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import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, confusion_matrix,
classification_report
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset
data = pd.read_csv('heart_failure_dataset.csv')

# Split the dataset into features and target variable
X = data.drop(columns=['DEATH_EVENT'])
y = data['DEATH_EVENT']

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.2, random_state=42)

# Initialize the Random Forest classifier
rf_classifier = RandomForestClassifier(n_estimators=100,
random_state=42)

# Train the classifier
rf_classifier.fit(X_train, y_train)

# Make predictions on the testing set
y_pred = rf_classifier.predict(X_test)

# Evaluate the classifier
accuracy = accuracy_score(y_test, y_pred)
conf_matrix = confusion_matrix(y_test, y_pred)
class_report = classification_report(y_test, y_pred)

# Print the evaluation metrics
print(f'Accuracy: {accuracy}')
print('Confusion Matrix:')
print(conf_matrix)
print('Classification Report:')
print(class_report)

plt.figure(figsize=(4, 4))
sns.heatmap(conf_matrix, annot=True, fmt='d', cmap='Blues',
xticklabels=['Survived', 'Died'], yticklabels=['Survived', 'Died'])
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.title('Confusion Matrix')
plt.show()

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Accuracy: 0.992

Confusion Matrix:

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[[694  4]
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[  4 298]]
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Classification Report:

	precision	recall	f1-score	support
0	0.99	0.99	0.99	698
1	0.99	0.99	0.99	302
accuracy			0.99	1000
macro avg	0.99	0.99	0.99	1000
weighted avg	0.99	0.99	0.99	1000

