In [1]:

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

In [3]:

```
data = pd.read_csv('bank.csv')
data
```

Out[3]:

	age	job	marital	education	default	balance	housing	loan	contact	day	month	duration	campaign	pdays	previous	poutcome	deposit
0	59	admin.	married	secondary	no	2343	yes	no	unknown	5	may	1042	1	-1	0	unknown	yes
1	56	admin.	married	secondary	no	45	no	no	unknown	5	may	1467	1	-1	0	unknown	yes
2	41	technician	married	secondary	no	1270	yes	no	unknown	5	may	1389	1	-1	0	unknown	yes
3	55	services	married	secondary	no	2476	yes	no	unknown	5	may	579	1	-1	0	unknown	yes
4	54	admin.	married	tertiary	no	184	no	no	unknown	5	may	673	2	-1	0	unknown	yes
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11157	33	blue-collar	single	primary	no	1	yes	no	cellular	20	apr	257	1	-1	0	unknown	no
11158	39	services	married	secondary	no	733	no	no	unknown	16	jun	83	4	-1	0	unknown	no
11159	32	technician	single	secondary	no	29	no	no	cellular	19	aug	156	2	-1	0	unknown	no
11160	43	technician	married	secondary	no	0	no	yes	cellular	8	may	9	2	172	5	failure	no
11161	34	technician	married	secondary	no	0	no	no	cellular	9	jul	628	1	-1	0	unknown	no

11162 rows × 17 columns

In [4]:

```
data.head()
```

Out[4]:

	age	job	marital	education	default	balance	housing	loan	contact	day	month	duration	campaign	pdays	previous	poutcome	deposit
0	59	admin.	married	secondary	no	2343	yes	no	unknown	5	may	1042	1	-1	0	unknown	yes
1	56	admin.	married	secondary	no	45	no	no	unknown	5	may	1467	1	-1	0	unknown	yes
2	41	technician	married	secondary	no	1270	yes	no	unknown	5	may	1389	1	-1	0	unknown	yes
3	55	services	married	secondary	no	2476	yes	no	unknown	5	may	579	1	-1	0	unknown	yes
4	54	admin.	married	tertiary	no	184	no	no	unknown	5	may	673	2	-1	0	unknown	yes

In [5]:

```
label_encoders = {}
for column in data.select_dtypes(include=['object']).columns:
    le = LabelEncoder()
    data[column] = le.fit_transform(data[column])
    label_encoders[column] = le
```

In [6]:

```
X = data.drop('deposit', axis=1)
y = data['deposit']
```

In [7]:

```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
```

In [8]:

```
rf = RandomForestClassifier(n_estimators=100, random_state=42)
rf.fit(X_train, y_train)
```

Out[8]:

```
▾ RandomForestClassifier
RandomForestClassifier(random_state=42)
```

In [9]:

```
y_pred = rf.predict(X_test)
```

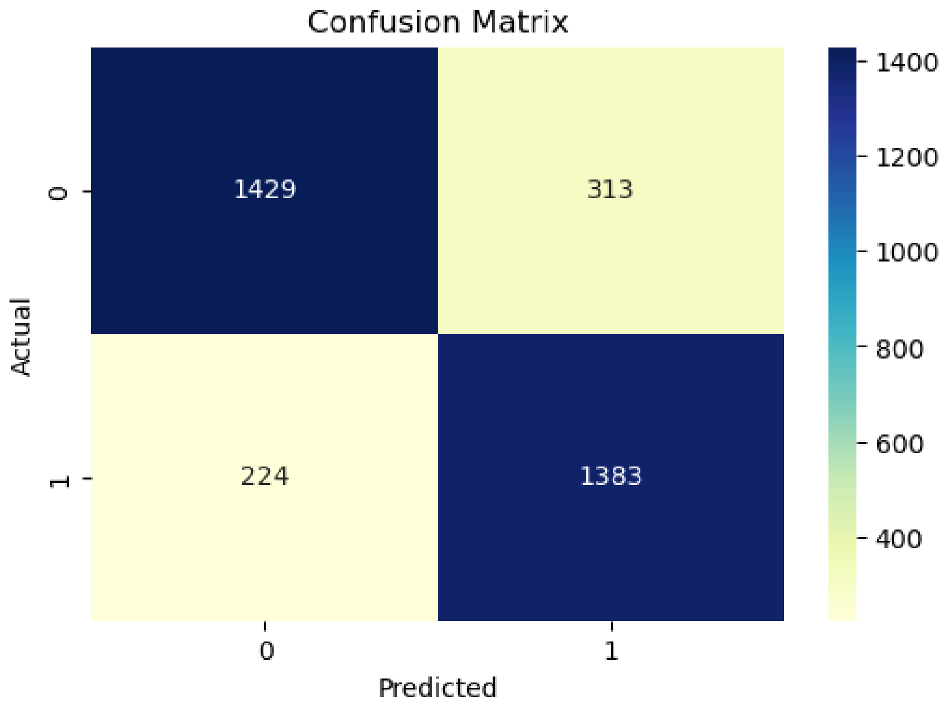
In [10]:

```
print("\nAccuracy Score:", accuracy_score(y_test, y_pred))
print("\nClassification Report:\n", classification_report(y_test, y_pred))
```

```
Accuracy Score: 0.8396536279486414

Classification Report:
               precision    recall  f1-score   support

           0       0.86      0.82      0.84      1742
           1       0.82      0.86      0.84      1607

    accuracy                           0.84      3349
   macro avg       0.84      0.84      0.84      3349
weighted avg       0.84      0.84      0.84      3349
```

In [11]:

```python
plt.figure(figsize=(6, 4))
sns.heatmap(confusion_matrix(y_test, y_pred), annot=True, fmt='d', cmap='YlGnBu')
plt.title("Confusion Matrix")
plt.xlabel("Predicted")
plt.ylabel("Actual")
plt.show()
```



In [ ]: