

DIAGNOSIS COVID-19 BERDASARKAN CITRA X-RAY PARU-PARU MENGGUNAKAN METODE CONVOLUTIONAL NEURAL NETWORK

ABSTRAK

12 Maret 2020, WHO mengumumkan kasus misterius pneumonia di Wuhan yang diberi nama COVID-19 sebagai pandemik. Salah satu cara untuk mendiagnosis COVID-19 adalah dengan menganalisis citra X-ray paru-paru. Ahli medis, menganalisis visual citra X-ray paru-paru harus secara teliti dan tepat, guna menentukan apakah pasien benar-benar terjangkit COVID-19. Namun menganalisis citra X-ray paru-paru membutuhkan proses yang cukup memakan waktu, maka dari itu dibutuhkan teknologi yang dapat dengan cepat mendiagnosis penyakit tersebut. Convolutional Neural Network (CNN) merupakan salah satu pengembangan algoritma *Multilayer Perceptron* (MLP) yang dirancang untuk mengidentifikasi berbagai pola gambar dari berbagai sisi. Model CNN yang dibangun pada penelitian ini memiliki 40 *convolution layer* dengan fungsi aktivasi *ReLU*, *Batch Normalization*, dan 5 *max-pooling layer*. Layer klasifikasi model CNN yang dibangun menerapkan *global average pooling* yang menghasilkan 512 neuron yang langsung terhubung ke *layer* terakhir dengan fungsi *softmax*. Akurasi dari hasil model CNN yang dibangun berhasil mencapai keseluruhan akurasi 92,14% yang diuji menggunakan 318 data citra. Kesimpulan dari penelitian ini algoritma *Convolutional Neural Network* (CNN) yang dibangun relatif mampu mendiagnosis penyakit COVID-19 berdasarkan citra X-ray paru-paru dan tingkat keefektifitas model mendiagnosis penyakit COVID-19 lebih rendah dibanding mendiagnosis penyakit yang tidak terjangkit COVID-19.

Kata Kunci : *Convolutional Neural Network*, COVID-19, diagnosis

DIAGNOSIS OF COVID-19 BASED ON X-RAY IMAGE OF THE LUNGS USING CONVOLUTIONAL NEURAL NETWORK

ABSTRACT

March 12, 2020, WHO announced a mysterious case of pneumonia in Wuhan which was named COVID-19 as a pandemic. One of way to diagnose COVID-19 is to analyze X-ray images of the lungs. Medical experts, analyze the visual X-ray image of the lungs carefully and precisely, to determine whether the patient really has COVID-19. However, analyzing an X-ray image of the lungs is a time-consuming process, therefore technology is needed that can quickly diagnose the disease. Convolutional Neural Network (CNN) is one of the developments of the Multilayer Perceptron (MLP) algorithm which is designed to identify various image patterns from various sides. The CNN model built in this study has 40 convolution layers with ReLU activation functions, Batch Normalization, and 5 max-pooling layers. The classification layer of the CNN model that is built applies global average pooling which produces 512 neurons which are directly connected to the last layer with the softmax function. The accuracy of the CNN results that were built managed to reach overall accuracy 92.14% which was tested using 318 image data. The conclusion of this study is that the Convolutional Neural Network (CNN) algorithm that was built is relatively capable of diagnosing COVID-19 disease based on X-ray images of the lungs and the effectiveness of the model for diagnosing COVID-19 disease is lower than diagnosing diseases that are not infected with COVID-19.

Keywords : Convolutional Neural Network, COVID-19, diagnosis