

COMPARISON OF
12 MACHINE LEARNING MODEL
FOR

SENTIMENT ANALYSIS TWITTER PROFILE

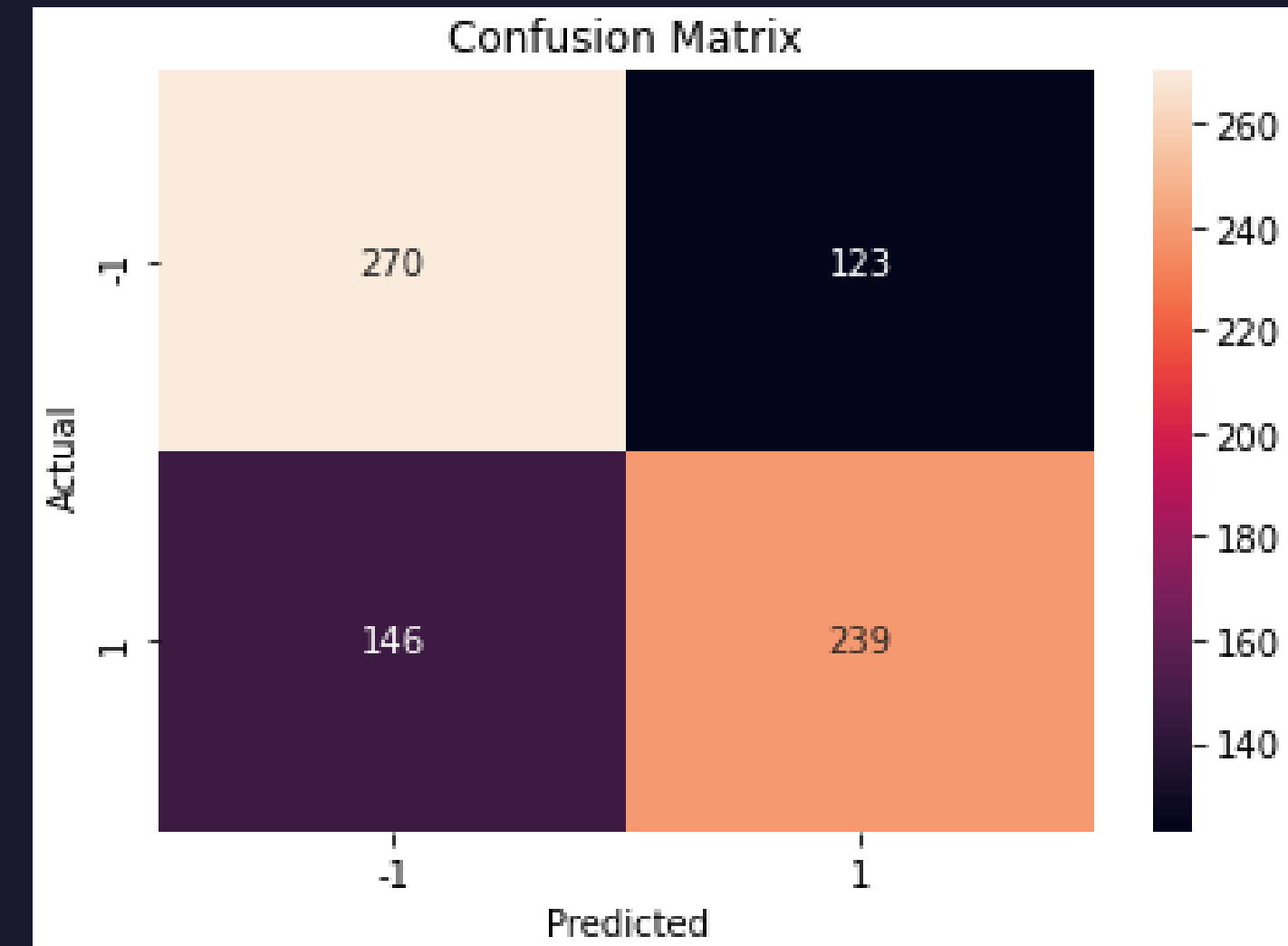
—● Trianto Haryo Nugroho ●—

1 - Random Forest Classifier

20.9 s

```
Test Accuracy Score: 0.6542416452442159
Test Precision: 0.6207792207792208
Test Recall: 0.6602209944751382
Test ROC AUC Score: 0.6546297280067999
```

	precision	recall	f1-score	support
-1	0.65	0.69	0.67	393
1	0.66	0.62	0.64	385
accuracy			0.65	778
macro avg	0.65	0.65	0.65	778
weighted avg	0.65	0.65	0.65	778



```
{'classifier': RandomForestClassifier(max_depth=20, n_estimators=250, random_state=42),
 'classifier__class_weight': None,
 'classifier__max_depth': 20,
 'classifier__n_estimators': 250}
```

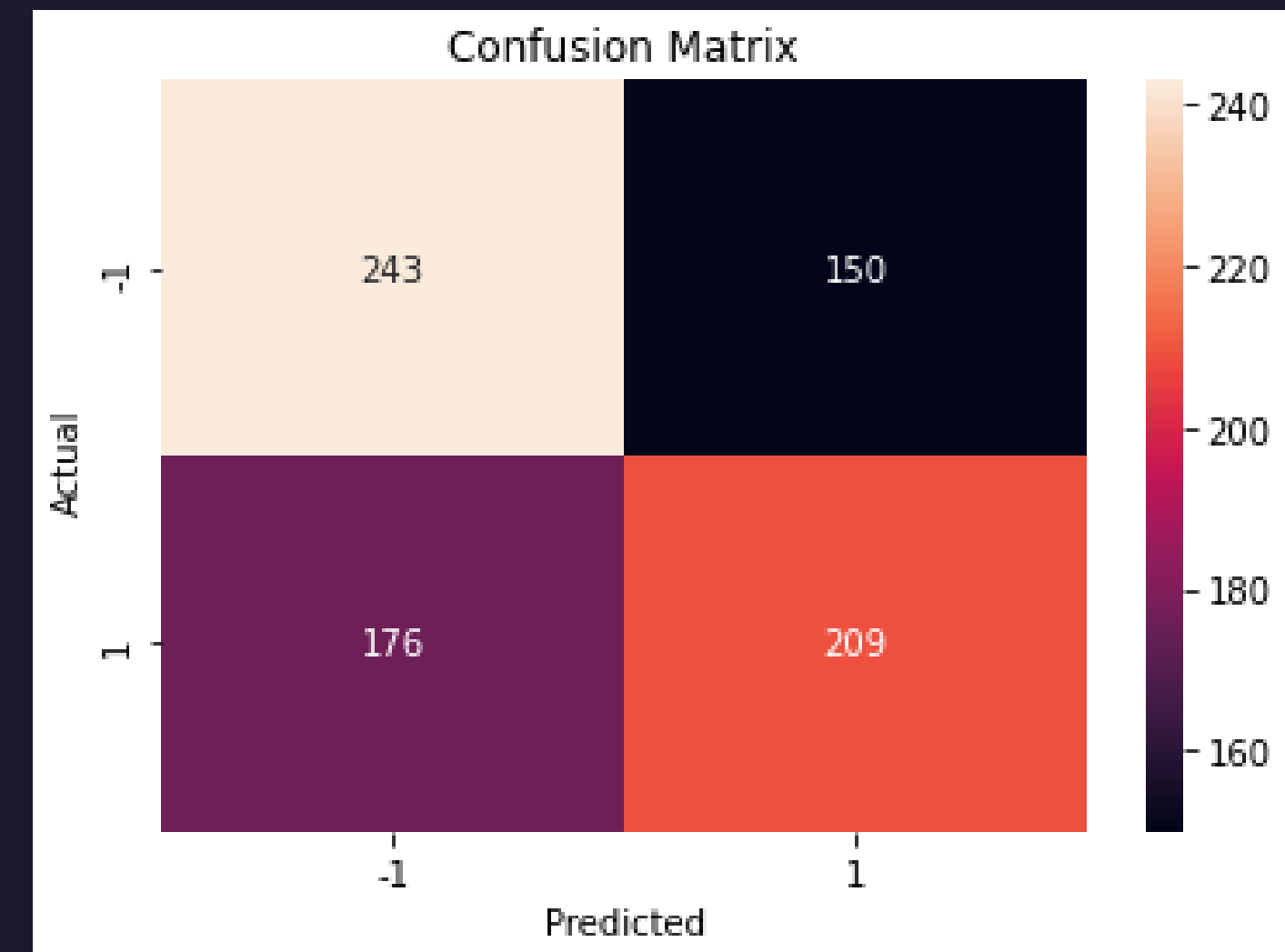
2 - Support Vector Classifier

1 m 16.3 s

```
Test Accuracy Score: 0.5809768637532133
Test Precision: 0.5428571428571428
Test Recall: 0.5821727019498607
Test ROC AUC Score: 0.5810624846264817
```

	precision	recall	f1-score	support
-1	0.58	0.62	0.60	393
1	0.58	0.54	0.56	385
accuracy			0.58	778
macro avg	0.58	0.58	0.58	778
weighted avg	0.58	0.58	0.58	778

```
{'classifier': SVC(C=1, probability=True, random_state=42),
 'classifier__C': 1,
 'classifier__class_weight': None}
```



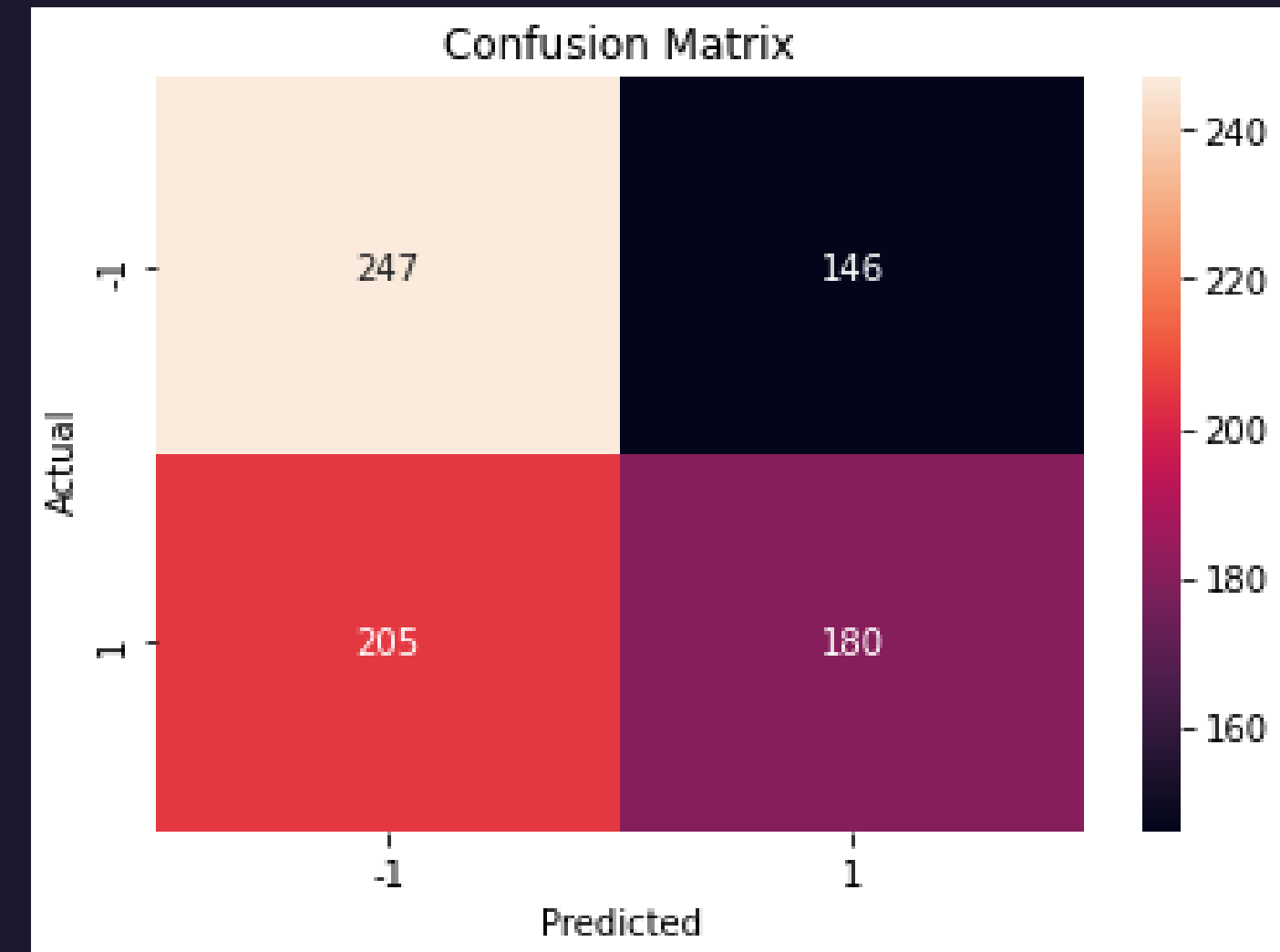
3 - Logistic Regression

12.4 s

```
Test Accuracy Score: 0.5488431876606684
Test Precision: 0.4675324675324675
Test Recall: 0.5521472392638037
Test ROC AUC Score: 0.5493037081274771
```

	precision	recall	f1-score	support
-1	0.55	0.63	0.58	393
1	0.55	0.47	0.51	385
accuracy			0.55	778
macro avg	0.55	0.55	0.55	778
weighted avg	0.55	0.55	0.55	778

```
{'classifier': LogisticRegression(C=1, random_state=42),
 'classifier__C': 1,
 'classifier__class_weight': None,
 'classifier__penalty': 'l2'}
```

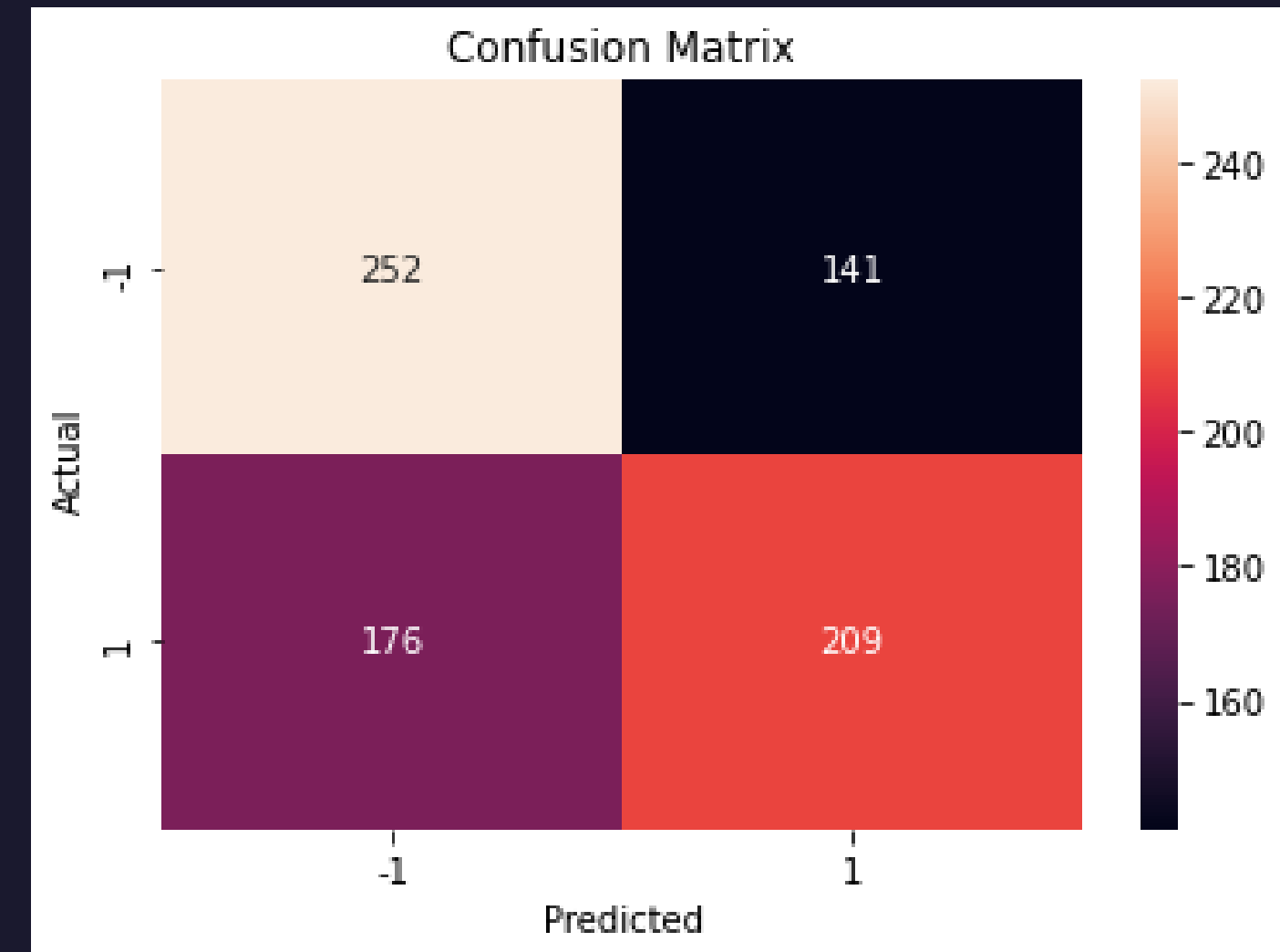


4 - Decision Tree Classifier

13.1 s

```
Test Accuracy Score: 0.5925449871465296
Test Precision: 0.5428571428571428
Test Recall: 0.5971428571428572
Test ROC AUC Score: 0.5929639519359146
```

	precision	recall	f1-score	support
-1	0.59	0.64	0.61	393
1	0.60	0.54	0.57	385
accuracy			0.59	778
macro avg	0.59	0.59	0.59	778
weighted avg	0.59	0.59	0.59	778



```
{'classifier': DecisionTreeClassifier(max_depth=5, random_state=42),
 'classifier__class_weight': None,
 'classifier__max_depth': 5,
 'classifier__min_samples_split': 2}
```

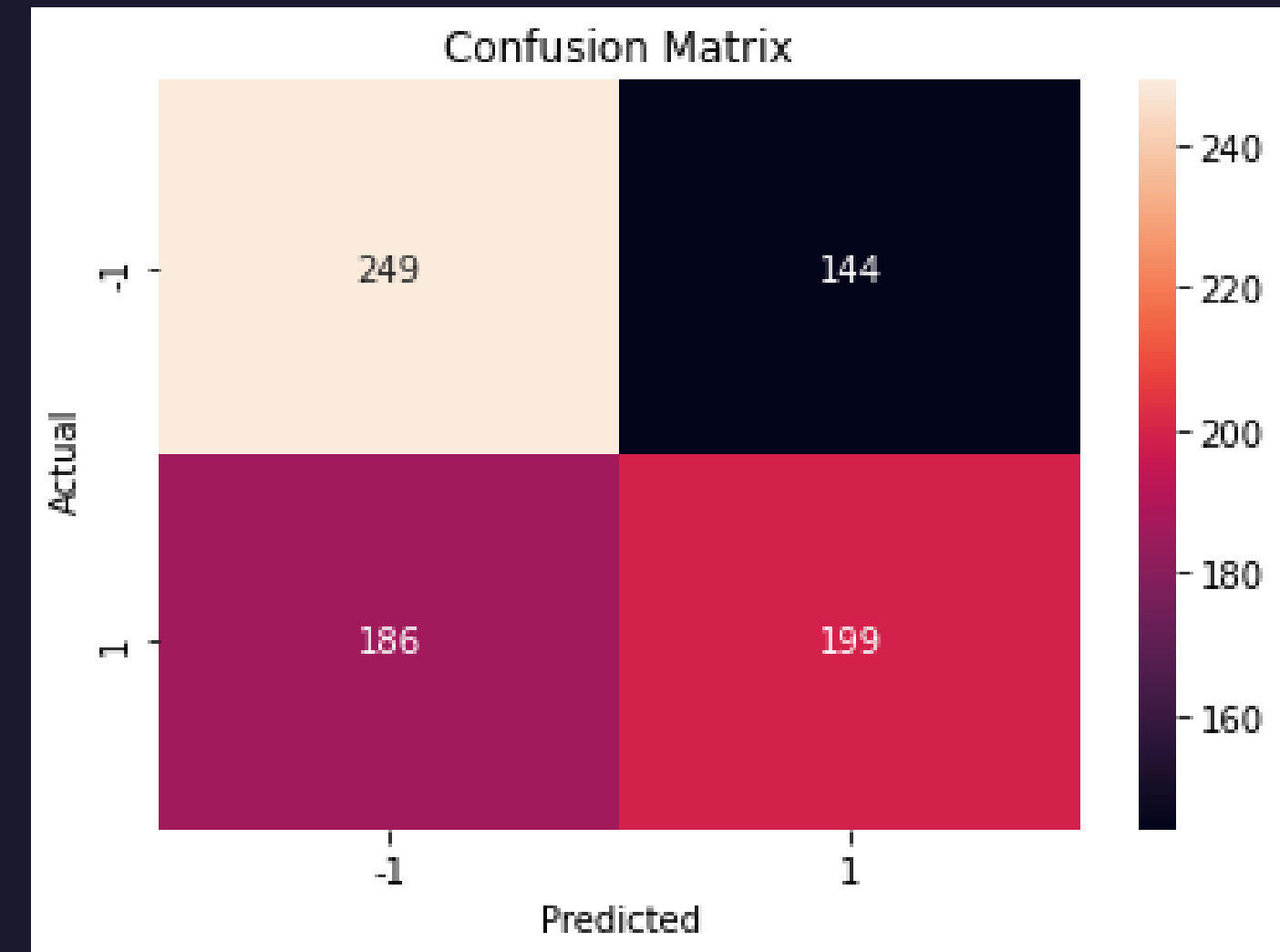
5 - KNeighbors Classifier

12.1 s

```
Test Accuracy Score: 0.5758354755784062
Test Precision: 0.5168831168831168
Test Recall: 0.5801749271137027
Test ROC AUC Score: 0.5762943601085755
```

	precision	recall	f1-score	support
-1	0.57	0.63	0.60	393
1	0.58	0.52	0.55	385
accuracy			0.58	778
macro avg	0.58	0.58	0.57	778
weighted avg	0.58	0.58	0.57	778

```
{'classifier': KNeighborsClassifier(n_neighbors=50),
 'classifier__n_neighbors': 50}
```



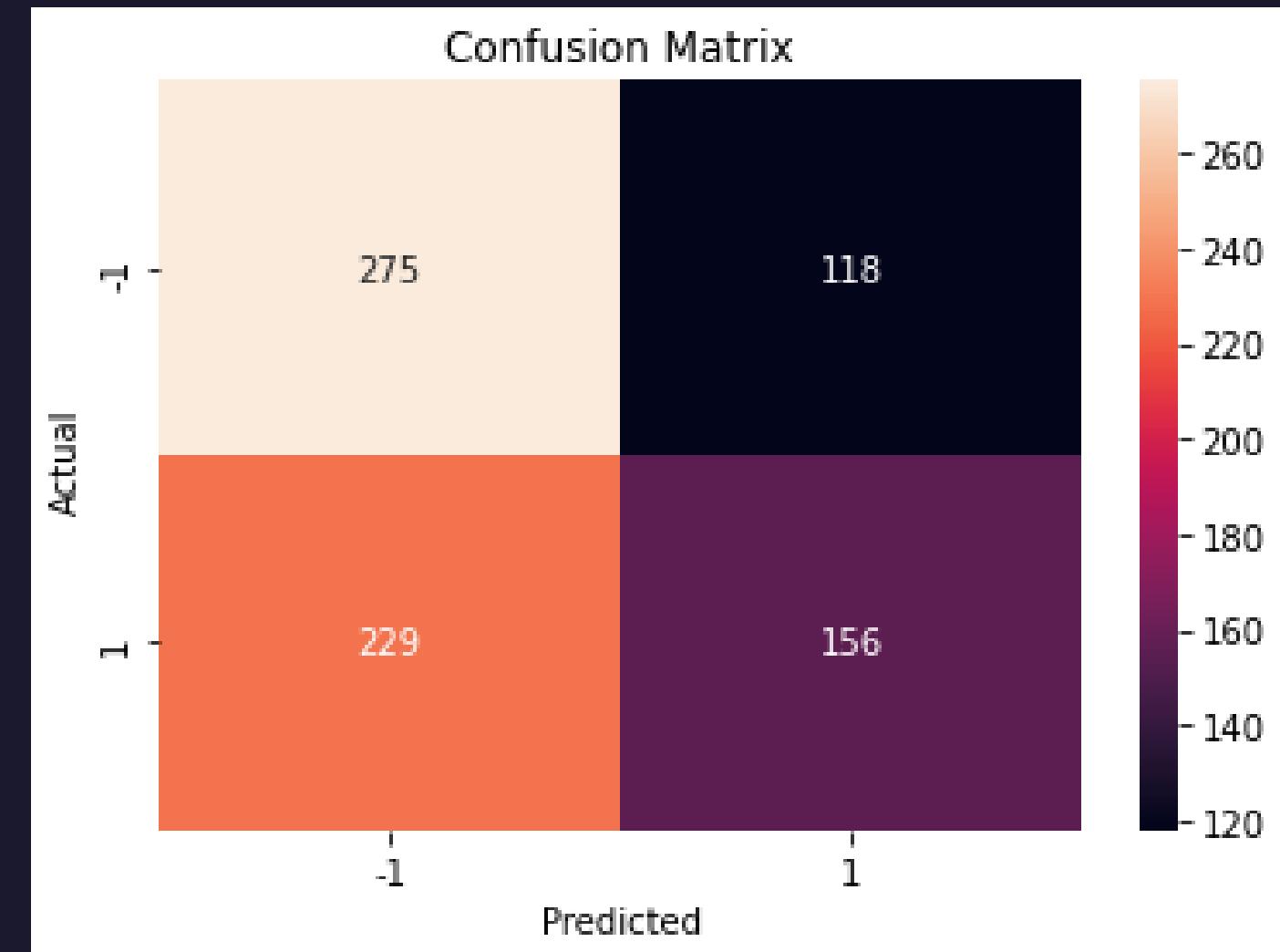
6 - Multinomial NB

11.3 s

```
Test Accuracy Score: 0.5539845758354756
Test Precision: 0.4051948051948052
Test Recall: 0.5693430656934306
Test ROC AUC Score: 0.5574889931641757
```

	precision	recall	f1-score	support
-1	0.55	0.70	0.61	393
1	0.57	0.41	0.47	385
accuracy			0.55	778
macro avg	0.56	0.55	0.54	778
weighted avg	0.56	0.55	0.54	778

```
{'classifier': MultinomialNB(alpha=10), 'classifier__alpha': 10}
```

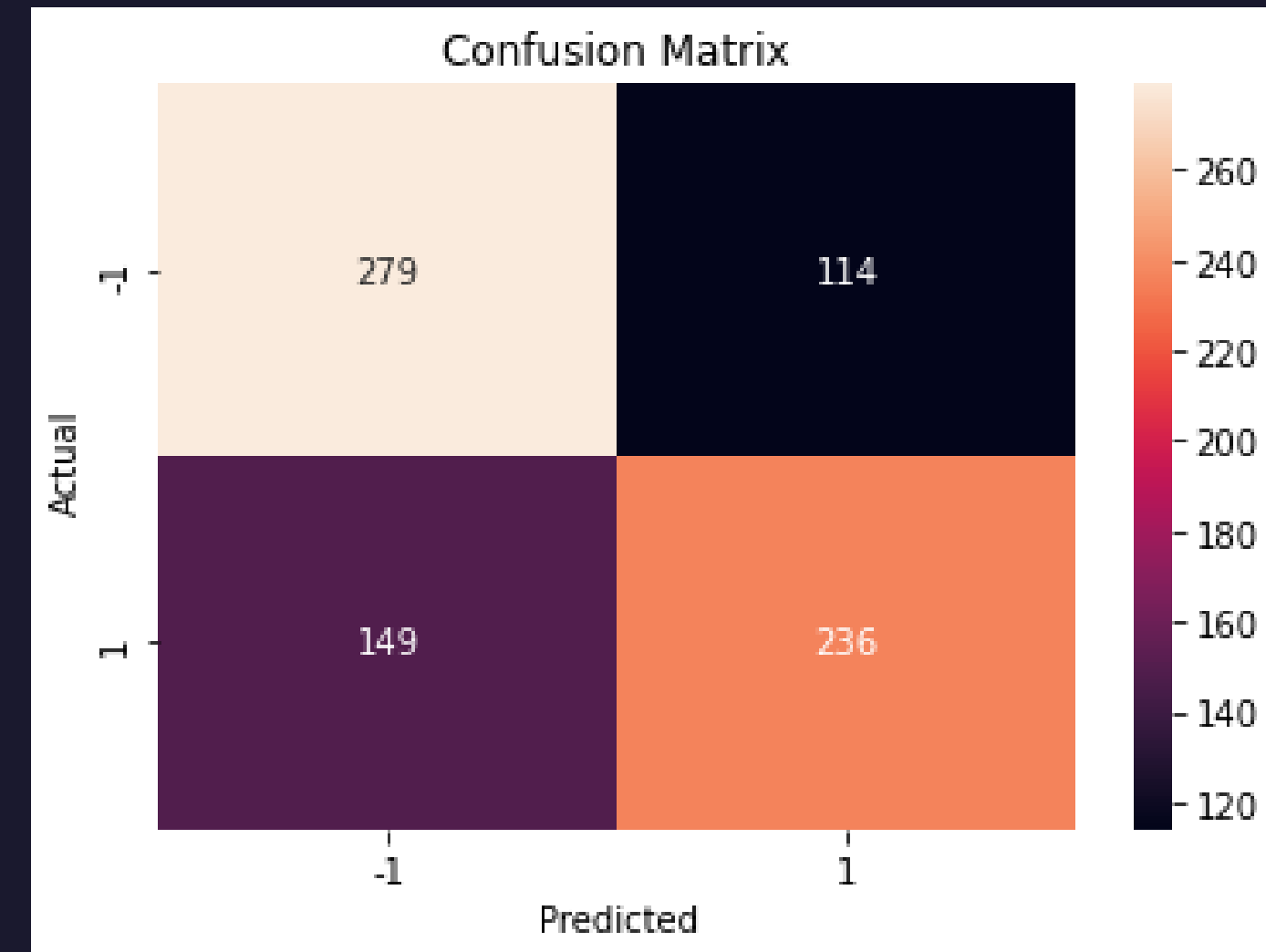


7 - Gradient Boosting Classifier

2 m 47.7 s

```
Test Accuracy Score: 0.6619537275064268
Test Precision: 0.612987012987013
Test Recall: 0.6742857142857143
Test ROC AUC Score: 0.6630774365821094
```

	precision	recall	f1-score	support
-1	0.65	0.71	0.68	393
1	0.67	0.61	0.64	385
accuracy			0.66	778
macro avg	0.66	0.66	0.66	778
weighted avg	0.66	0.66	0.66	778



```
{'classifier': GradientBoostingClassifier(max_depth=10, n_estimators=250, random_state=42),
 'classifier__max_depth': 10,
 'classifier__n_estimators': 250}
```

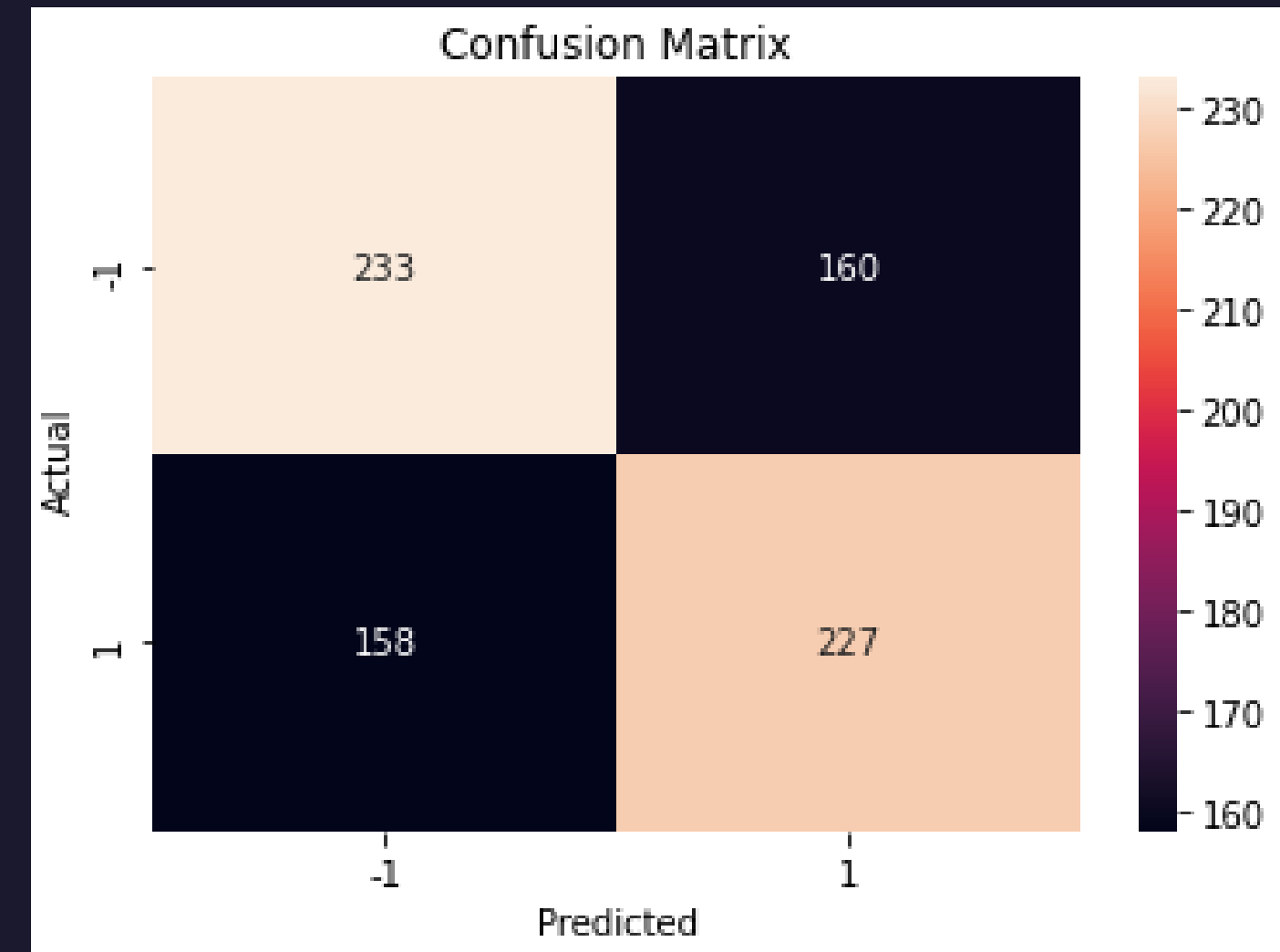

8 - AdaBoost Classifier

11 m 27.6 s

```
Test Accuracy Score: 0.5912596401028277
Test Precision: 0.5896103896103896
Test Recall: 0.58656330749354
Test ROC AUC Score: 0.5912356179411433
```

	precision	recall	f1-score	support
-1	0.60	0.59	0.59	393
1	0.59	0.59	0.59	385
accuracy			0.59	778
macro avg	0.59	0.59	0.59	778
weighted avg	0.59	0.59	0.59	778

```
{'algorithm': 'SAMME.R', 'learning_rate': 1.0, 'n_estimators': 500}
```



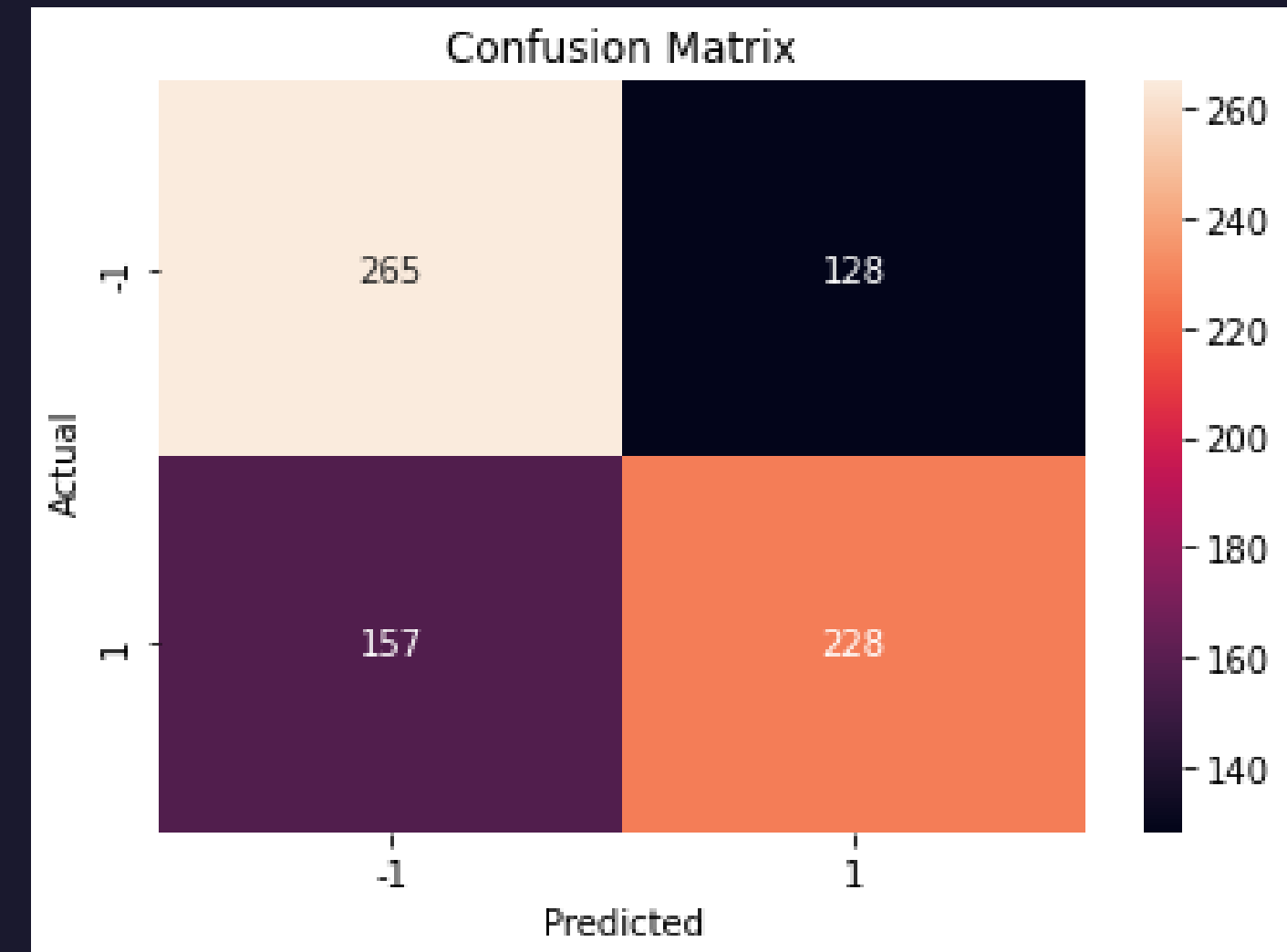
9 - XGBoost Classifier

2 m 5.8 s

```
Test Accuracy Score: 0.6336760925449871
Test Precision: 0.5922077922077922
Test Recall: 0.6404494382022472
Test ROC AUC Score: 0.634205761755152
```

	precision	recall	f1-score	support
0	0.63	0.67	0.65	393
1	0.64	0.59	0.62	385
accuracy			0.63	778
macro avg	0.63	0.63	0.63	778
weighted avg	0.63	0.63	0.63	778

```
{'criterion': 'gini', 'max_depth': 8, 'n_estimators': 130}
```



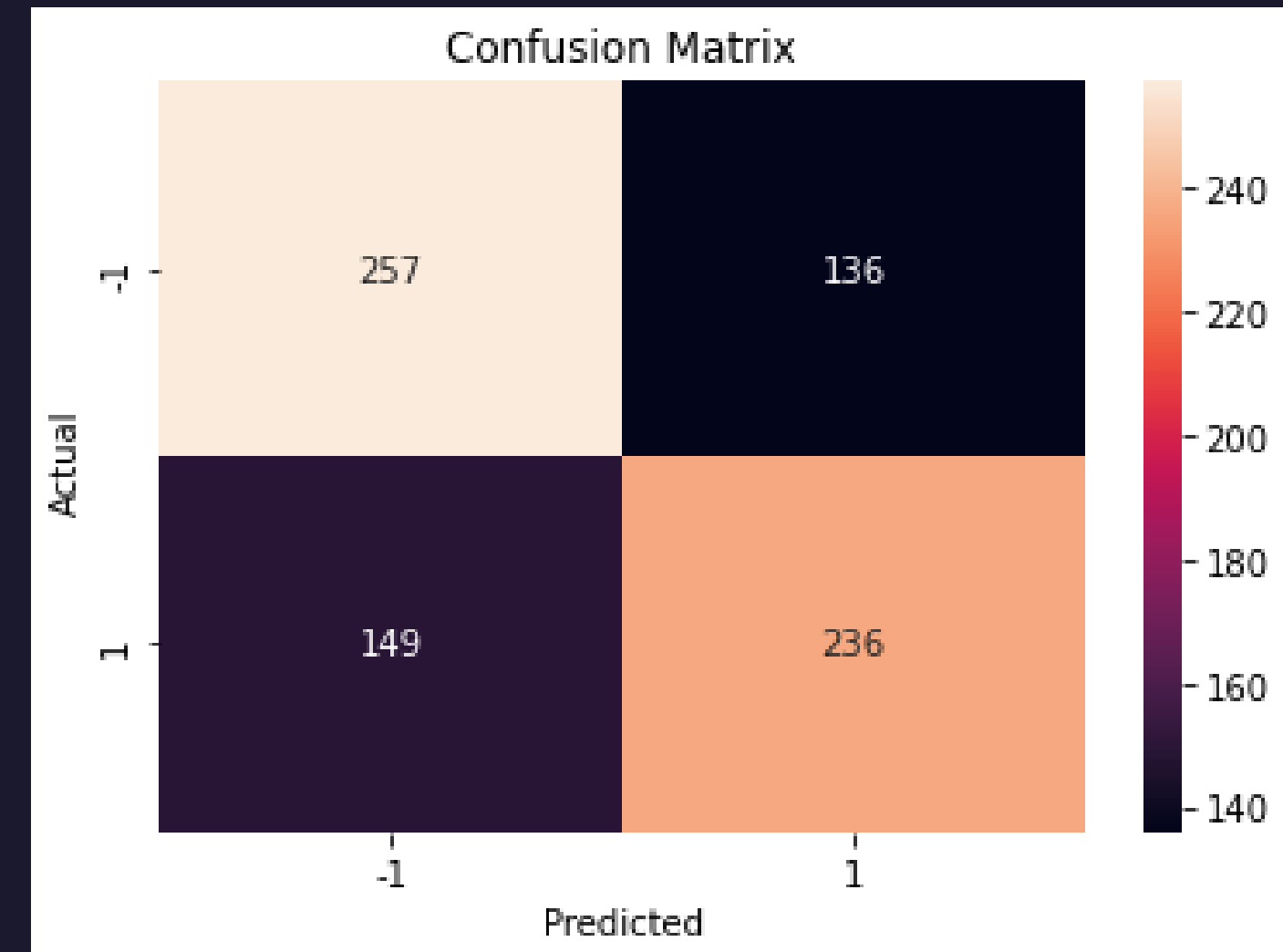
10 - CatBoost Classifier

18 m 7.7 s

```
Test Accuracy Score: 0.6336760925449871
Test Precision: 0.612987012987013
Test Recall: 0.6344086021505376
Test ROC AUC Score: 0.6337067641294559
```

	precision	recall	f1-score	support
-1	0.63	0.65	0.64	393
1	0.63	0.61	0.62	385
accuracy			0.63	778
macro avg	0.63	0.63	0.63	778
weighted avg	0.63	0.63	0.63	778

```
{'depth': 10, 'iterations': 20, 'learning_rate': 0.02}
```



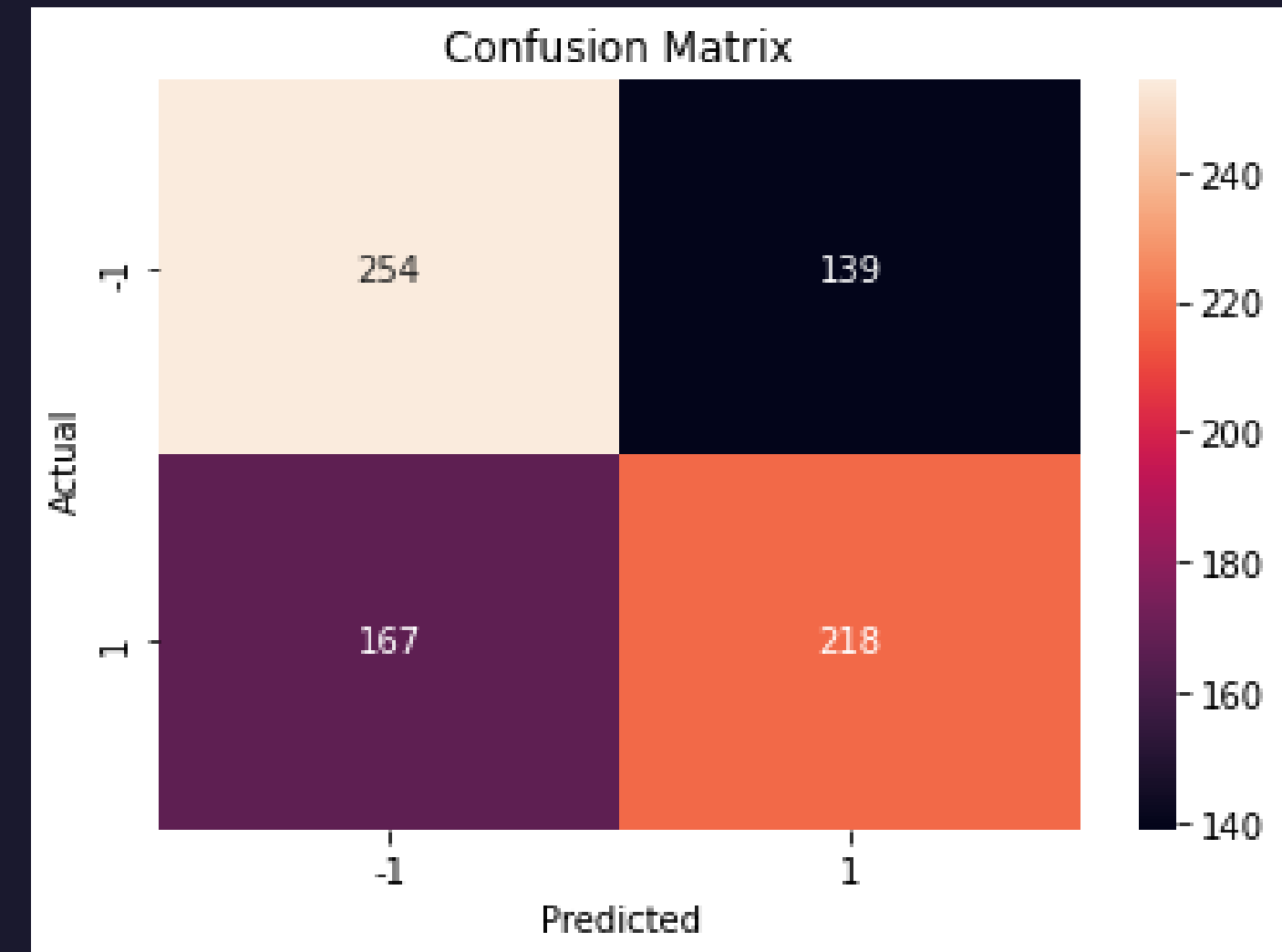
11 - ExtraTrees Classifier

7 m 23.7 s

```
Test Accuracy Score: 0.6066838046272494
Test Precision: 0.5662337662337662
Test Recall: 0.6106442577030813
Test ROC AUC Score: 0.6069848366900205
```

	precision	recall	f1-score	support
-1	0.60	0.65	0.62	393
1	0.61	0.57	0.59	385
accuracy			0.61	778
macro avg	0.61	0.61	0.61	778
weighted avg	0.61	0.61	0.61	778

```
{'max_depth': 25, 'n_estimators': 300, 'random_state': 0}
```

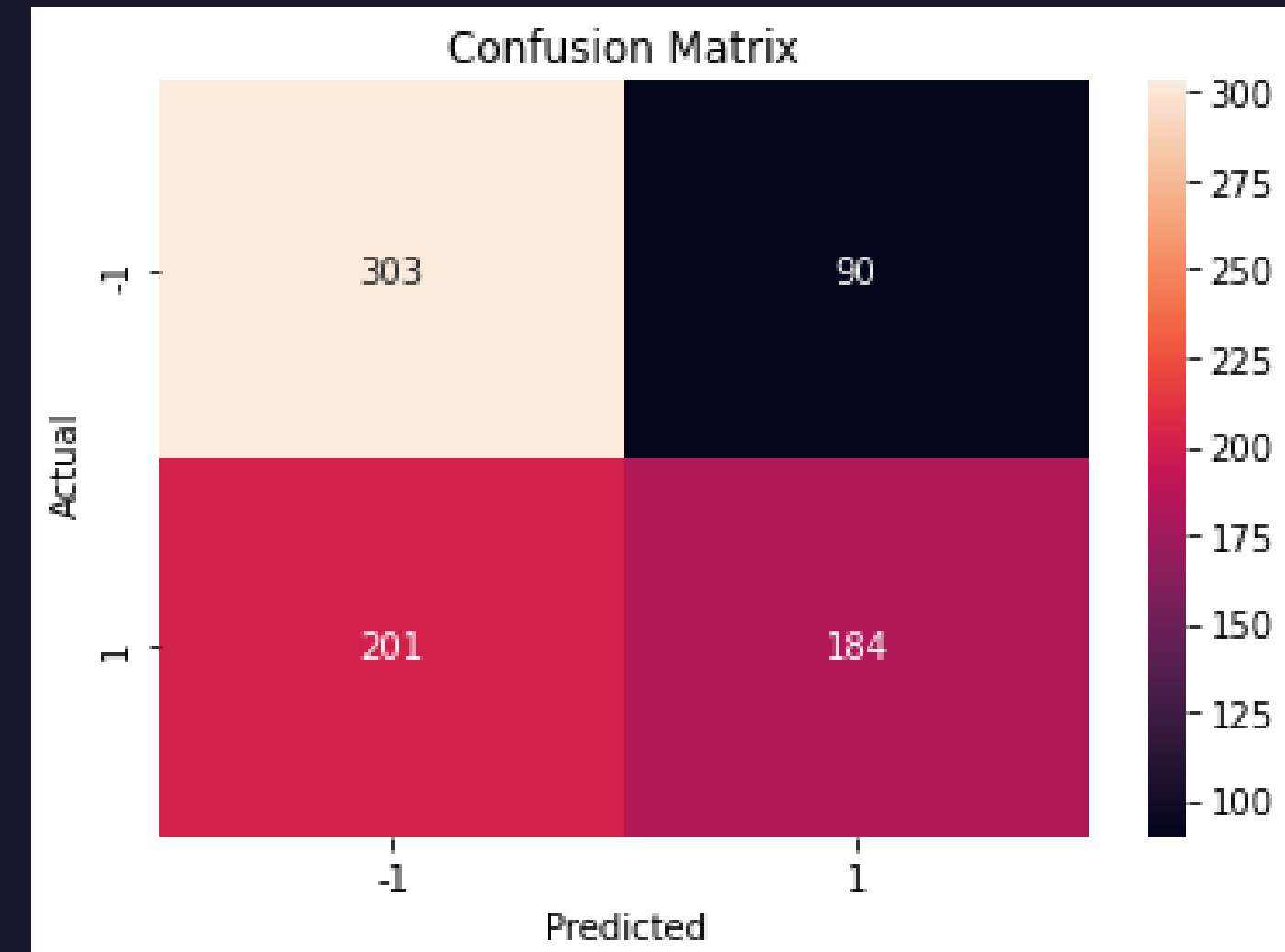


12 - LGBM Classifier

4 m 58.6 s

```
Test Accuracy Score: 0.6259640102827764
Test Precision: 0.4779220779220779
Test Recall: 0.6715328467153284
Test ROC AUC Score: 0.6363616614529024
```

	precision	recall	f1-score	support
-1	0.60	0.77	0.68	393
1	0.67	0.48	0.56	385
accuracy			0.63	778
macro avg	0.64	0.62	0.62	778
weighted avg	0.64	0.63	0.62	778



```
{'boosting_type': 'gbdt', 'colsample_bytree': 0.66, 'learning_rate': 0.01,
 'max_bin': 255, 'n_estimators': 24, 'num_leaves': 16, 'objective': 'binary',
 'random_state': 500, 'reg_alpha': 1, 'reg_lambda': 1.4, 'subsample': 0.7}
```

Model Comparison

01 Random Forest Classifier

20.9 s

	precision	recall	f1-score	support
-1	0.65	0.69	0.67	393
1	0.66	0.62	0.64	385
accuracy			0.65	778
macro avg	0.65	0.65	0.65	778
weighted avg	0.65	0.65	0.65	778

03 Logistic Regression

12.4 s

	precision	recall	f1-score	support
-1	0.55	0.63	0.58	393
1	0.55	0.47	0.51	385
accuracy			0.55	778
macro avg	0.55	0.55	0.55	778
weighted avg	0.55	0.55	0.55	778

02 Support Vector Classifier

1 m 16.3 s

	precision	recall	f1-score	support
-1	0.58	0.62	0.60	393
1	0.58	0.54	0.56	385
accuracy			0.58	778
macro avg	0.58	0.58	0.58	778
weighted avg	0.58	0.58	0.58	778

04 Decision Tree Classifier

13.1 s

	precision	recall	f1-score	support
-1	0.59	0.64	0.61	393
1	0.60	0.54	0.57	385
accuracy			0.59	778
macro avg	0.59	0.59	0.59	778
weighted avg	0.59	0.59	0.59	778

Model Comparison

05 KNeighbors Classifier

12.1 s

	precision	recall	f1-score	support
-1	0.57	0.63	0.60	393
1	0.58	0.52	0.55	385
accuracy			0.58	778
macro avg	0.58	0.58	0.57	778
weighted avg	0.58	0.58	0.57	778

06 Multinomial NB

11.3 s

	precision	recall	f1-score	support
-1	0.55	0.70	0.61	393
1	0.57	0.41	0.47	385
accuracy			0.55	778
macro avg	0.56	0.55	0.54	778
weighted avg	0.56	0.55	0.54	778

07 Gradient Boosting Classifier

2 m 47.7 s

	precision	recall	f1-score	support
-1	0.65	0.71	0.68	393
1	0.67	0.61	0.64	385
accuracy			0.66	778
macro avg	0.66	0.66	0.66	778
weighted avg	0.66	0.66	0.66	778

08 AdaBoost Classifier

11 m 27.6 s

	precision	recall	f1-score	support
-1	0.60	0.59	0.59	393
1	0.59	0.59	0.59	385
accuracy			0.59	778
macro avg	0.59	0.59	0.59	778
weighted avg	0.59	0.59	0.59	778

Model Comparison

09 XGBoost Classifier

2 m 5.8 s

	precision	recall	f1-score	support
0	0.63	0.67	0.65	393
1	0.64	0.59	0.62	385
accuracy			0.63	778
macro avg	0.63	0.63	0.63	778
weighted avg	0.63	0.63	0.63	778

11 ExtraTrees Classifier

7 m 23.7 s

	precision	recall	f1-score	support
-1	0.60	0.65	0.62	393
1	0.61	0.57	0.59	385
accuracy			0.61	778
macro avg	0.61	0.61	0.61	778
weighted avg	0.61	0.61	0.61	778

10 CatBoost Classifier

18 m 7.7 s

	precision	recall	f1-score	support
-1	0.63	0.65	0.64	393
1	0.63	0.61	0.62	385
accuracy			0.63	778
macro avg	0.63	0.63	0.63	778
weighted avg	0.63	0.63	0.63	778

12 LGBM Classifier

4 m 58.6 s

	precision	recall	f1-score	support
-1	0.60	0.77	0.68	393
1	0.67	0.48	0.56	385
accuracy			0.63	778
macro avg	0.64	0.62	0.62	778
weighted avg	0.64	0.63	0.62	778

Best MODEL

Melalui pertimbangan dari
accuracy, precision, recall,
roc-auc dan runtime

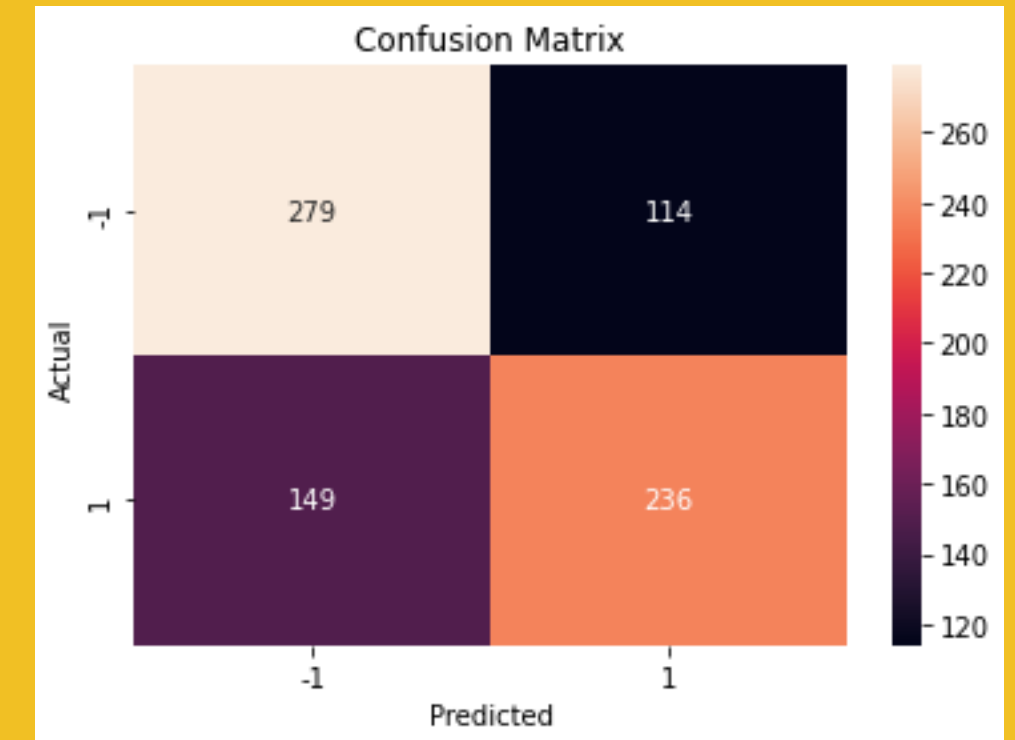
7

Gradient Boosting Classifier

2 m 47.7 s

```
Test Accuracy Score: 0.6619537275064268
Test Precision: 0.612987012987013
Test Recall: 0.6742857142857143
Test ROC AUC Score: 0.6630774365821094
```

	precision	recall	f1-score	support
-1	0.65	0.71	0.68	393
1	0.67	0.61	0.64	385
accuracy			0.66	778
macro avg	0.66	0.66	0.66	778
weighted avg	0.66	0.66	0.66	778



```
{'classifier': GradientBoostingClassifier(max_depth=10, n_estimators=250, random_state=42),
 'classifier__max_depth': 10,
 'classifier__n_estimators': 250}
```



THANK YOU



Trianto Haryo Nugroho