation, the model is able to learn vocabulary from data domain 2, 3, 4, and 5. In fact, the vocabulary update has an effect in increasing the performances of transfer of knowledge and loss of knowledge.