

# Deep learning dengan model concatenate untuk mendeteksi penyakit paru-paru covid-19 dengan gambar CT scan = Ddeep learning model concatenate untuk mendeteksi penyakit paru-paru covid-19 dengan gambar CT scan.

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## Abstrak

COVID-19 merupakan penyakit pernapasan seperti pneumonia yang mengakibatkan kematian pada jutaan orang setiap harinya. Januari 2020, "Organisasi Kesehatan Dunia" WHO menyatakan COVID-19 sebagai wabah penyakit virus yang menjadi perhatian internasional sebagai darurat kesehatan masyarakat yang menjadi perhatian internasional, dikenal sebagai pandemi dunia. Dilaporkan dari 205 negara di seluruh dunia, pada 1 April 2020, penularan virus COVID-19 sekitar ada lebih dari 900000 kasus COVID-19 yang dikonfirmasi dan hampir 50000 kematian. Berdasarkan laporan WHO, angka kematian 2-3% orang karena virus. Sangat penting untuk melakukan tes diagnostik sejak dini stadium berdasarkan kriteria sebagai gejala klinis, "Reverse-Transcription Polymerase Chain Reaction" (RT-PCR), sehingga dapat segera mengisolasi orang yang terinfeksi. Mendiagnosis penyakit virus COVID-19 dengan pencitraan yang lebih efektif menggunakan citra CT dada. Model DenseNet201, MobileNet, Xception, InceptionV3, ResNet152V2, dan VGG19 untuk memeriksa keakuratannya dalam pengenalan gambar. Untuk menganalisis kinerja model, 1888 sampel dari gambar CT paru-paru dikumpulkan dari situs resmi Kaggle. Model penggabungan (concatenate) pada arsitektur CNN yang telah terlatih seperti penggabungan (concatenate) antara ResNet152V2 dengan VGG19 memiliki accuracy sebesar 99,65%, sensitivity sebesar 99,66%, precision sebesar 99,66%, recall sebesar 99,66%, specificity sebesar 99,64%, dan skor F-measure sebesar 99,66%; gabungan DenseNet201 dan MobileNet diperoleh saat batchsize 32 dan 64 dengan learning rate 0,0001 diperoleh accuracy sebesar 99,65%, sensitivity sebesar 99,64%, precision sebesar 99,64%, recall sebesar 99,64%, specificity sebesar 99,66%, dan F-measure sebesar 99,64%; serta gabungan DenseNet201 dan MobileNet diperoleh saat batchsize 32 dan 64 dengan learning rate 0,001 maupun gabungan InceptionV3 dan Xception saat batchsize 32 dan learning rate 0,0001 diperoleh accuracy sebesar 99,65%, sensitivity sebesar 100%, precision sebesar 99,28%, recall sebesar 100%, specificity sebesar 99,31%, dan F-measure sebesar 99,64%.

.....COVID-19 is a respiratory disease like pneumonia that kills millions of people every day. January 2020, the WHO "World Health Organization" declared COVID-19 as a viral outbreak of international concern as a public health emergency of international concern, known as a world pandemic. Reported from 205 countries around the world, as of April 1, 2020, the transmission of the COVID-19 virus was around more than 900000 confirmed cases of COVID-19 and nearly 50000 deaths. Based on the WHO report, the death rate of 2-3% of people is due to the virus. To isolate the infected person immediately, it is very important to carry out a diagnostic test early based on the criteria as a clinical symptom, "Reverse-Transcription Polymerase Chain Reaction" (RT-PCR). Diagnosing COVID-19 viral disease with more effective imaging using chest CT images. DenseNet201, MobileNet, Xception, InceptionV3, ResNet152V2, and VGG19 models for accuracy in image recognition. To analyze the model's performance, 1888 samples of CT images of the lungs were collected from the official Kaggle website. The concatenate model on the CNN architecture that

has occurred, such as the concatenate between ResNet152V2 and VGG19, has an accuracy of 99.65%, sensitivity of 99.66%, the precision of 99.66%, recall of 99.66%, specificity by 99.64%, and the F-measure score of 99.66%; the combination of DenseNet201 and MobileNet was obtained when batch size 32 and 64 with a learning rate of 0.0001 obtained an accuracy of 99.65%, the sensitivity of 99.64%, the precision of 99.64%, recall of 99.64%, specificity of 99.66 %, and F-measure of 99.64%; and the combination of DenseNet201 and MobileNet obtained at batch size 32 and 64 with a learning rate of 0.001 or a combination of InceptionV3 and Xception at batch size 32 and a learning rate of 0.0001 obtained an accuracy of 99.65%, the sensitivity of 100%, precision of 99.28%, recall of 100%, specificity of 99.31%, and F-measure of 99.64%.