INTISARI

Deteksi nodul paru-paru pada citra *x-ray* dada memerlukan sebuah metode yang tepat sehingga memberikan hasil yang akurat. Pemanfaatan *deep learning* dapat menjadi solusi dalam mengatasi permasalahan tersebut. Dalam hal ini, *convolutional neural network* (CNN) dipilih dikarenakan kemampuannya dalam mengolah citra-citra yang dengan beragam varians, sehingga *object detection* dapat dilakukan dengan akurat.

Perancangan pada *capstone project* ini mempertimbangkan 3 aspek, yaitu *pre-processing*, *data augmentation* dan arsitektur yang digunakan. Teknik *pre-processing* yang digunakan adalah *tuned*-CLAHE, *median filter* dan *resize*. Berbagai parameter seperti PSNR dan SSIM digunakan untuk mengukuran kualitas citra hasil *pre-processing*. Sedangkan, untuk teknik *data augmentation* digunakan *geometric augmentation* dan *brightness augmentation*. Kemudian, data-data tersebut digunakan untuk melatih arsitektur yang dipilih, yaitu YOLOv4. Pemilihan tersebut dilandaskan pada pertimbangan mengenai dataset yang digunakan. Hasil simulasi menunjukkan nilai mAP yang cukup tinggi, yaitu sebesar 90,23 %.

Kata Kunci: citra *x-ray* dada, *deep learning*, *convolutional neural network*, *pre-processing*, *data augmentation*, YOLOv4, mAP

ABSTRACT

Lung nodule detection on chest x-ray images needs some proper methods in order to gain an accurate result. Deep learning can be used to solve that problem. In this case, convolutional neural network (CNN) is choosen as it abbility to process images with high variances, thus the object detection can be obtained accurately.

The designing processes in this captone project are done by considering 3 aspects, those are pre-processing, data augmentation and the architecture that is used. The pre-processing techniques that are used are tuned-CLAHE, median filter and resize. Parameters such as PSNR and SSIM are used to measure the images quality. Then, for the data augmentation techniques that are applied are geometric augmentation and brightness augmentation. Finally, those datas will be used to train the choosen architecture, that is YOLOv4. Those methods election is based on the dataset that is used in this project. The simulation result show that the mAP value is very high, that is 90.23%.

Keywords: *chest x-ray images, deep learning, convolutional neural network, pre-processing, data augmentation, YOLOv4, mAP*