MINI PROJECT : TITANIC SURVIVAL PREDICTION

AIM: To analyze the accuracy of survival chances during the Titanic disaster using machine learning techniques.

Description: This project contains test data and traning data. predictive model to classify passengers as survivors or non-survivors. By using random forest classifier algorithm we can predict the accuracy of survival chances.

Algorithm Used:

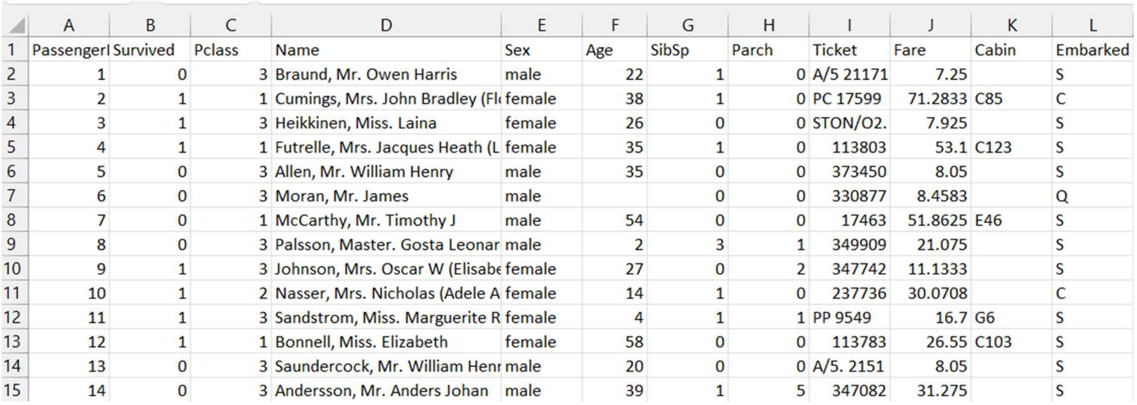
Random forest classifier algorithm: Using the Random Forest classification algorithm, we aim to build a predictive model that will allow us to estimate the likelihood of survival for each individual aboard the Titanic.

Work flow:

1) Data selection and Data preprocessing
2) Optimizing data for model training
3) Data transformation
4) Model training
5) Predict accuracy
6) Data Visualization

Data set:

#Train dataset:



	A	B	C	D	E	F	G	H	I	J	K	L
1	PassengerI	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
2	1	0	3	Braund, Mr. Owen Harris	male	22	1	0	A/5 21171	7.25		S
3	2	1	1	Cumings, Mrs. John Bradley (Fl	female	38	1	0	PC 17599	71.2833	C85	C
4	3	1	3	Heikkinen, Miss. Laina	female	26	0	0	STON/O2.	7.925		S
5	4	1	1	Futrelle, Mrs. Jacques Heath (L	female	35	1	0	113803	53.1	C123	S
6	5	0	3	Allen, Mr. William Henry	male	35	0	0	373450	8.05		S
7	6	0	3	Moran, Mr. James	male		0	0	330877	8.4583		Q
8	7	0	1	McCarthy, Mr. Timothy J	male	54	0	0	17463	51.8625	E46	S
9	8	0	3	Palsson, Master. Gosta Leonar	male	2	3	1	349909	21.075		S
10	9	1	3	Johnson, Mrs. Oscar W (Elisabe	female	27	0	2	347742	11.1333		S
11	10	1	2	Nasser, Mrs. Nicholas (Adele A	female	14	1	0	237736	30.0708		C
12	11	1	3	Sandstrom, Miss. Marguerite R	female	4	1	1	PP 9549	16.7	G6	S
13	12	1	1	Bonnell, Miss. Elizabeth	female	58	0	0	113783	26.55	C103	S
14	13	0	3	Saundercock, Mr. William Henr	male	20	0	0	A/5. 2151	8.05		S
15	14	0	3	Andersson, Mr. Anders Johan	male	39	1	5	347082	31.275		S

Source Code:

```
import warnings
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
plt.style.use('fivethirtyeight')
%matplotlib inline
warnings.filterwarnings('ignore')
train = pd.read_csv('train.csv')
test = pd.read_csv('test.csv')
# To know number of columns and rows
train.shape
# (891, 12)
train = train.drop(['Cabin'], axis=1)
test = test.drop(['Cabin'], axis=1)
train = train.drop(['Ticket'], axis=1)
test = test.drop(['Ticket'], axis=1)
# replacing the missing values in
# the Embarked feature with S
train = train.fillna({"Embarked": "S"})
# sort the ages into logical categories
train["Age"] = train["Age"].fillna(-0.5)
test["Age"] = test["Age"].fillna(-0.5)
bins = [-1, 0, 5, 12, 18, 24, 35, 60, np.inf]
labels = ['Unknown', 'Baby', 'Child', 'Teenager',
        'Student', 'Young Adult', 'Adult', 'Senior']
train['AgeGroup'] = pd.cut(train["Age"], bins, labels=labels)
test['AgeGroup'] = pd.cut(test["Age"], bins, labels=labels)
```

```
# create a combined group of both datasets
combine = [train, test]
# extract a title for each Name in the
# train and test datasets
for dataset in combine:
    dataset['Title'] = dataset.Name.str.extract(' ([A-Za-z]+)\.', expand=False)
pd.crosstab(train['Title'], train['Sex'])
# replace various titles with more common names
for dataset in combine:
    dataset['Title'] = dataset['Title'].replace(['Lady', 'Capt', 'Col',
                                                 'Don', 'Dr', 'Major',
                                                 'Rev', 'Jonkheer', 'Dona'],
                                                'Rare')
    dataset['Title'] = dataset['Title'].replace(
        ['Countess', 'Lady', 'Sir'], 'Royal')
    dataset['Title'] = dataset['Title'].replace('Mlle', 'Miss')
    dataset['Title'] = dataset['Title'].replace('Ms', 'Miss')
    dataset['Title'] = dataset['Title'].replace('Mme', 'Mrs')

train[['Title', 'Survived']].groupby(['Title'], as_index=False).mean()

# map each of the title groups to a numerical value
title_mapping = {"Mr": 1, "Miss": 2, "Mrs": 3,
                 "Master": 4, "Royal": 5, "Rare": 6}
for dataset in combine:
    dataset['Title'] = dataset['Title'].map(title_mapping)
    dataset['Title'] = dataset['Title'].fillna(0)
mr_age = train[train["Title"] == 1]["AgeGroup"].mode()  # Young Adult
miss_age = train[train["Title"] == 2]["AgeGroup"].mode()  # Student
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```
mrs_age = train[train["Title"] == 3]["AgeGroup"].mode()  # Adult
master_age = train[train["Title"] == 4]["AgeGroup"].mode()  # Baby
royal_age = train[train["Title"] == 5]["AgeGroup"].mode()  # Adult
rare_age = train[train["Title"] == 6]["AgeGroup"].mode()  # Adult
age_title_mapping = {1: "Young Adult", 2: "Student",
                     3: "Adult", 4: "Baby", 5: "Adult", 6: "Adult"}
for x in range(len(train["AgeGroup"])):
    if train["AgeGroup"][x] == "Unknown":
        train["AgeGroup"][x] = age_title_mapping[train["Title"][x]]
for x in range(len(test["AgeGroup"])):
    if test["AgeGroup"][x] == "Unknown":
        test["AgeGroup"][x] = age_title_mapping[test["Title"][x]]
# map each Age value to a numerical value
age_mapping = {'Baby': 1, 'Child': 2, 'Teenager': 3,
               'Student': 4, 'Young Adult': 5, 'Adult': 6,
               'Senior': 7}
train['AgeGroup'] = train['AgeGroup'].map(age_mapping)
test['AgeGroup'] = test['AgeGroup'].map(age_mapping)
train.head()
# dropping the Age feature for now, might change
train = train.drop(['Age'], axis=1)
test = test.drop(['Age'], axis=1)
train = train.drop(['Name'], axis=1)
test = test.drop(['Name'], axis=1)
sex_mapping = {"male": 0, "female": 1}
train['Sex'] = train['Sex'].map(sex_mapping)
test['Sex'] = test['Sex'].map(sex_mapping)
embarked_mapping = {"S": 1, "C": 2, "Q": 3}
train['Embarked'] = train['Embarked'].map(embarked_mapping)
```

```
test['Embarked'] = test['Embarked'].map(embarked_mapping)
for x in range(len(test["Fare"])):
    if pd.isnull(test["Fare"][x]):
        pclass = test["Pclass"][x]  # Pclass = 3
        test["Fare"][x] = round(
            train[train["Pclass"] == pclass]["Fare"].mean(), 4)
# map Fare values into groups of
# numerical values
train['FareBand'] = pd.qcut(train['Fare'], 4,
                            labels=[1, 2, 3, 4])
test['FareBand'] = pd.qcut(test['Fare'], 4,
                           labels=[1, 2, 3, 4])
# drop Fare values
train = train.drop(['Fare'], axis=1)
test = test.drop(['Fare'], axis=1)
from sklearn.model_selection import train_test_split
# Drop the Survived and PassengerId
# column from the trainset
predictors = train.drop(['Survived', 'PassengerId'], axis=1)
target = train["Survived"]
x_train, x_val, y_train, y_val = train_test_split(
    predictors, target, test_size=0.2, random_state=0)
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score
randomforest = RandomForestClassifier()
# Fit the training data along with its output
randomforest.fit(x_train, y_train)
y_pred = randomforest.predict(x_val)
# Find the accuracy score of the model
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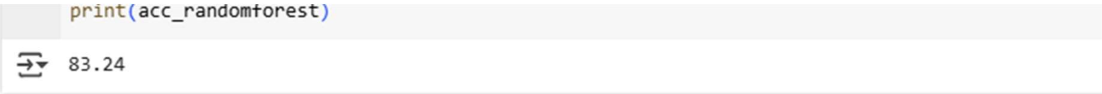
acc_randomforest = round(accuracy_score(y_pred, y_val) * 100, 2)
print(acc_randomforest)
f, ax = plt.subplots(1, 2, figsize=(12, 4))
train['Survived'].value_counts().plot.pie(
        explode=[0, 0.1], autopct='%1.1f%%', ax=ax[0], shadow=False)
ax[0].set_title('Survivors (1) and the dead (0)')
ax[0].set_ylabel('')
sns.countplot(x='Survived', data=train, ax=ax[1])
ax[1].set_ylabel('Quantity')
ax[1].set_title('Survivors (1) and the dead (0)')
plt.show()
```

Output:



```
print(acc_randomforest)
```

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83.24
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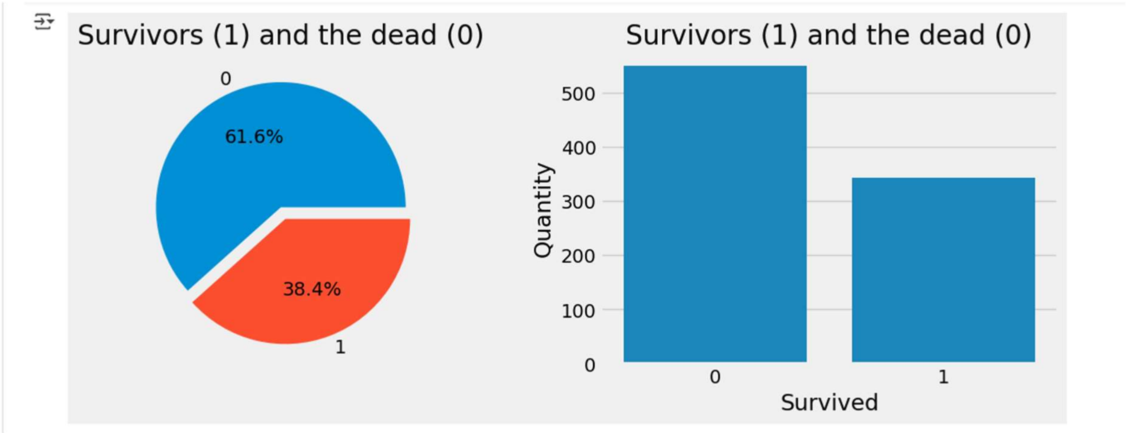

Result: Hence,the analyzing the accuracy and visualization of survival chances during Titanic disaster using random forest classification algorithm has been executed successfully.