

LUNG CANCER DETECTION ON CT-SCAN IMAGES WITH DEEP LEARNING METHODS: SUGENO FUZZY INTEGRAL-BASED CNN ENSEMBLE

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Currently available deep learning studies on lung cancer detection are not ideal. Existing approaches to lung cancer detection are primarily focused on a single model or multiple models using probability averaging. All deep learning model have limitation in image processing, and the possibility of inaccurate result that occur due to those limitation will impede the diagnosis. This issue must be rectified promptly as lung cancer causes the highest mortality rate among all cancer. With the intention of saving more life, this study proposes the use of Sugeno Ensemble approach in combination with four Convolutional Neural Networks (CNN), VGG11, SqueezeNet, GoogLeNet, and Wide ResNet-50-2 to achieve a higher accuracy for lung cancer detection to allow medical practitioners to treat the patients without delay. This study analyses the accuracy of utilising Sugeno fuzzy logic techniques on CT-scan images of lung cancer to see if it outperforms existing approaches and investigate the shortcomings of previous studies. This study looks at various cancer morphologies from various images of patients. The confusion matrix is then used to evaluate the framework's performance. The final accuracy result attained is 98.47%. This study discovered that combining Sugeno ensemble approach with the four CNN models improves the overall performance of lung cancer detection. This paper can be used to create tools for aiding medical practitioner to identify patients suffering from lung cancer. The findings provide implications in artificial intelligence for medical practitioners and the medical industry.

Keyword: *deep learning, convolutional neural network, ensemble, lung cancer, CT-scan images*