Pengembangan Sistem Penilaian Esai Otomatis (SIMPLE-O) untuk Penilaian Esai Bahasa Indonesia dengan Menggunakan Hybrid CNN Bi-LSTM Manhattan Distance dan Cosine Similarity = The Development of Automatic Essay Scoring (SIMPLE-O) for Indonesia Essay Assessment with Hybrid CNN Bi-LSTM using Manhattan Distance and Cosine Similarity

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Abstrak

Sistem Penilaian Esai Otomatis (SIMPLE-O) merupakan teknologi deep learning yang dikembangkan oleh Departemen Teknik Elektro, Fakultas Teknik Universitas Indonesia. SIMPLE-O dikembangkan untuk menilai ujian esai Bahasa Indonesia menggunakan gabungan algoritma CNN dengan Bidirectional LSTM. Dokumen yang menjadi input untuk sistem berupa jawaban mahasiswa dan kunci jawaban dosen. Keduanya akan melalui proses pre-processing yang dilanjut menuju proses embedding dan masuk ke dalam model deep learning. Selanjutnya akan dilakukan perhitungan dengan metrik penilaian yaitu Manhattan Distance dan Cosine Similarity. Pengujian dilakukan dengan mencari hyperparameter terbaik dari enam skenario yang dijalankan. Hasil pengujian skenario akhir fase training dan testing pengukuran Manhattan Distance mendapatkan nilai rata-rata selisih sebesar 0,72 dan 15,19. Untuk pengujian akhir pengukuran Cosine Similarity didapatkan nilai sebesar 1,07 dan 15,43.

.....The Automated Essay Assessment System (SIMPLE-O) is a deep learning technology developed by the Department of Electrical Engineering, Faculty of Engineering, University of Indonesia. SIMPLE-O was developed to assess Indonesian essay exams using the CNN algorithm and the Bidirectional LSTM. Documents that become input for the system are student answers and lecturer answer keys. Both of them will go through a pre-processing process, leading to the embedding process and entering the deep learning model. Next, calculations will be done with assessment metrics: Manhattan Distance and Cosine Similarity. Testing is done by looking for the best hyperparameters from the six-run scenarios. The results of testing the scenario at the end of the training and testing phase of the Manhattan Distance measurement obtained an average difference of 0.72 and 15.19. For the final test of the Cosine Similarity measurement, values were obtained of 1.07 and 15.43.