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In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
# roc curve and auc score
from sklearn.datasets import make_classification
from sklearn.neighbors import KNeighborsClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.model_selection import train_test_split
from sklearn.metrics import roc_curve
from sklearn.metrics import roc_auc_score
```

```
In [2]: def plot_roc_curve(fpr, tpr):
plt.plot(fpr, tpr, color='orange', label='ROC')
plt.plot([0, 1], [0, 1], color='darkblue', linestyle='--')
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('Receiver Operating Characteristic (ROC) Curve')
plt.legend()
plt.show()
```

```
In [3]: data_X, class_label = make_classification(n_samples=1000, n_classes=2, weights
=[1,1], random_state=1)
```

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In [4]: trainX, testX, trainy, testy = train_test_split(data_X, class_label, test_size
=0.3, random_state=1)
```

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In [5]: model = RandomForestClassifier()
model.fit(trainX, trainy)
```

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Out[5]: RandomForestClassifier()
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In [7]: probs = model.predict_proba(testX)
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In [8]: probs = probs[:, 1]
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In [9]: auc = roc_auc_score(testy, probs)
print('AUC: %.2f' % auc)
```

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AUC: 0.95
```

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In [10]: fpr, tpr, thresholds = roc_curve(testy, probs)
```

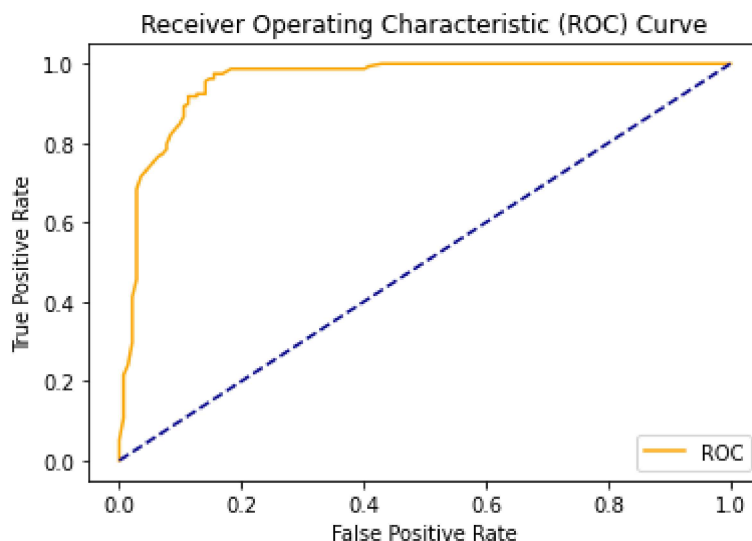
In [11]: fpr

```
Out[11]: array([0.          , 0.          , 0.          , 0.          , 0.00704225,
                0.00704225, 0.00704225, 0.01408451, 0.02112676, 0.02112676,
                0.02112676, 0.02112676, 0.02816901, 0.02816901, 0.02816901,
                0.02816901, 0.02816901, 0.02816901, 0.03521127,
                0.06338028, 0.07042254, 0.07746479, 0.07746479, 0.08450704,
                0.09859155, 0.1056338 , 0.1056338 , 0.1056338 , 0.11267606,
                0.11267606, 0.12676056, 0.12676056, 0.14084507, 0.14084507,
                0.14084507, 0.14084507, 0.14788732, 0.15492958, 0.15492958,
                0.16901408, 0.18309859, 0.1971831 , 0.21126761, 0.22535211,
                0.25352113, 0.26760563, 0.28873239, 0.3028169 , 0.34507042,
                0.37323944, 0.40140845, 0.4084507 , 0.42957746, 0.51408451,
                0.57746479, 0.66901408, 0.75352113, 0.88028169, 0.97183099,
                1.          ])
```

In [12]: tpr

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Out[12]: array([0.          , 0.00632911, 0.01265823, 0.05063291, 0.10759494,
                0.15822785, 0.21518987, 0.24050633, 0.29746835, 0.32278481,
                0.37341772, 0.41139241, 0.4556962 , 0.49367089, 0.51265823,
                0.56329114, 0.62025316, 0.64556962, 0.6835443 , 0.71518987,
                0.76582278, 0.7721519 , 0.78481013, 0.79746835, 0.82278481,
                0.84810127, 0.86708861, 0.87341772, 0.89240506, 0.89873418,
                0.91772152, 0.91772152, 0.92405063, 0.92405063, 0.93670886,
                0.94936709, 0.9556962 , 0.96202532, 0.96202532, 0.97468354,
                0.97468354, 0.98734177, 0.98734177, 0.98734177, 0.98734177,
                0.98734177, 0.98734177, 0.98734177, 0.98734177, 0.98734177,
                0.98734177, 0.99367089, 1.          , 1.          ,
                1.          , 1.          , 1.          , 1.          ,
                1.          ])
```

In [13]: plot\_roc\_curve(fpr, tpr)



In [ ]: