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In [1]: import numpy as np
import matplotlib.pyplot as plt
from sklearn.metrics import roc_curve, auc, classification_report, confusion_matrix
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.impute import SimpleImputer
import pandas as pd

data = pd.read_csv('/Users/mehtap/Downloads/PCOS_data.csv')

imputer = SimpleImputer(strategy='mean')
data_imputed = imputer.fit_transform(data.iloc[:, 3:-1])

X = data_imputed
y = data['PCOS (Y/N)']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

knn_classifier = KNeighborsClassifier()
knn_classifier.fit(X_train, y_train)

y_pred = knn_classifier.predict(X_test)

accuracy = np.mean(y_test == y_pred)

conf_matrix = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:")
print(conf_matrix)

class_report = classification_report(y_test, y_pred)
print("Classification Report:")
print(class_report)

y_prob = knn_classifier.predict_proba(X_test)[:, 1]

fpr, tpr, _ = roc_curve(y_test, y_prob)
roc_auc = auc(fpr, tpr)

plt.figure()
plt.plot(fpr, tpr, color='darkorange', lw=2, label='ROC curve (area = %0.2f)' % roc_auc)
plt.plot([0, 1], [0, 1], color='navy', lw=2, linestyle='--')
plt.xlim([0.0, 1.0])
plt.ylim([0.0, 1.05])
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('Receiver Operating Characteristic (ROC)')
plt.legend(loc='lower right')
plt.show()

roc_auc_score = roc_auc_score(y_test, y_prob)
print("ROC AUC Score:", roc_auc_score)

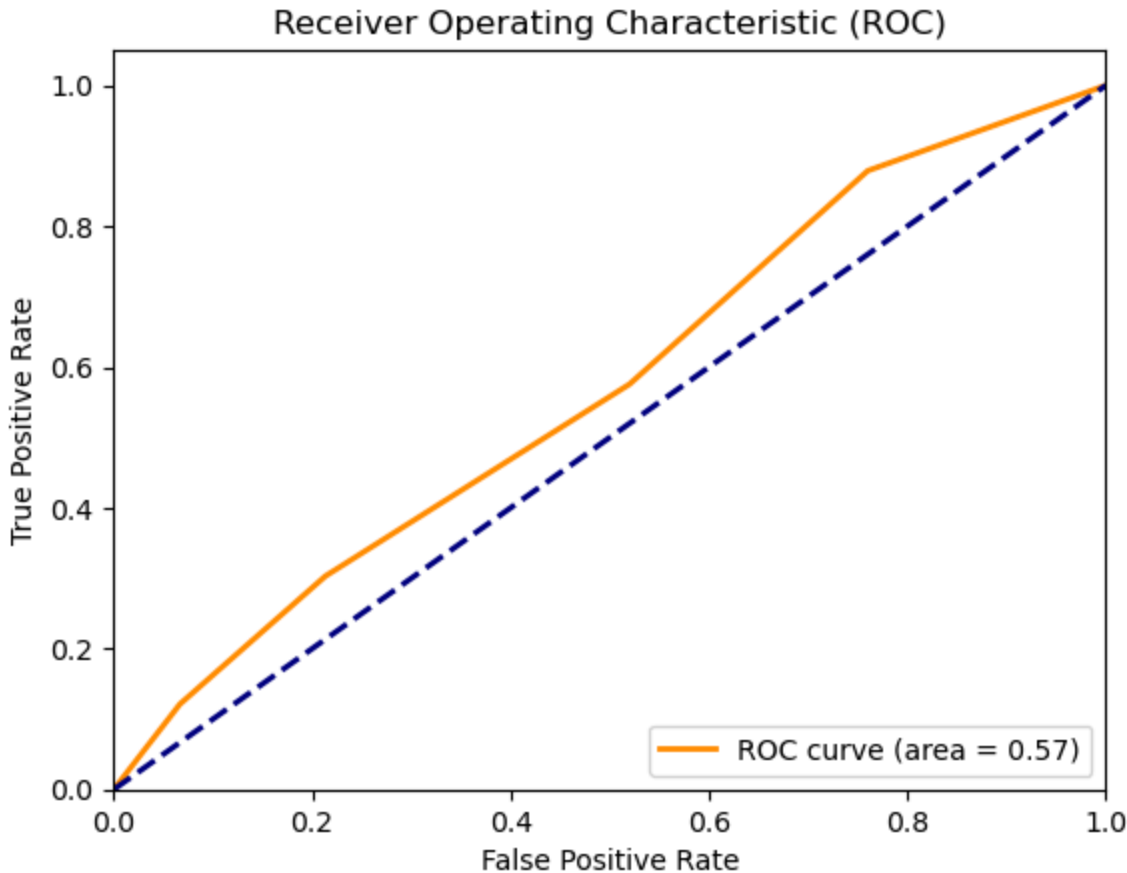
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Confusion Matrix:

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[[59 16]
 [23 10]]
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Classification Report:

|              | precision | recall | f1-score | support |
|--------------|-----------|--------|----------|---------|
| 0            | 0.72      | 0.79   | 0.75     | 75      |
| 1            | 0.38      | 0.30   | 0.34     | 33      |
| accuracy     |           |        | 0.64     | 108     |
| macro avg    | 0.55      | 0.54   | 0.55     | 108     |
| weighted avg | 0.62      | 0.64   | 0.63     | 108     |



ROC AUC Score: 0.5698989898989899

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