

**Abstract**

**Lung cancer is the leading cause of death in the world. There are two types of lung cancer, i.e., non-small cell lung cancer and small cell lung cancer. The major cause of lung cancer is smoking. However, there are several cases of nonsmall lung cancer, with 7% of women with lung cancer in Taiwan having a smoking history. Early detecting of cancer will help it go faster and save lives every year. Nowadays, the technology being used are very helpful in the medical field because it uses microarray technology which can help detect cancer in early phase by analyzing DNA and RNA. In this study, we utilized GA combined with SVM for the classification of Non-Small Cell Lung Cancer in non-smoking female with microarray data. Hyperparameter tuning is performed to improve model performance. We discovered that SVM with a linear kernel performs better than alternative kernels with accuracy and F1-score values of 0.91 and 0.91 respectively.**

**Keywords: Non-small Cell Lung Cancer (NSCLC), Microarray, Genetic Algorithm, Support Vector Machines.**

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