



Development of an Artificial Intelligence Model for Predicting Chemotherapy Response in Non-Small Cell Lung Cancer (NSCLC) Patients Using CT Imaging and Genomic Data

Chanyanuch Oumyoo¹, Kornkamon Thonghom¹ and Rattaporn Klinbantom^{1*}

¹Princess Chulabhorn Science High School Lopburi, Huai Pong, Khok Samrong, Lopburi 15120, Thailand

*E-mail: 04796@pccl.ac.th

Abstract

This study aimed to develop artificial intelligence models to predict chemotherapy response in patients with non-small cell lung cancer (NSCLC) using radiomic features from computed tomography (CT) images and genomic gene expression data. Radiomic features were quantitatively extracted from segmented tumor regions, while genomic data consisted of selected gene expression features associated with treatment response. Logistic Regression and Random Forest models were constructed and evaluated using the AUC, accuracy, and sensitivity. For radiomic-based prediction, Logistic Regression achieved superior performance with an AUC of approximately 0.83, an accuracy of about 0.82, and a sensitivity of around 0.89, compared with Random Forest (AUC $\approx$ 0.76, accuracy $\approx$ 0.68). These results suggest that radiomic and genomic data combined with machine learning techniques have potential value for predicting chemotherapy response in NSCLC patients and may serve as a foundation for future clinical decision support tools.

Keywords : NSCLC, Radiomics, Genomics, Machine Learning