

Unit 3.2 Assignment Supervised Machine Learning

Peer Members:

- Syed Muhammad Raqim Ali Shah (2303.KHI.DEG.008)
- Maaz Javaid Siddique (2303.KHI.DEG.004)

Question:

Implement a single classification model of your choice and try to achieve at least an 80% F1 score on the wine dataset provided by Sklearn.

Solution:

```
import matplotlib.pyplot as plt
import numpy as np
from sklearn import datasets
from sklearn.metrics import f1_score, mean_squared_error
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression

wine = datasets.load_wine()
wine_x = wine.data[:, 2:]
wine_y = wine.target

x_train, x_test, y_train, y_test = train_test_split(wine_x, wine_y, test_size=0.2, random_state=0)

scaler = StandardScaler()

x_train = scaler.fit_transform(x_train)
x_test = scaler.transform(x_test)

model = LogisticRegression()

model.fit(x_train, y_train)

y_pred = model.predict(x_test)

f1_score(y_test, y_pred, average="micro")

print("F1 Score is ", f1_score(y_test, y_pred, average="micro"))
```

First imported the necessary libraries,

We load the wine dataset from scikit-learn and extract the feature data and target variable.

We split the dataset into training and testing sets using “train_test_split()”. The test set size is set to 20% of the total dataset, and the random state is set to 0 to ensure reproducibility of the results.

We scale the feature data using “StandardScaler()”. The scaler is first fit to the training data using “fit_transform()”, and then applied to the testing data using “transform()”.

We create a logistic regression model using “LogisticRegression()” and fit the model to the training data using “fit()”. We then make predictions on the testing data using “predict()”.

We calculate and print the F1 score of the model's predictions using “f1_score()” with the micro averaging method, which computes the F1 score globally by counting the total true positives, false negatives, and false positives.

Output:

```
F1 Score is  0.9444444444444444
```