

CLASSIFICATION ASSIGNMENT

1) Problem statement:

- Domain Selection: ML
- Learning Selection: Supervised
- Supervised: Classification

2) Total. no. of. rows=400 & Total . no . of .columns=24

3) Pre-processing method: Nominal data

4) ML classification method using confusion matrix and classification report:

- Logistic Regression:

The confusion Matrix:

```
[[51  0]
 [ 1 81]]
```

```
print("The report:\n",clf_report)
```

The report:

	precision	recall	f1-score	support
False	0.98	1.00	0.99	51
True	1.00	0.99	0.99	82
accuracy			0.99	133
macro avg	0.99	0.99	0.99	133
weighted avg	0.99	0.99	0.99	133

-
- Support vector machine:

```
from sklearn.metrics import f1_score
f1_macro=f1_score(y_test,grid_predictions,average='weighted')
print("The f1_macro value for best parameter {}".format(grid.best_params_),f1_macro)
```

The f1_macro value for best parameter {'C': 10, 'gamma': 'auto', 'kernel': 'sigmoid'}: 0.9924946382275899

[32]:

```
print("The confusion Matrix:\n",cm)
```

The confusion Matrix:

```
[[51  0]
 [ 1 81]]
```

[33]:

```
print("The report:\n",clf_report)
```

The report:

	precision	recall	f1-score	support
False	0.98	1.00	0.99	51
True	1.00	0.99	0.99	82
accuracy			0.99	133
macro avg	0.99	0.99	0.99	133
weighted avg	0.99	0.99	0.99	133

- Decision Tree:

The f1_macro value for best parameter {'criterion': 'entropy', 'max_features': 'log2', 'splitter': 'random'}: 0.940378372090564

[57]:

```
print("The confusion Matrix:\n",cm)
```

The confusion Matrix:

```
[[50  1]
 [ 7 75]]
```

[58]:

```
print("The report:\n",clf_report)
```

The report:

	precision	recall	f1-score	support
False	0.88	0.98	0.93	51
True	0.99	0.91	0.95	82
accuracy			0.94	133
macro avg	0.93	0.95	0.94	133
weighted avg	0.94	0.94	0.94	133

- Random Forest:

The f1_macro value for best parameter {'criterion': 'gini', 'max_features': 'sqrt', 'n_estimators': 10}: 0.9700283472213296

```
print("The confusion Matrix:\n",cm)
```

The confusion Matrix:

```
[[50  1]
 [ 3 79]]
```

```
print("The report:\n",clf_report)
```

The report:

	precision	recall	f1-score	support
False	0.94	0.98	0.96	51
True	0.99	0.96	0.98	82
accuracy			0.97	133
macro avg	0.97	0.97	0.97	133
weighted avg	0.97	0.97	0.97	133

The final Model of ML:

- Logistic Regression = 0.99

And

- Support Vector Machine = 0.99