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**CLASSIFIER BASED ANALYSIS FOR LUNG CANCER PATIENTS USING WEKA TOOL****DR. S. SENTHIL****ASSOCIATE PROFESSOR OF MCA  
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BENGALURU****ABSTRACT**

*Lung cancer is the major reason of cancer death globally. Cancer allied mortality for both men and women and its rate is increasing worldwide. Smoking is by far the most important inevitable cause of cancer in the world. The frequency of lung cancer is strongly correlated with cigarette smoking with around 90% of lung cancers get to your feet as an outcome of tobacco use. The possibility of lung cancer rises with the amount of cigarettes smoked over time. Maximum people know that smoking causes cancer but may not realize how many non-smokers get lung cancer. Each year, approximately 16,000 to 24,000 people die of lung cancer, even though they have never smoked. We examined the lung cancer prediction by means of classification algorithm such as Decision table, Multilayer Perception, VFI, NaiveBayes, Logistic, random Forest, Genetic programming, ZeroR and J48 algorithm. The foremost objective of this paper is to provide the former cautionary to the users and the performance analysis of the classification algorithms.*

**KEYWORDS**

data mining, lung cancer, prediction, classification, decision table, multilayer perception, vfi, naivebayes, logistic, random forest, genetic programming, zeror, j48 algorithm.

**1. INTRODUCTION**

Data mining is a vital tool to transform the data into information. Data mining is also called as knowledge mining or knowledge discovery from data. Classification is a data mining procedure used to determine group association for data illustrations. If a person gets lung cancer they could feel symptoms in other places in the body. The lung cancer symptom is used to predict risk level of disease. The purpose of this paper is to estimate the threat level of lung cancer using WEKA tool. The rest of the paper is organized as follows. Section 2 describes various classifiers used for the study like ZeroR, J48, decision table, multilayer perception, VFI, naive Bayes, Logistic, Random Forest and genetic programming. Datasets used are presented in Section 3. Section 4 shows the performance analysis of various classifiers, confusion matrix, time taken by each classifier and the last section concludes the paper.

**2. LITERATURE SURVEY**

YongqianQiang, YouminGuo, Xue Li, Qiuping Wang, Hao Chen, & DuwuCuic [6] conducted clinical and imaging diagnostic rules of peripheral lung cancer by data mining technique, and to explore new ideas in the diagnosis of peripheral lung cancer, and to obtain early-stage technology and knowledge support of computer-aided detecting (CAD). The data were imported into the database after the standardization of the clinical and CT findings attributes were identified. The diagnosis rules for peripheral lung cancer with three data mining technology is same as clinical diagnostic rules, and these rules also can be used to build the knowledge base of expert system. The demonstrated the potential values of data mining technology in clinical imaging diagnosis and differential diagnosis.

Krishnaiah V, Narsimha G, Subhash Chandra N [7] proposed to a model for nearly detection and correct diagnosis of the disease which will help the doctor in saving the life of the patient. Using generic lung cancer symptoms such as age, sex, wheezing, shortness of breath, Pain in shoulder, chest, arm, it can predict the likelihood of patients getting a lung cancer disease.

Prashant Naresh [8] applied a pattern prediction tools for a lung cancer prediction system, lung cancer risk prediction system should prove helpful in detection of a person's predisposition for lung cancer. The early prediction of lung cancer should play a pivotal role in the diagnosis process and for an effective preventive strategy.

Thangaraju P, Karthikeyan T, Barkavi G [9] conducted smoking is the biggest risk factor of lung cancer. The more years and larger number of cigarettes smoked the greater the risk of developing lung cancer. The average age of someone diagnosed with lung cancer is 65 to 70 years old, but people who are younger can develop lung cancer. Young adults who have never smoked also can develop lung cancer.

Ravi Kumar G., Ramachandra.A, Nagamani.K, [10] conducted breast cancer is one of the major causes of death in women when compared to all other cancers. Breast cancer has become the most hazardous types of cancer among women in the world. Early detection of breast cancer is essential in reducing life losses. The comparison among the different data mining classifiers on the database of breast cancer Wisconsin Breast Cancer (WBC), by using classification accuracy. The aims to be establish an accurate classification model for breast cancer prediction, in order to make full use of the invaluable information in clinical data, especially which is usually ignored by most of the existing methods when they aim for high prediction accuracies. It is compare six classification techniques in WEKA software and comparison results that Support Vector Machine (SVM) has higher prediction accuracy than those methods. Different methods for breast cancer detection are explored and their accuracies are compared. With these results, The SVM are more suitable in handling the classification problem of breast cancer prediction, and use of approaches in similar classification problems.

Tapas Ranjan Baitharu, Subhendu Kumar Pani [11] Conducted the most important cause of death for both men and women is the cancer lung cancer is a disease of uncontrolled cell growth in tissues of the lung. Data classification is an important task in KDD (knowledge discovery in databases) process. It has several potential applications. The performance of classifiers is strongly dependent on the data set used for learning. It leads to better performance of the classification models in terms of their predictive or descriptive accuracy, diminishing of computing time needed to build models as they learn faster, and better understanding of the models. A comparative analysis of data classification accuracy using lung cancer data in different scenarios is presented. The predictive performances of popular classifiers are compared for the prediction.

### 3. PERFORMANCE MEASURES

#### 1. ACCURACY CLASSIFICATION

All classification result could have an error rate and it may fail to classify correctly. So accuracy can be calculated as follows. Accuracy = (Instances Correctly Classified / Total Number of Instances)\*100 %.

#### 2. MEAN ABSOLUTE ERROR (MAE)

MAE is the average of difference between predicted and actual value in all test cases. The formula for calculating MAE is given in equation shown below:

$$MAE = (|a_1 - c_1| + |a_2 - c_2| + \dots + |a_n - c_n|) / n$$

Here 'a' is the actual output and 'c' is the expected output.

#### 3. ROOT MEAN SQUARED ERROR (RMSE)

RMSE is used to measure differences between values predicted by a model and the values actually observed. It is calculated by taking the square root of the mean square value.

#### 4. CONFUSION MATRIX

A confusion matrix contains information about actual and predicted classifications done by a classification system.

TABLE 1

	MAE	RMSE
1.J48	0.0903	0.2608
2.Decision Table	0.2468	0.3016
3.Logistic	0.0409	0.2005
4.Multilayer Perceptron	0.0643	0.2155
5.NaiveBayes	0.0426	0.1603
6.RandomForest	0.0792	0.2138
7.VFI	0.277	0.3448
8.ZeroR	0.2285	0.3249
9.Genetic Programming	0.2987	0.2567

### 4. PERFORMANCE ANALYSIS

In this study mainly classification algorithms such as SVM, Decision Table and J48 are applied on type Lung Cancer Disease dataset in the WEKA tool and the performance is measured.

All the attributes in data set are displayed in row format in the left half and on the right side is bar graphs represent the distributions of the different attributes for data mining. Class is predicting the risk attributes for 3 distinct in Label Low, Medium, High.

FIGURE 1: LUNG CANCER RISK PREDICTION

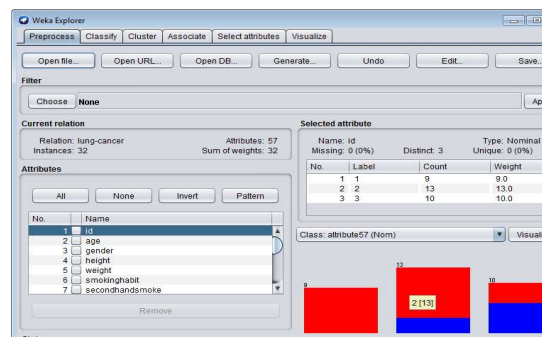


FIGURE 2: J48 ALGORITHM

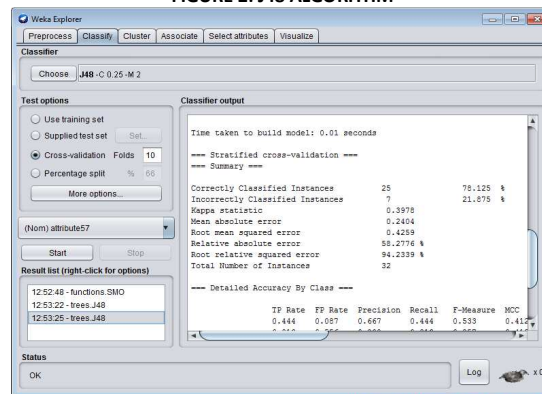
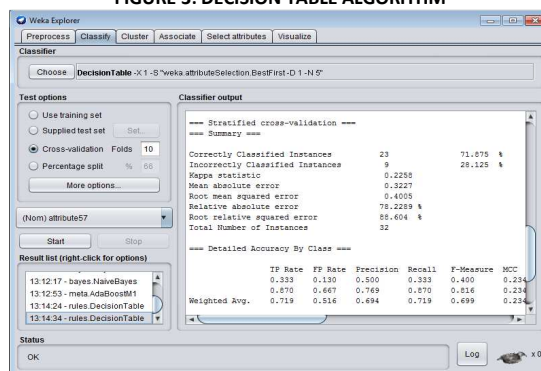


FIGURE 3: DECISION TABLE ALGORITHM



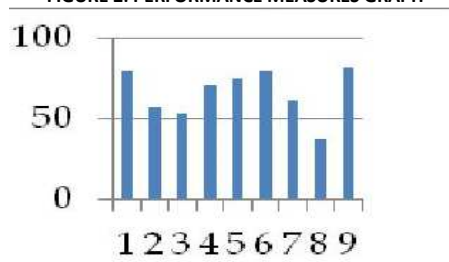
## 5. RESULTS

Ranking is done on the basis of accuracy and in case of tie time complexity is used to determine which algorithm performs better. Number of features get reduced from 56 to 4 by using cfs Subset Eval and genetic search.

TABLE 2: COMPARISON OF ALGORITHMS

Classifiers	Accuracy	Time Complexity(ms)	Ranking
J48	87.5%	450	4
Decision Table	84.375%	359	7
Logistic	93.75%	812	2
MultilayerPerceptron	90.625%	4137	3
NaiveBayes	96.875%	250	1
Random Forest	87.5%	2129	5
VFI	84.375%	581	8
ZeroR	81.25%	250	9
GeneticProgramming	85%	28739	6

FIGURE 2: PERFORMANCE MEASURES GRAPH



## 6. CONCLUSIONS AND FUTURE WORK

Data mining plays a major role in extracting the hidden information the medical database. The data pre-processing is used in order to increase the quality of the data. This model is made based on the UCI repository dataset. The testing has been successfully performed with a number of data mining classification techniques and it is found that the Naïve Bayes algorithm provides a superior performance over the supplied data set with the accuracy of 96.5%. It is understood that the data mining can suggestively help in the Lung Cancer research and finally develop the quality of health care of Lung Cancer patients.

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