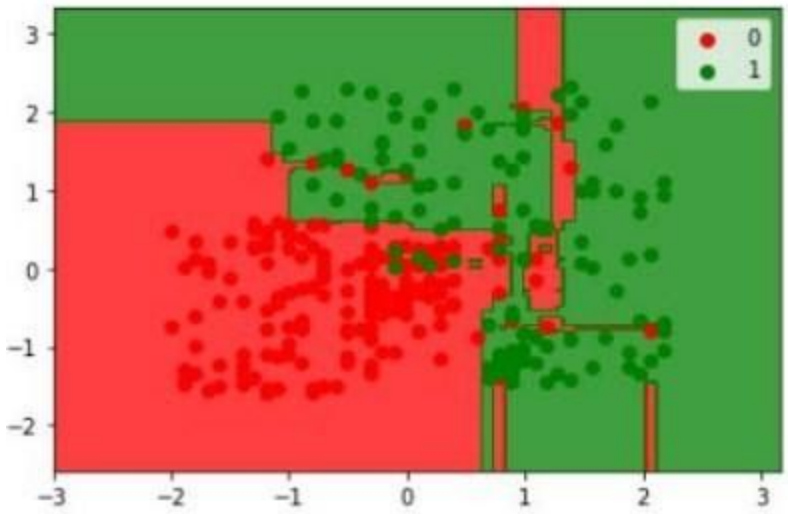
COIMBATORE INSTITUTE OF TECHNOLOGY
MSC DECISION AND COMPUTING SCIENCES

Problem Statement- 1 : Social_Network_Ads

AIM:

To try to understand the dataset of Social_Network_Ads.csv and try to find the best suitable ML algorithm and write the code in python for algorithm from scratch and try to achieve the below output plot



DATASET:

The Social_Network_Ads.csv is a Categorical dataset that contains the data about profiles of the users either he/she purchased the product or not.

SOLUTION:

For the given data I have used ***Random Forest Classifier***, instead of Logistic Regression and Naive Bayes Classifier, because it is a meta estimator that fits a number of decision tree classifiers on various sub-samples of the dataset and also it uses averaging to produce the higher accuracy.

I have inserted the snippet code along with the screenshots of the output

From the above used model i got the accuracy as : ***0.85***

social network ques1.ipynb

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```
..
sample_data
social.xlsx
```

```
import numpy as np
import pandas as pd
from sklearn import datasets
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier

def accuracy(y_true, y_pred):
    accuracy = np.sum(y_true == y_pred) / len(y_true)
    return accuracy

data = pd.read_excel("social.xlsx")
print(data)
X = data.iloc[:, [2, 3]].values
y = data.iloc[:, 4].values

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=123)

clf = RandomForestClassifier(n_estimators=3, max_depth=10)
clf.fit(X_train, y_train)
y_pred = clf.predict(X_test)
acc = accuracy(y_test, y_pred)

print ("Accuracy:", acc)
```

```
     User ID   Gender   Age   EstimatedSalary   Purchased
0    15624510    Male     19             19000          0
1    15810944    Male     35             20000          0
2    15668575  Female     26             43000          0
3    15603246  Female     27             57000          0
4    15804002    Male     19             76000          0
..        ...     ...    ...               ...        ...
395  15691863  Female     46             41000          1
396  15706071    Male     51             23000          1
397  15654296  Female     50             20000          1
398  15755018    Male     36             33000          0
399  15594041  Female     49             36000          1

[400 rows x 5 columns]
Accuracy: 0.85
```

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399  15594041  Female     49             36000          1

[400 rows x 5 columns]
Accuracy: 0.85
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```
from sklearn.ensemble import RandomForestClassifier
classifier = RandomForestClassifier(n_estimators = 10, criterion = 'entropy', random_state = 0)
classifier.fit(X_train, y_train)
y_pred = classifier.predict(X_test)
```

```
[ ] from matplotlib.colors import ListedColormap
    from matplotlib import pyplot as plt
    X_set, y_set = X_test, y_test
    X1, X2 = np.meshgrid(np.arange(start = X_set[:, 0].min() - 1, stop = X_set[:, 0].max() + 1, step = 0.01),
                         np.arange(start = X_set[:, 1].min() - 1, stop = X_set[:, 1].max() + 1, step = 0.01))
    plt.contourf(X1, X2, classifier.predict(np.array([X1.ravel(), X2.ravel()]).T).reshape(X1.shape),
                 alpha = 0.75, cmap = ListedColormap(('red', 'green')))
    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('Random Forest Classification (Test set)')
    plt.xlabel('Age')
    plt.ylabel('Estimated Salary')
    plt.legend()
    plt.show()
```

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'c' argument looks like a single numeric RGB or RGBA sequence, which should be avoided as value-mapping will have precede
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