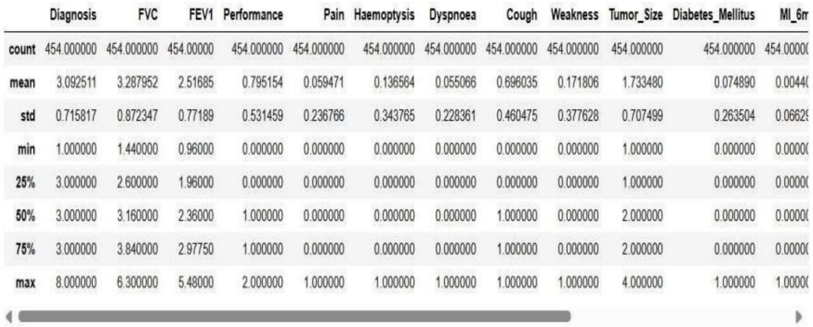
Data Collection and Preprocessing Phase

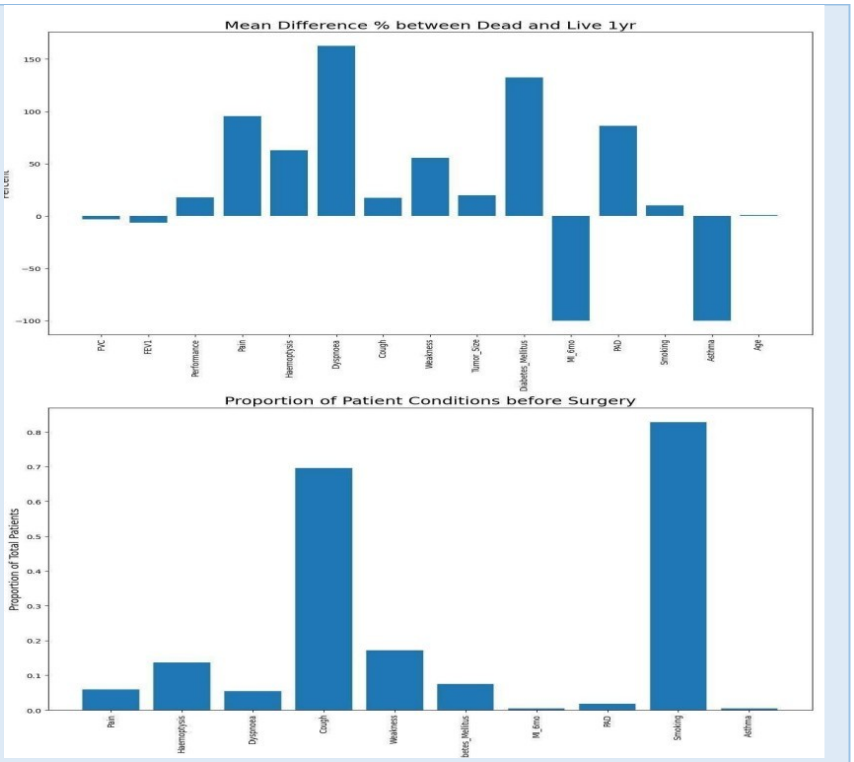
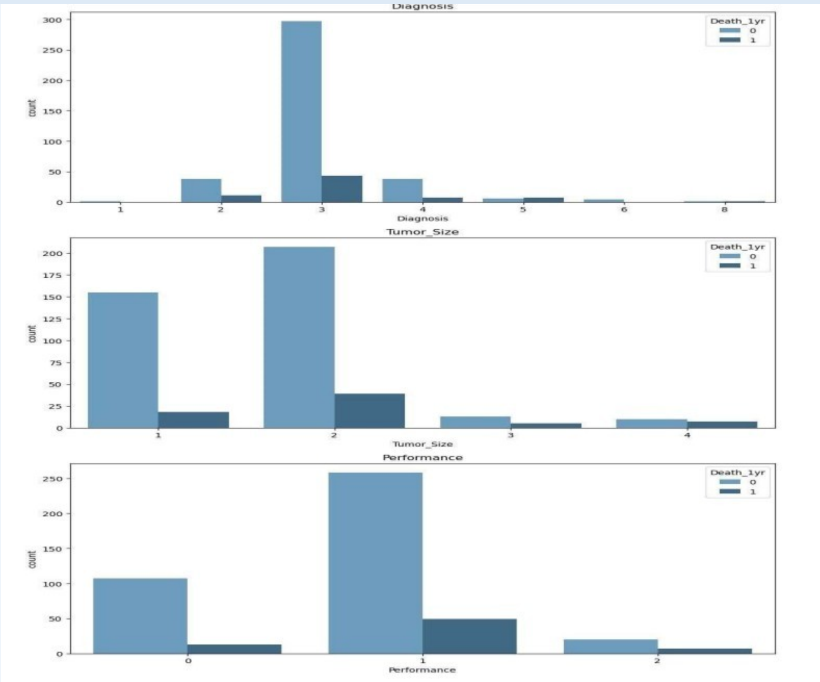
Date	15 July 2024
Team ID	739847
Project Title	**One Year Life Expectancy post on Thoracic Surgery using Machine Learning**
Maximum Marks	6 Marks

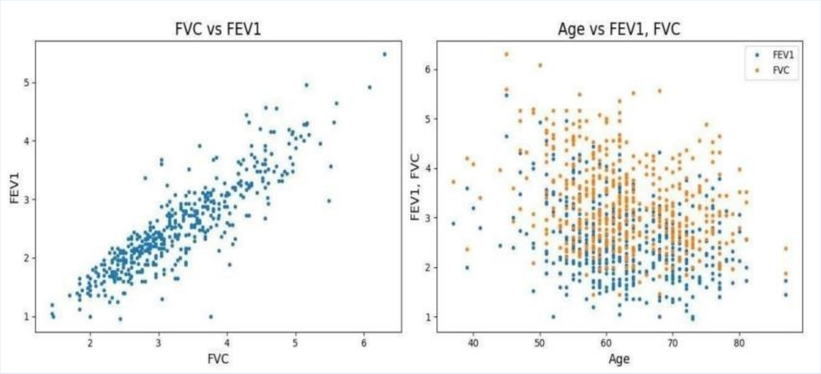
Data Exploration and Preprocessing Report

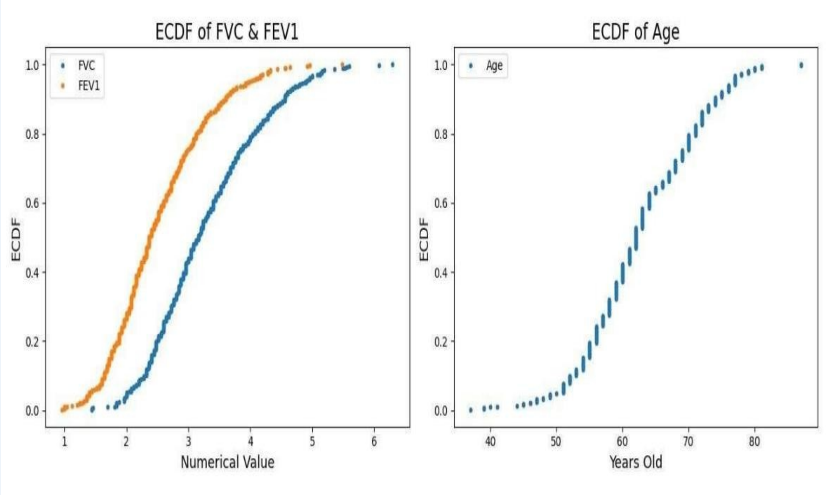
Dataset variables will be statistically analyzed to identify patterns and outliers, with Python employed for pre-processing tasks like normalization and feature engineering. Data cleaning will address missing values and outliers, ensuring quality for subsequent analysis and modeling, and forming a strong foundation for insights and predictions.

Section	Description
Data Overview	Dimension: 454 rows × 17 columns Descriptive statistics: 

	Diagnosis	FVC	FEV1	Performance	Pain	Haemoptysis	Dyspnoea	Cough	Weakness	Tumor_Size	Diabetes_Mellitus	MI_6m
count	454.000000	454.000000	454.00000	454.000000	454.000000	454.000000	454.000000	454.000000	454.000000	454.000000	454.000000	454.0000
mean	3.092511	3.287952	2.51685	0.795154	0.059471	0.136564	0.055066	0.696035	0.171806	1.733480	0.074890	0.0044
std	0.715817	0.872347	0.77189	0.531459	0.236766	0.343765	0.228361	0.460475	0.377628	0.707499	0.263504	0.0662
min	1.000000	1.440000	0.96000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.0000
25%	3.000000	2.600000	1.96000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.0000
50%	3.000000	3.160000	2.36000	1.000000	0.000000	0.000000	0.000000	1.000000	0.000000	2.000000	0.000000	0.0000
75%	3.000000	3.840000	2.97750	1.000000	0.000000	0.000000	0.000000	1.000000	0.000000	2.000000	0.000000	0.0000
max	8.000000	6.300000	5.48000	2.000000	1.000000	1.000000	1.000000	1.000000	1.000000	4.000000	1.000000	1.0000

Exploratory Data analysis	 

<table>
<tr>
<td>Correlation Coefficient</td>
<td>




</td>
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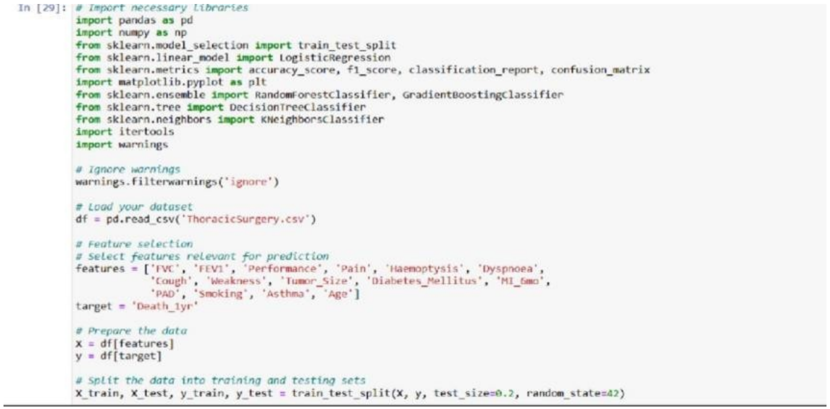
</table>

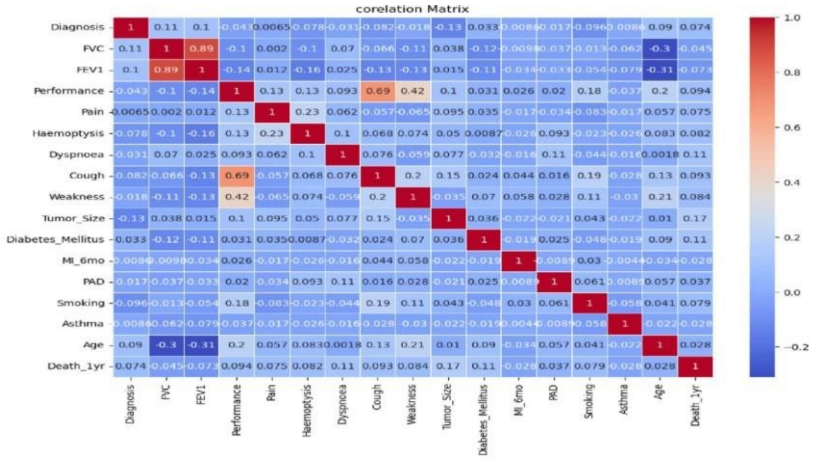
Data Preprocessing Code Screenshots

Loading Data

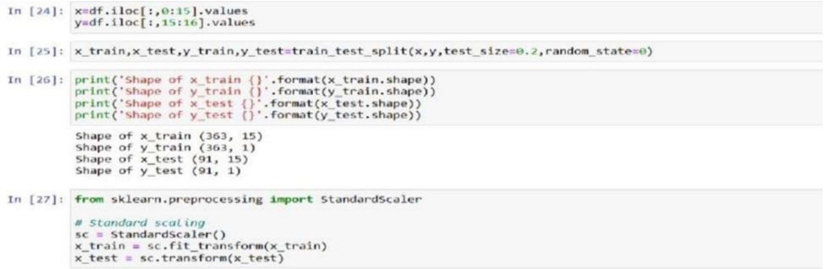


```
In [29]: # Import necessary Libraries
         import pandas as pd
         import numpy as np
         from sklearn.model_selection import train_test_split
         from sklearn.linear_model import LogisticRegression
         from sklearn.metrics import accuracy_score, f1_score, classification_report, confusion_matrix
         import matplotlib.pyplot as plt
         from sklearn.ensemble import RandomForestClassifier, GradientBoostingClassifier
         from sklearn.tree import DecisionTreeClassifier
         from sklearn.neighbors import KNeighborsClassifier
         import itertools
         import warnings

         # Ignore warnings
         warnings.filterwarnings('ignore')

         # Load your dataset
         df = pd.read_csv('ThoracicSurgery.csv')

         # Feature selection
         # Select features relevant for prediction
         features = ['FVC', 'FEV1', 'Performance', 'Pain', 'Haemoptysis', 'Dyspnoea',
                     'Cough', 'Weakness', 'Tumor_Size', 'Diabetes_Mellitus', 'MI_6mo',
                     'PAD', 'Smoking', 'Asthma', 'Age']
         target = 'Death_1yr'

         # Prepare the data
         X = df[features]
         y = df[target]

         # Split the data into training and testing sets
         X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

Corelation Matrix



Data Transformation



```
In [24]: x=df.iloc[:,0:15].values
         y=df.iloc[:,15:16].values

In [25]: x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=0)

In [26]: print('Shape of x_train {}'.format(x_train.shape))
         print('Shape of y_train {}'.format(y_train.shape))
         print('Shape of x_test {}'.format(x_test.shape))
         print('Shape of y_test {}'.format(y_test.shape))

         Shape of x_train (363, 15)
         Shape of y_train (363, 1)
         Shape of x_test (91, 15)
         Shape of y_test (91, 1)

In [27]: from sklearn.preprocessing import StandardScaler

         # Standard scaling
         sc = StandardScaler()
         x_train = sc.fit_transform(x_train)
         x_test = sc.transform(x_test)
```

Feature Engineering

Attached the codes in final submission.

Save Processed Data

Data saved in the form of model .pkl file