

ABSTRAK

Rai Mirayanti, Ni Komang (2023), *Analisis pengaruh batch size dan learning rate terhadap kinerja model cnn dalam klasifikasi dataset citra ct-chest covid-19*. Tesis, Ilmu Komputer, Program Pascasarjana, Universitas Pendidikan Ganesha.

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Kata-kata kunci : COVID-19, CNN, *batch size*, *learning rate*.

Metode *Convolutional Neural Network* (CNN) merupakan salah satu teknik deep learning yang banyak digunakan untuk klasifikasi dataset citra CT-Chest COVID-19 dan non-COVID. Namun untuk membangun model klasifikasi CNN dengan kinerja yang baik, beberapa hyperparameter perlu disesuaikan. Hyperparameter merupakan parameter yang nilainya digunakan untuk mengontrol proses pembelajaran dalam *machine learning*. Dua dari hyperparameter ini adalah *batch size* dan *learning rate*. Penelitian ini menganalisis pengaruh *batch size* dan *learning rate* terhadap kinerja model klasifikasi CNN menggunakan dataset CT-Chest COVID-19 dan non-COVID. Penelitian ini dibagi menjadi 2 percobaan yaitu percobaan ke-1 dan percobaan ke-2. Pada percobaan ke-1 klasifikasi dilakukan tanpa melalui proses ekstraksi fitur, sementara pada penelitian ke-2 klasifikasi dilakukan melalui proses ekstraksi fitur terlebih dahulu pada dataset sebelum dilakukan proses klasifikasi. Perlakuan tersebut dilakukan untuk melihat perbedaan output yang dihasilkan. Klasifikasi pada setiap percobaan dilakukan berulang kali dengan *batch size* dan *learning rate* berbeda menggunakan metode *k-fold validation* dengan nilai $k=10$ dan dengan *optimizer* Adam. Output yang dihasilkan dalam penelitian ini adalah nilai *True Positive* (TP), *True Negative* (TN), *False Positive* (FP) dan *False Negative* (FN). Nilai-nilai tersebut selanjutnya digunakan dalam perhitungan nilai *Accuracy*, *Sensitivity*, *Specificity* dan *Precision*. Selanjutnya pengaruh *batch size* dan *learning rate* terhadap kinerja model klasifikasi dapat diketahui dengan melihat nilai *Accuracy*, *Sensitivity*, *Specificity* dan *Precision* yang dihasilkan menggunakan *batch size* dan *learning rate* tertentu. Hasil penelitian ini menunjukkan bahwa *batch size* dan *learning rate* memiliki pengaruh terhadap kinerja model klasifikasi CNN. Semakin rendah *learning rate* maka semakin rendah pula *batch size* yang diperlukan agar model bekerja lebih baik dalam mengklasifikasikan dataset CT-Chest COVID-19 dan nonCOVID. Dalam penelitian ditemukan pula bahwa *learning rate* dan *batch size* terbaik diperoleh dari percobaan 1 dengan *learning rate* 0,01 dan *batch size* 64 yang menghasilkan nilai *Accuracy* sebesar 60.86%, *Sensitivity* sebesar 93.43%, *Specificity* sebesar 65.24%, *Precision* sebesar 60.27% dan *F2 Score* sebesar 81.53%.

ABSTRACT

Rai Mirayanti, Ni Komang (2023), *Analysis of the influence of batch size and learning rate on the performance of the CNN model in classifying the Covid-19 CT-chest image dataset*. Thesis, Computer Science, Postgraduate Program, Ganesha University of Education.

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Key words: COVID-19, CNN, batch size, learning rate.

The Convolutional Neural Network (CNN) method is a deep learning technique that is widely used for classifying COVID-19 and non-COVID CT-Chest image datasets. However, to build a CNN classification model with good performance, some hyperparameters need to be adjusted. Hyperparameters are parameters whose values are used to control the learning process in machine learning. Two of these hyperparameters are batch size and learning rate. This research analyzes the effect of batch size and learning rate on the performance of the CNN classification model using the CT-Chest COVID-19 and non-COVID datasets. This research was divided into 2 experiments, namely experiment 1 and experiment 2. In the 1st experiment, classification was carried out without going through a feature extraction process, while in the 2nd experiment, classification was carried out through a feature extraction process first on the dataset before the classification process was carried out. This treatment was carried out to see the differences in the output produced. Classification for each experiment was carried out repeatedly with different batch sizes and learning rates using the k-fold validation method with a value of $k=10$ and with the Adam optimizer. The output produced in this research is the True Positive (TP), True Negative (TN), False Positive (FP) and False Negative (FN) values. These values are then used in calculating the Accuracy, Sensitivity, Specificity and Precision values. Furthermore, the influence of batch size and learning rate on the performance of the classification model can be determined by looking at the Accuracy, Sensitivity, Specificity and Precision values produced using a certain batch size and learning rate. The results of this research show that batch size and learning rate have an influence on the performance of the CNN classification model. The lower the learning rate, the lower the batch size required for the model to work better in classifying the COVID-19 and non-COVID CT-Chest datasets. In the research it was also found that the best learning rate and batch size were obtained from experiment 1 with a learning rate of 0.01 and a batch size of 64 which produced an Accuracy value of 60.86%, Sensitivity of 93.43%, Specificity of 65.24%, Precision of 60.27% and F2 Score amounting to 81.53%