Project - 5

Tour & Travels Customer Churn Prediction

In [ ]:
```
# import required library
import pandas as pd
from sklearn.preprocessing import LabelEncoder
from matplotlib import pyplot as plt
from matplotlib import rcParams
from sklearn.model_selection import train_test_split
from sklearn import tree
from sklearn.ensemble import RandomForestClassifier
from xgboost import XGBClassifier
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix
import seaborn as sns
import warnings
```

1. Load Data

In [ ]:
```
df = pd.read_csv('/content/drive/MyDrive/Customertravel.csv')
df.head()
```

Out[ ]:

	Age	FrequentFlyer	AnnualIncomeClass	ServicesOpted	AccountSyncedToSocialMedia	BookedHotelOrNot	Target
0	34	No	Middle Income	6	No	Yes	0
1	34	Yes	Low Income	5	Yes	No	1
2	37	No	Middle Income	3	Yes	No	0
3	30	No	Middle Income	2	No	No	0
4	30	No	Low Income	1	No	No	0

2. Give Labels to Data

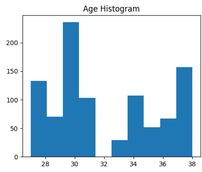
In [ ]:
```
le = LabelEncoder()
for col in df.columns:
    if df[col].dtype == 'object':
        df[col] = le.fit_transform(df[col])
df.head()
```

Out[ ]:

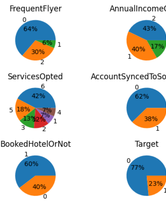
	Age	FrequentFlyer	AnnualIncomeClass	ServicesOpted	AccountSyncedToSocialMedia	BookedHotelOrNot	Target
0	34	0	2	6	0	1	0
1	34	2	1	5	1	0	1
2	37	0	2	3	1	0	0
3	30	0	2	2	0	0	0
4	30	0	1	1	0	0	0

3. Data Visualization

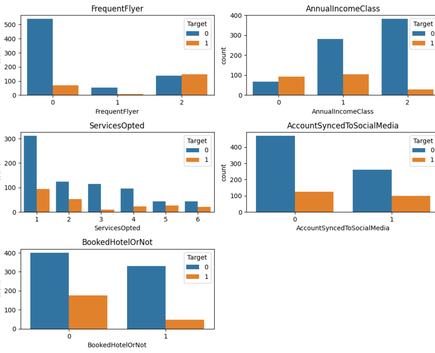
In [ ]:
```
plt.hist(x=df['Age'])
plt.title('Age Histogram')
warnings.filterwarnings("ignore")
```



In [ ]:
```
rcParams['figure.figsize'] = 5,9
for i,col in enumerate(df.columns[1:7]):
  plt.subplot(6,2,i+1)
  plt.pie(df[col].value_counts(),labels=df[col].unique(),autopct='%.0f%%')
  plt.title(f"{col}")
  plt.tight_layout()
```



In [ ]:
```
rcParams['figure.figsize'] = 10,15
for i,col in enumerate(df.columns[1:6]):
  plt.subplot(6,2,i+1)
  sns.countplot(data=df,x=col,hue='Target')
  plt.title(f"{col}")
  plt.tight_layout()
```



Split Data into Training & Testing

In [ ]:
```
# Make 'Target' field Target
X = df.drop(columns='Target')
Y = df['Target']
```

In [ ]:
```
# Split Data
X_train,X_test,Y_train,Y_test=train_test_split(X,Y,test_size=0.3,random_state=42)
```

Modeling

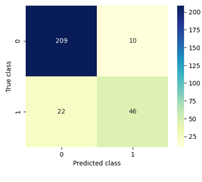
1. RandomForestClassifier

In [ ]:
```
clf1 = RandomForestClassifier()
clf1 = clf1.fit(X_train,Y_train)
Y_pred1 = clf1.predict(X_test)
```

In [ ]:
```
accuracy1 = accuracy_score(Y_test, Y_pred1)
print("Training Accuracy:",clf1.score(X_train,Y_train)*100,'%')
print("Testing Accuracy:",accuracy1*100,'%')
```

```
Training Accuracy: 95.20239880059971 %
Testing Accuracy: 88.85017421602788 %
```

In [ ]:
```
rcParams['figure.figsize'] = 5,4
s=sns.heatmap(confusion_matrix(Y_test, Y_pred1),annot=True, fmt='g', cmap='YlGnBu')
s.set(xlabel='Predicted class', ylabel='True class')
warnings.filterwarnings("ignore")
```



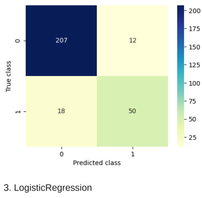
2. XGBClassifier

In [ ]:
```
clf2 =  XGBClassifier()
clf2 = clf2.fit(X_train,Y_train)
Y_pred2 = clf2.predict(X_test)
```

In [ ]:
```
accuracy2 = accuracy_score(Y_test, Y_pred2)
print("Training Accuracy:",clf2.score(X_train,Y_train)*100,'%')
print("Testing Accuracy:", accuracy2*100,'%')
```

```
Training Accuracy: 95.05247376311844 %
Testing Accuracy: 89.54703832752612 %
```

In [ ]:
```
s=sns.heatmap(confusion_matrix(Y_test, Y_pred2),annot=True, fmt='g', cmap='YlGnBu')
s.set(xlabel='Predicted class', ylabel='True class')
warnings.filterwarnings("ignore")
```



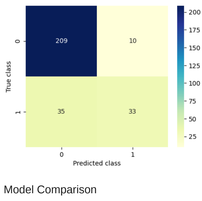
3. LogisticRegression

In [ ]:
```
clf3 =  LogisticRegression()
clf3 = clf3.fit(X_train,Y_train)
Y_pred3 = clf3.predict(X_test)
```

In [ ]:
```
accuracy3 = accuracy_score(Y_test, Y_pred3)
print("Training Accuracy:",clf3.score(X_train,Y_train)*100,'%')
print("Testing Accuracy:", accuracy3*100,'%')
```

```
Training Accuracy: 81.70914542728636 %
Testing Accuracy: 84.3205574912892 %
```

In [ ]:
```
s=sns.heatmap(confusion_matrix(Y_test, Y_pred3),annot=True, fmt='g', cmap='YlGnBu')
s.set(xlabel='Predicted class', ylabel='True class')
warnings.filterwarnings("ignore")
```



Model Comparison

In [ ]:
```
from prettytable import PrettyTable
table = PrettyTable(["Train/Test","RandomForestClassifier","XGBClassifier","LogisticRegression"])
table.add_row(['Training Accuracy',str(round(clf1.score(X_train,Y_train)*100,2))+' %',str(round(clf2.score(X_train,Y_train)*100,2))+' %',str(round(clf3.score(X_train,Y_train)*100,2))+' %'])
table.add_row(['Testing Accuracy',str(round(accuracy1*100,2))+' %',str(round(accuracy2*100,2))+' %',str(round(accuracy3*100,2))+' %'])
print(table)
```

```
+----------------+-------------------------+-----------------+---------------------+
|   Train/Test   | RandomForestClassifier | XGBClassifier | LogisticRegression |
+----------------+-------------------------+-----------------+---------------------+
| Training Accuracy |         95.2 %          |     95.05 %     |       81.71 %       |
|  Testing Accuracy |        88.85 %          |     89.55 %     |       84.32 %       |
+----------------+-------------------------+-----------------+---------------------+
```