Logistic_Regression

Import Libraries

Suggested code may be subject to a license | 3arii/LogReg-GUI

```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay
from sklearn.metrics import accuracy_score
```

Importing dataset and splitting dataset into training and test sets

```
pd = pd.read_csv('Social_Network_Ads.csv')
X = pd.iloc[:, :-1].values
y = pd.iloc[:, -1].values
x_train, x_test, y_train, y_test = train_test_split(X, y, test_size = 0.25, random_state = 0)
```

Feature Scaling

```
sc = StandardScaler()
x_train = sc.fit_transform(x_train)
x_test = sc.transform(x_test)
```

Training the Logistic Regression model on the training set

Suggested code may be subject to a license | 07shivam/Forest-Cover-Type-Kernels-Only-

```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
classifier.fit(x_train, y_train)
```

```
▾       LogisticRegression
LogisticRegression(random_state=0)
```

Predicting a new result

```
print(classifier.predict(sc.transform([[30,87000]])))
```

```
[0]
```

Predicting the test set result

```
y_predict = classifier.predict(x_test)
display(y_predict)
```

```
array([0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1,
       0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0,
       1, 0, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1,
       0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 1, 1, 1, 0, 0, 1, 1, 0, 1,
       0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1])
```

```
print(np.concatenate((y_predict.reshape(len(y_predict),1), y_test.reshape(len(y_test),1)),1))
```

```
 [0 0]
 [0 0]
 [0 0]
 [1 1]
 [0 1]
 [0 0]
 [0 0]
 [0 1]
 [0 0]
 [0 0]
 [1 1]
 [0 0]
 [0 1]
 [0 0]
 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [0 0]
 [1 1]
 [0 0]
 [0 0]
 [0 1]
 [0 0]
 [0 0]
 [1 0]
 [0 0]
 [1 1]
 [1 1]
 [1 1]
 [1 0]
 [0 0]
 [0 0]
 [1 1]
 [1 1]
 [0 0]
 [1 1]
 [0 1]
 [0 0]
 [0 0]
 [1 1]
 [0 0]
 [0 0]
 [0 0]
 [0 1]
 [0 0]
 [0 1]
 [1 1]
 [1 1]]
```

Making the confusion matrix

```
confusion_matrix(y_test, y_predict)
```

```
array([[65,  3],
       [ 8, 24]])
```

```
accuracy_score(y_test, y_predict)
```

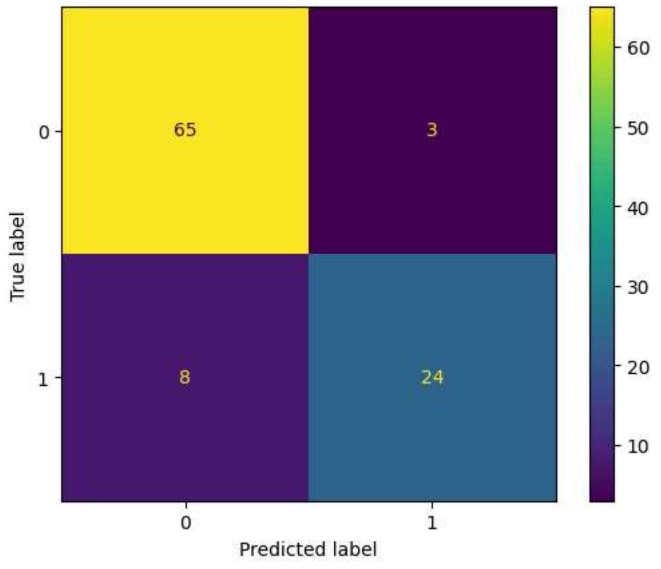
```
0.89
```

```
!pip install scikit-learn
#Import the module

import matplotlib.pyplot as plt

cm = confusion_matrix(y_test, y_predict, labels=classifier.classes_)
disp = ConfusionMatrixDisplay(confusion_matrix=cm,display_labels=classifier.classes_)
disp.plot()
plt.show()
```

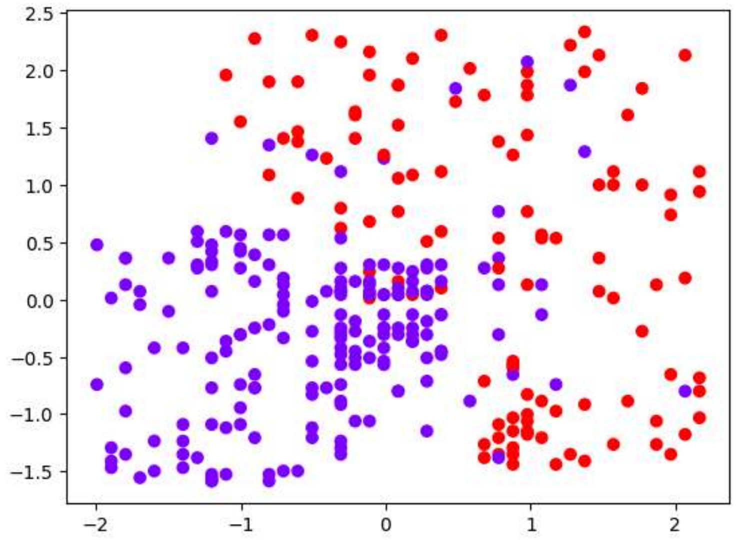
```
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.10/dist-packages (1.2.2)
Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.10/dist-packages (from scikit-learn) (1.25.2)
Requirement already satisfied: scipy>=1.3.2 in /usr/local/lib/python3.10/dist-packages (from scikit-learn) (1.11.4)
Requirement already satisfied: joblib>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from scikit-learn) (1.4.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn) (3.5.0)
```



Visualising the Training set results

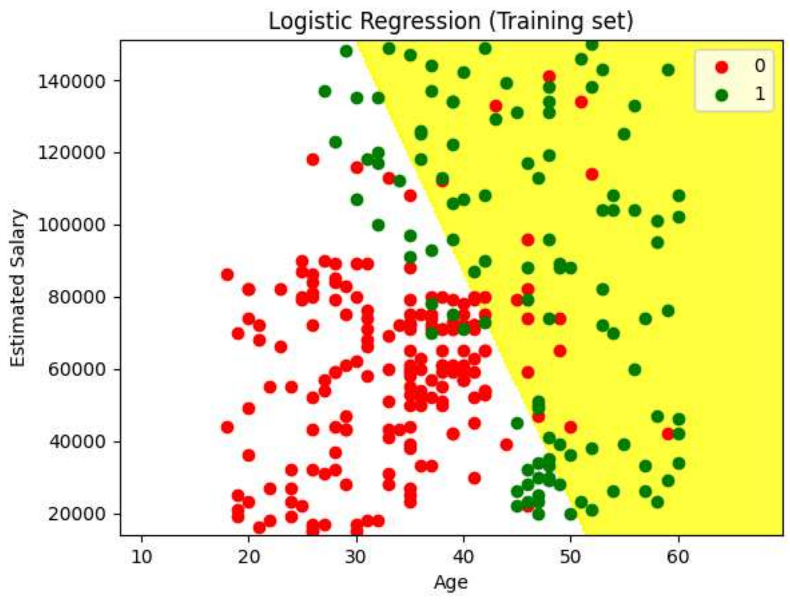
```
plt.scatter(x_train[:, 0], x_train[:, 1], c = y_train, cmap = 'rainbow')
```

```
<matplotlib.collections.PathCollection at 0x79c9a0761ea0>
```



```
from matplotlib.colors import ListedColormap
x_set, y_set =  sc.inverse_transform(x_train), y_train
X1, X2 = np.meshgrid(np.arange(start = x_set[:, 0].min() - 10, stop = x_set[:, 0].max() + 10, step = 0.25),
                     np.arange(start = x_set[:, 1].min() - 1000, stop = x_set[:, 1].max() + 1000, step = 0.25))
plt.contourf(X1, X2, classifier.predict(sc.transform(np.array([X1.ravel(), X2.ravel()]).T)).reshape(X1.shape),
             alpha = 0.75, cmap = ListedColormap(('white', 'yellow')))
plt.xlim(X1.min(), X1.max())
plt.ylim(X2.min(), X2.max())
for i, j in enumerate(np.unique(y_set)):
    plt.scatter(x_set[y_set == j, 0], x_set[y_set == j, 1], c = ListedColormap(('red', 'green'))(i), label = j)
plt.title('Logistic Regression (Training set)')
plt.xlabel('Age')
plt.ylabel('Estimated Salary')
plt.legend()
plt.show()
```

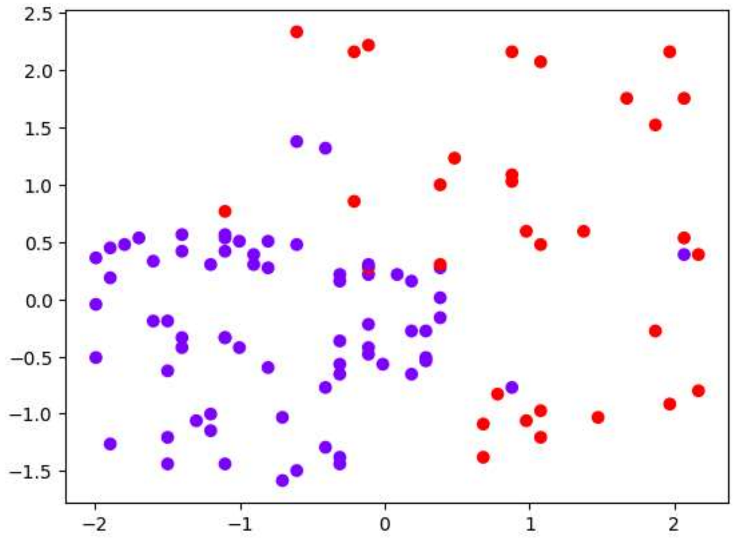
```
<ipython-input-32-1ff84f439571>:10: UserWarning: *c* argument looks like a single numeric RGB or RGBA sequence, which should be avoided
  plt.scatter(x_set[y_set == j, 0], x_set[y_set == j, 1], c = ListedColormap(('red', 'green'))(i), label = j)
```



Visualising the Test set results

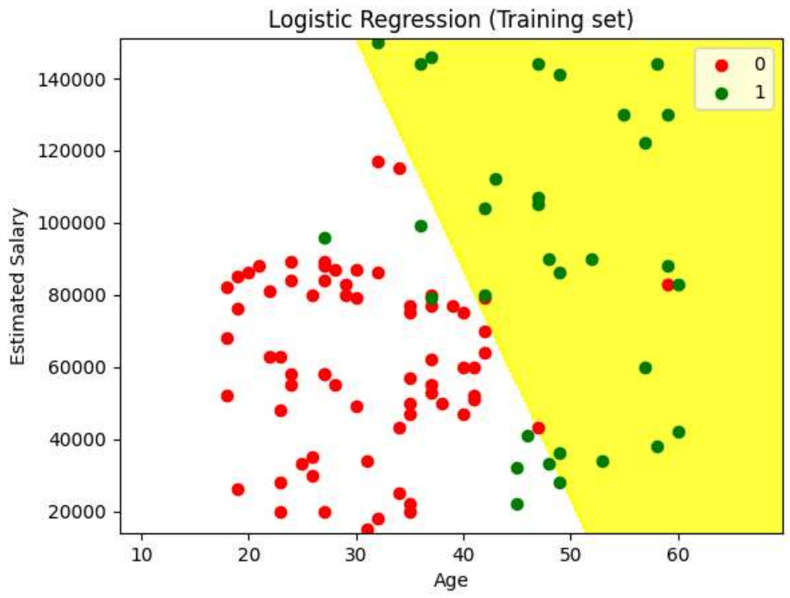
```
plt.scatter(x_test[:, 0], x_test[:, 1], c = y_test, cmap = 'rainbow')
```

```
<matplotlib.collections.PathCollection at 0x79c9a06d9960>
```



```
from matplotlib.colors import ListedColormap
x_set, y_set =  sc.inverse_transform(x_test), y_test
X1, X2 = np.meshgrid(np.arange(start = x_set[:, 0].min() - 10, stop = x_set[:, 0].max() + 10, step = 0.25),
                     np.arange(start = x_set[:, 1].min() - 1000, stop = x_set[:, 1].max() + 1000, step = 0.25))
plt.contourf(X1, X2, classifier.predict(sc.transform(np.array([X1.ravel(), X2.ravel()]).T)).reshape(X1.shape),
             alpha = 0.75, cmap = ListedColormap(('white', 'yellow')))
plt.xlim(X1.min(), X1.max())
plt.ylim(X2.min(), X2.max())
for i, j in enumerate(np.unique(y_set)):
    plt.scatter(x_set[y_set == j, 0], x_set[y_set == j, 1], c = ListedColormap(('red', 'green'))(i), label = j)
plt.title('Logistic Regression (Training set)')
plt.xlabel('Age')
plt.ylabel('Estimated Salary')
plt.legend()
plt.show()
```

```
<ipython-input-33-7a4736fed5f0>:10: UserWarning: *c* argument looks like a single numeric RGB or RGBA sequence, which should be avoided
  plt.scatter(x_set[y_set == j, 0], x_set[y_set == j, 1], c = ListedColormap(('red', 'green'))(i), label = j)
```


Logistic Regression (Training set)
Estimated Salary
Age