

Project-Performance

Model Performance Test

Date	16 November 2023
Team ID	Team-591563
Project Name	Lymphography Classification using Machine Learning
Maximum Marks	10 Marks

Metrics:

Confusion Matrix:

```
✓ [62] 1 from sklearn.metrics import accuracy_score, f1_score, confusion_matrix
```

```
✓ [74] 1 confusion_matrix(y_test, prediction)
```

```
array([[11,  1,  0],  
       [ 2, 15,  0],  
       [ 1,  0,  0]])
```

Accuracy-Score:

```
✓ 0s 1 accuracy_score(y_test, prediction)
```

```
0.8666666666666667
```

Classification-Report:

```
1 print(classification_report(y_test, prediction))
```

```
precision    recall  f1-score   support

2         0.79         0.92         0.85         12
3         0.94         0.88         0.91         17
4         0.00         0.00         0.00          1

accuracy          0.87         30
macro avg         0.57         0.60         0.59         30
weighted avg      0.85         0.87         0.85         30
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:136: UserWarning:
Precision-Recall scores are not defined for classes with zero support.
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:136: UserWarning:
Precision-Recall scores are not defined for classes with zero support.
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:136: UserWarning:
Precision-Recall scores are not defined for classes with zero support.
```

Hyper-Parameter Tuning:

```
✓ 0s [66] 1 params={
2     'max_depth':[9,10,11],
3     'min_samples_leaf':[2,3],
4     'n_estimators':[90,95,100,110],
5     'max_features':[2,3,4,5]
6 }
```

Validation-Method:

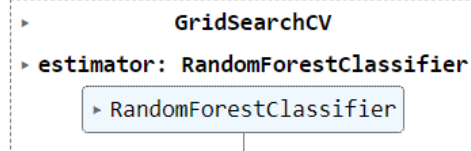
Cross-Fold Validation with 2 folds

```
✓ 0s [66] 1 from sklearn.model_selection import GridSearchCV
```

```
✓ 0s [67] 1 grid_search=GridSearchCV(estimator=rf,
2                               param_grid=params,
3                               cv=2,
4                               verbose=1,
5                               scoring="accuracy")
```

```
✓ 27s [68] 1 grid_search.fit(x_train,y_train)
```

Fitting 2 folds for each of 96 candidates, totalling 192 fits



```
✓ [69] 1 grid_search.best_score_
```

```
0.8135593220338984
```

```
✓ [69] 1 rf_best=grid_search.best_estimator_  
2 rf_best
```



```
RandomForestClassifier  
RandomForestClassifier(max_depth=9, max_features=2, min_samples_leaf=2,  
n_estimators=90)
```



```
1 rf_classify=RandomForestClassifier(random_state=42,  
2 n_jobs=-1,  
3 max_depth=9,  
4 min_samples_split=2,  
5 max_features='sqrt',  
6 n_estimators=90,  
7 bootstrap=True)
```

```
✓ [72] 1 rf_classify.fit(x_train,y_train)
```

```
RandomForestClassifier  
RandomForestClassifier(max_depth=9, n_estimators=90, n_jobs=-1, random_state=42)
```