one-graph

May 14, 2024

[1]:
```
import numpy as np
import pandas as pd
import re
```

[2]:
```
#pip install -U scikit-learn
```

[3]:
```
data=pd.read_csv('chatgpt_paraphrases.csv')
data.head()
```

[3]:

	text	paraphrases	category	source
0	What is the step by step guide to invest in sh…	['Can you provide a detailed procedure for inv…	question	quora
1	What is the story of Kohinoor (Koh-i-Noor) Dia…	['Can you tell me about the history of the Koh…	question	quora
2	How can I increase the speed of my internet co…	['What are some ways to enhance my internet sp…	question	quora
3	Why am I mentally very lonely? How can I solve…	['What is causing my mental loneliness and how…	question	quora
4	Which one dissolve in water quikly sugar, salt…	['Among sugar, salt, methane, and carbon dioxi…	question	quora

[5]:
```
category={}
for i in range(len(data)):
    ai=data.iloc[i]["paraphrases"][1:-1].split(', ')
    for j in ai[:1]:
        category[j[1:-1]]='ai'
    category[data.iloc[i]['text']]="human"
```

[6]:
```
data=pd.DataFrame(category.items(),columns=["text","category"])
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 808028 entries, 0 to 808027
Data columns (total 2 columns):
 #   Column    Non-Null Count   Dtype
---  ------    --------------   -----
```

```
 0   text      808028 non-null  object
 1   category  808028 non-null  object
dtypes: object(2)
memory usage: 12.3+ MB
```

[7]:
```
data=data.sample(frac=1)
data=data[:20000]
data
```

[7]:

	text	category
453413	What is the reason for our eyes to blink?	ai
166798	Why do I always hurt people Anytime im around …	human
233365	What would happen if unblurred backups Google …	human
742262	Honour: Mr Crosby had originally been given a …	human
741357	Angelica Castill	ai
…	…	…
111637	How do I stop my Chihuahua from biting my shoes?	human
401154	Can you tell me the likelihood of surviving st…	ai
273865	When is the ideal time to visit Goa?	ai
716572	Krenski was seen overtaking cars at high spee	ai
411251	If you take a screenshot of an unopened snapch…	human

[20000 rows x 2 columns]

[8]:
```
data["category"].value_counts()
```

[8]:
```
category
human    10309
ai        9691
Name: count, dtype: int64
```

[9]:
```
from sklearn.model_selection import train_test_split
X=data['text']
y=data['category']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2)
```

[10]:
```
from sklearn.feature_extraction.text import TfidfVectorizer
vectorizer = TfidfVectorizer()
X_train_tfidf = vectorizer.fit_transform(X_train)
X_test_tfidf = vectorizer.transform(X_test)
```

[11]:
```
from sklearn.ensemble import VotingClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.naive_bayes import MultinomialNB
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
```

```
from sklearn.ensemble import␣
 ↪RandomForestClassifier,ExtraTreesClassifier,AdaBoostClassifier,BaggingClassifier,GradientBo
```

[12]:
```
lg = LogisticRegression(penalty='l1',solver='liblinear')
sv = SVC(kernel='sigmoid',gamma=1.0)
mnb = MultinomialNB()
dtc = DecisionTreeClassifier(max_depth=5)
knn = KNeighborsClassifier()
rfc = RandomForestClassifier(n_estimators=50,random_state=2)
etc = ExtraTreesClassifier(n_estimators=50,random_state=2)
abc = AdaBoostClassifier(n_estimators=50,random_state=2)
bg = BaggingClassifier(n_estimators=50,random_state=2)
gbc = GradientBoostingClassifier(n_estimators=50,random_state=2)
```

[13]:
```
from sklearn import metrics
```

[14]:
```
def score_prediction(model,X_train,X_test,y_train,y_test):
    model.fit(X_train,y_train)
    pr = model.predict(X_test)
    acc_score = metrics.accuracy_score(y_test,pr)
    pre_score = metrics.precision_score(y_test,pr,average="binary",␣
 ↪pos_label="ai")
    recall= metrics.recall_score(y_test,pr,average="binary", pos_label="ai")
    f1= metrics.f1_score(y_test,pr,average="binary", pos_label="ai")
    mcc= metrics.matthews_corrcoef(y_test,pr)
    return acc_score,pre_score,recall,f1,mcc
```

[15]:
```
acc_score = {}
pre_score = {}
recall_score={}
f1_score={}
mcc_score={}
clfs= {
    'LR':lg,
    'SVM':sv,
    'KNN':knn,
    'RFC':rfc,
    'ETC':etc,
    'ABC':abc,
    'BG':bg,
    'GBC':gbc,

}
```

[16]:
```
for name,clf in clfs.items():
```

```
  ␣
↪acc_score[name],pre_score[name],recall_score[name],f1_score[name],mcc_score[name]␣
↪= score_prediction(clf,X_train_tfidf,X_test_tfidf,y_train,y_test)
```

[17]:
```
acc_score
```

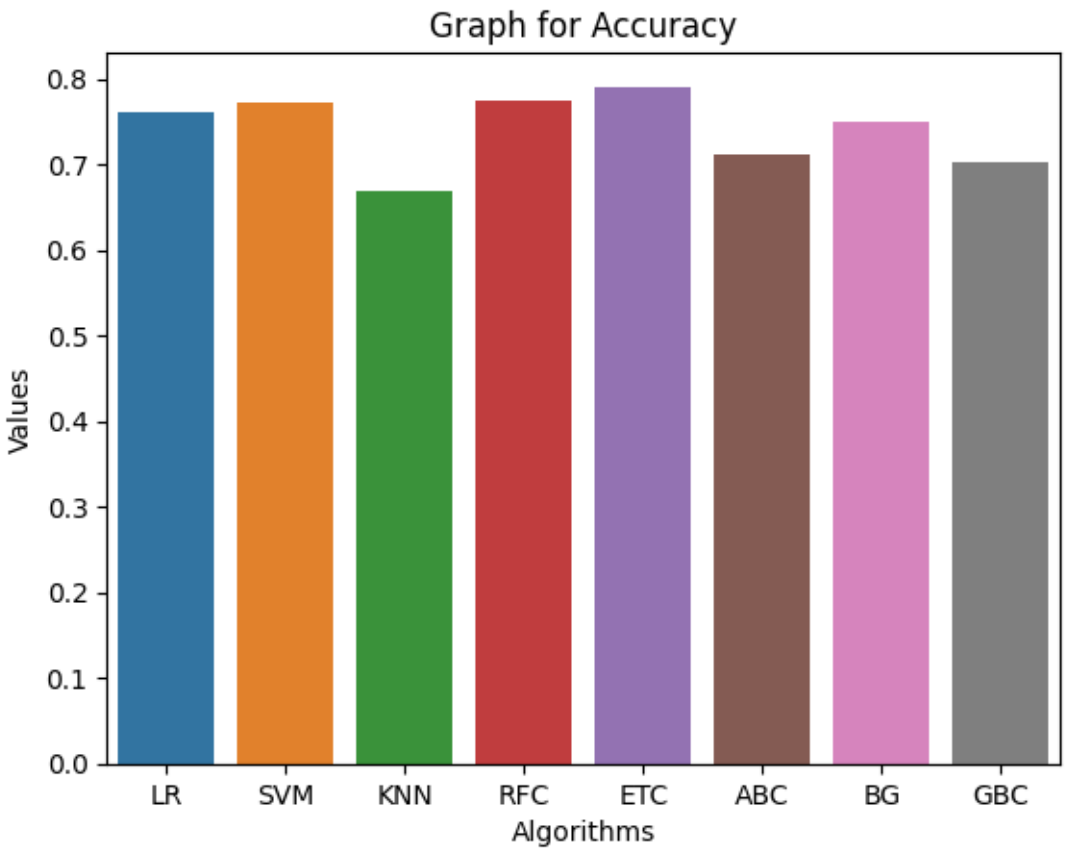
[17]:
```
{'LR': 0.7605,
 'SVM': 0.7725,
 'KNN': 0.668,
 'RFC': 0.77525,
 'ETC': 0.791,
 'ABC': 0.71175,
 'BG': 0.74975,
 'GBC': 0.703}
```

[18]:
```
import seaborn as sns
import matplotlib.pyplot as plt
```

[21]:
```
keys = list(acc_score.keys())
values = list(acc_score.values())

num_bars = len(keys)
# Create a bar plot using Seaborn with different colors for each bar
sns.barplot(x=keys, y=values,hue=keys,legend=False)
plt.xlabel('Algorithms')
plt.ylabel('Values')
plt.title('Graph for Accuracy')

# Show the plot
plt.show()
```



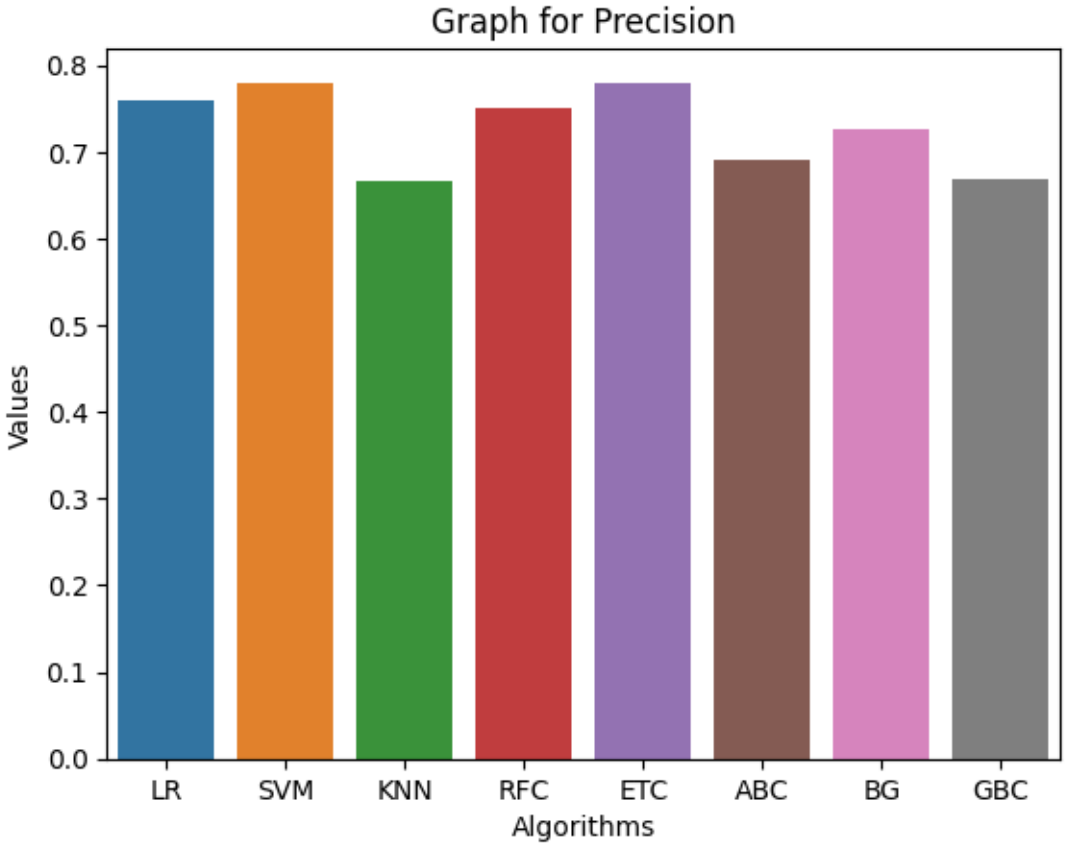
[22]:
```
pre_score
```

[22]:
```
{'LR': 0.76,
 'SVM': 0.7800320341697811,
 'KNN': 0.666490765171504,
 'RFC': 0.75,
 'ETC': 0.7800498753117207,
 'ABC': 0.6906338694418165,
 'BG': 0.7257304429783223,
 'GBC': 0.6690048224462954}
```

[23]:
```
keys = list(pre_score.keys())
values = list(pre_score.values())

num_bars = len(keys)
# Create a bar plot using Seaborn with different colors for each bar
sns.barplot(x=keys, y=values,hue=keys,legend=False)
plt.xlabel('Algorithms')
plt.ylabel('Values')
plt.title('Graph for Precision')
```

```
# Show the plot
plt.show()
```



[24]:
```
recall_score
```

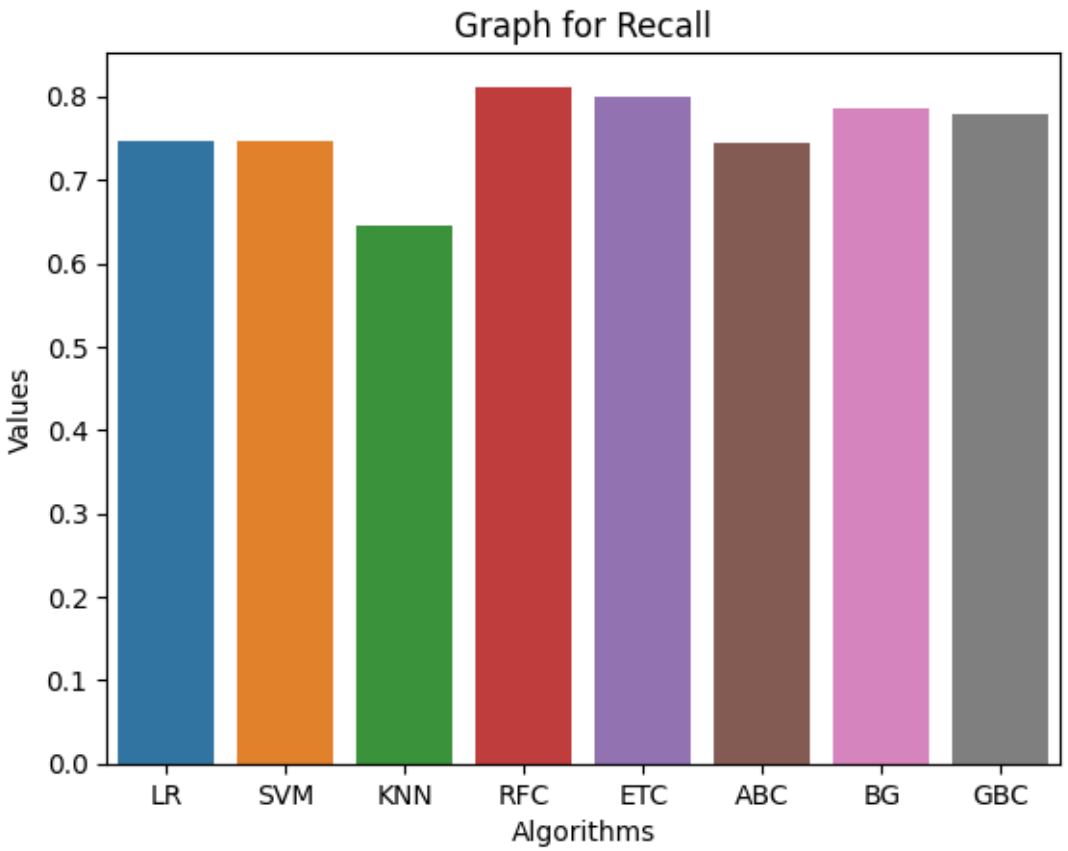
[24]:
```
{'LR': 0.746809596733027,
 'SVM': 0.7457886676875957,
 'KNN': 0.6447166921898928,
 'RFC': 0.8116385911179173,
 'ETC': 0.7983665135273098,
 'ABC': 0.74527820316488,
 'BG': 0.7861153649821337,
 'GBC': 0.7789688616641144}
```

[26]:
```
keys = list(recall_score.keys())
values = list(recall_score.values())

num_bars = len(keys)
# Create a bar plot using Seaborn with different colors for each bar
```

```
sns.barplot(x=keys, y=values,hue=keys,legend=False)
plt.xlabel('Algorithms')
plt.ylabel('Values')
plt.title('Graph for Recall')

# Show the plot
plt.show()
```



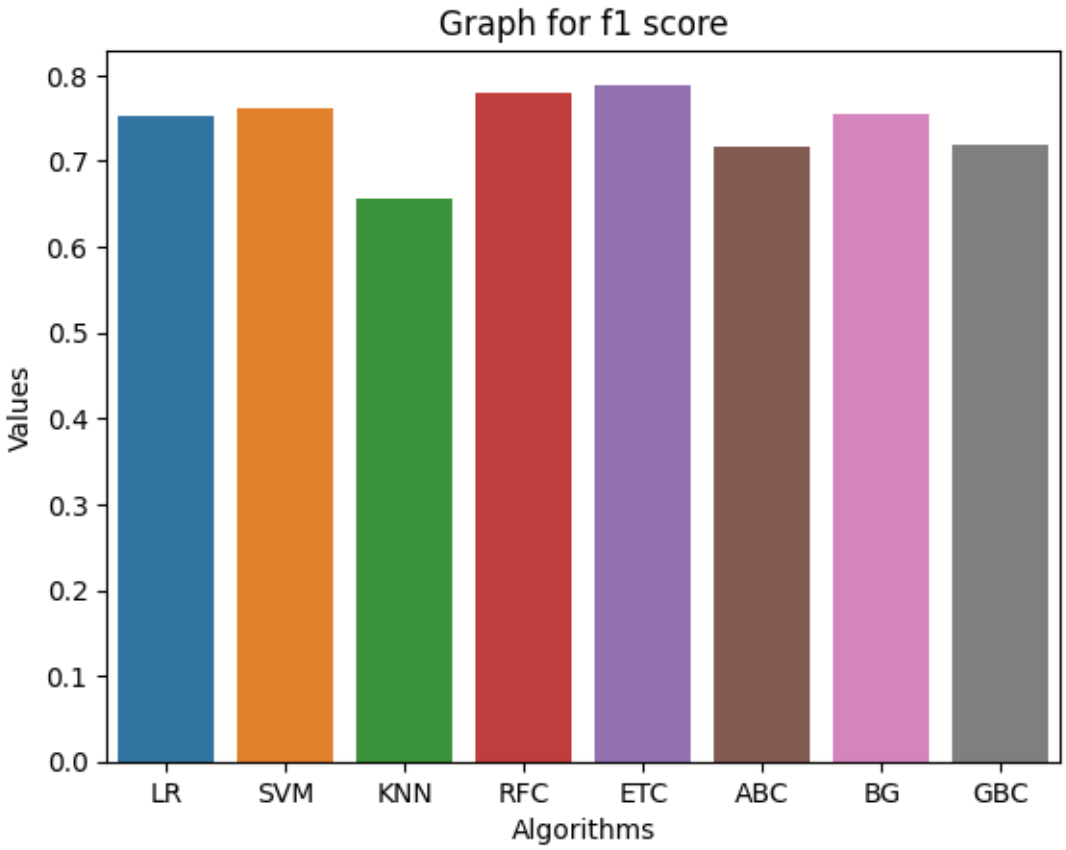
[27]:
```
f1_score
```

[27]:
```
{'LR': 0.7533470648815654,
 'SVM': 0.7625260960334029,
 'KNN': 0.6554229372080955,
 'RFC': 0.7796028438342731,
 'ETC': 0.7891019172552975,
 'ABC': 0.7169162779278173,
 'BG': 0.7547169811320755,
 'GBC': 0.719811320754717}
```

[28]:
```
keys = list(f1_score.keys())
values = list(f1_score.values())

num_bars = len(keys)
# Create a bar plot using Seaborn with different colors for each bar
sns.barplot(x=keys, y=values,hue=keys,legend=False)
plt.xlabel('Algorithms')
plt.ylabel('Values')
plt.title('Graph for f1 score')

# Show the plot
plt.show()
```



[29]:
```
mcc_score
```

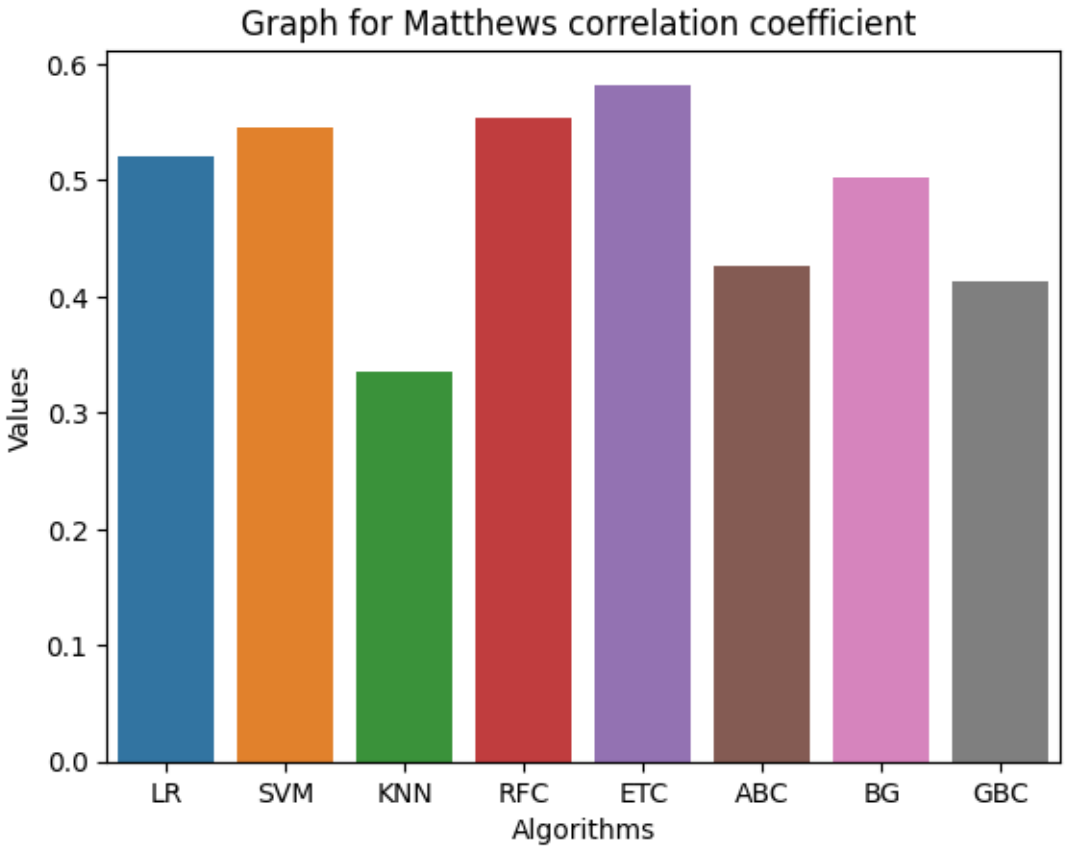
[29]:
```
{'LR': 0.5207068488662124,
 'SVM': 0.5449122515361974,
 'KNN': 0.3354567683955699,
 'RFC': 0.5528419816060773,
 'ETC': 0.5821754113819548,
```

```
 'ABC': 0.425449466556554,
 'BG': 0.501790204132277,
 'GBC': 0.4130635027223545}
```

[30]:
```
keys = list(mcc_score.keys())
values = list(mcc_score.values())

num_bars = len(keys)
# Create a bar plot using Seaborn with different colors for each bar
sns.barplot(x=keys, y=values,hue=keys,legend=False)
plt.xlabel('Algorithms')
plt.ylabel('Values')
plt.title('Graph for Matthews correlation coefficient ')

# Show the plot
plt.show()
```



[31]:
```
etc.fit(X_train_tfidf,y_train)
```

[31]:
```
ExtraTreesClassifier(n_estimators=50, random_state=2)
```

[32]:
```
from sklearn.metrics import confusion_matrix
y_pred =etc.predict(X_test_tfidf)
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

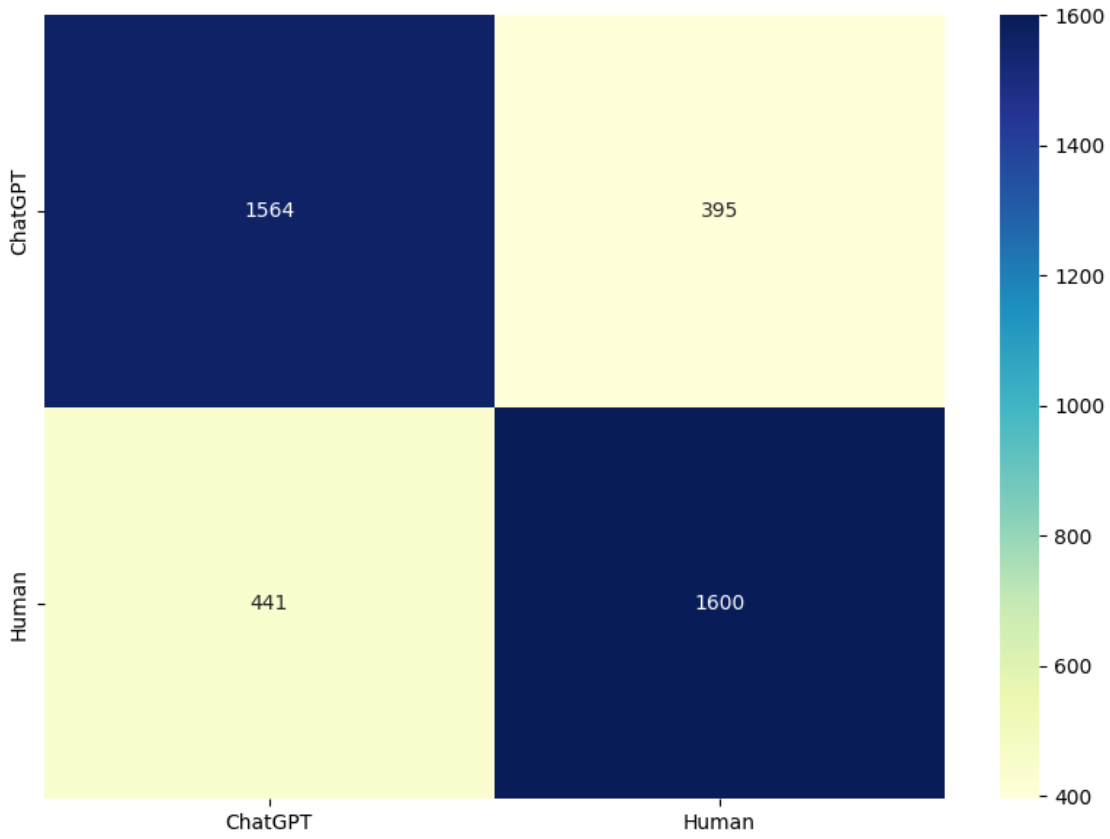
```
[[1564  395]
 [ 441 1600]]
```

[33]:
```
y_test.value_counts()
```

[33]:
```
category
human    2041
ai       1959
Name: count, dtype: int64
```

[34]:
```
import seaborn as sn
import pandas as pd
import matplotlib.pyplot as plt
df_cm = pd.DataFrame(cm, index = [i for i in ["ChatGPT","Human"]],
                  columns = [i for i in ["ChatGPT","Human"]])
plt.figure(figsize = (10,7))
sn.heatmap(df_cm, annot=True,cmap="YlGnBu", fmt='g')
```

[34]:
```
<Axes: >
```

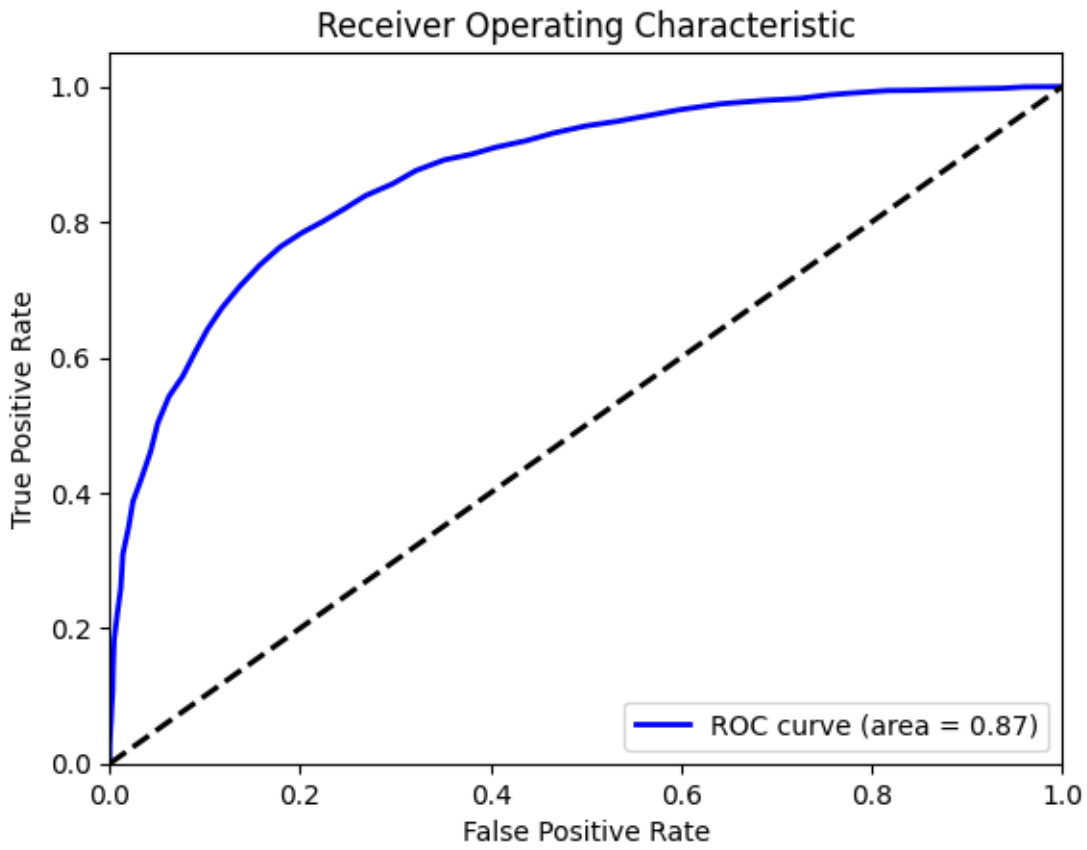


[35]:
```
from sklearn.metrics import roc_curve,auc
y_prob = etc.predict_proba(X_test_tfidf)[:, 1]
```

[36]:
```
fpr, tpr, thresholds = roc_curve(y_test, y_prob, pos_label='human')

# Calculate the area under the ROC curve
roc_auc = auc(fpr, tpr)

# Plot the ROC curve
plt.plot(fpr, tpr, color='blue', lw=2, label='ROC curve (area = %0.2f)' %␣
 ↪roc_auc)
plt.plot([0, 1], [0, 1], color='black', 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')
plt.legend(loc="lower right")
plt.show()
```



[37]:
```
def predict_text_category(model, text):
    text_vectorized = vectorizer.transform([text])

    prediction_prob = model.predict_proba(text_vectorized)

    predicted_class_idx = np.argmax(prediction_prob)

    unique_class_labels = np.unique(y_train)

    predicted_category = unique_class_labels[predicted_class_idx]

    return predicted_category
```

[39]:
```
text_to_predict = 'Machine learning is a technique that automates things for␣
 ↪machines, enabling them to learn without assistance.'
predicted_category = predict_text_category(etc, text_to_predict)
print("Predicted Category:", predicted_category)
```

```
Predicted Category: human
```

[40]:
```
text_to_predict = "Creating a text classifier involves using a machine learning␣
↪model, and for this purpose, I'll provide a simple example using Python and␣
↪the scikit-learn library. This example won't specifically distinguish␣
↪between human and AI-generated text, as it would require a more complex␣
↪model and potentially a larger dataset for training. However, this example␣
↪demonstrates the basics of a text classifier."
predicted_category = predict_text_category(etc, text_to_predict)
print("Predicted Category:", predicted_category)
```

```
Predicted Category: human
```

[41]:
```
text_to_predict =  'What is the ideal waiting time to see a physician?'
predicted_category = predict_text_category(etc, text_to_predict)
print("Predicted Category:", predicted_category)
```

```
Predicted Category: ai
```

[42]:
```
text_to_predict =  'Certainly! Here are some basic notes on a Reduced␣
↪Instruction Set Computing (RISC) Instruction Set Architecture (ISA):'
predicted_category = predict_text_category(etc, text_to_predict)
print("Predicted Category:", predicted_category)
```

```
Predicted Category: human
```

[43]:
```
text_to_predict =  'There are no arrest records for Patterson in the past.'
predicted_category = predict_text_category(etc, text_to_predict)
print("Predicted Category:", predicted_category)
```

```
Predicted Category: human
```

[ ]:
```

```