Here we will be analyzing the sales records of company

In [387]:
```
import numpy as np
import pandas as pd
import statsmodels.api as sm
import statsmodels.formula.api as smf
import seaborn as sns
import altair as alt

from sklearn.preprocessing import scale
from sklearn.model_selection import train_test_split, GridSearchCV, cro
ss_val_score
from sklearn.metrics import confusion_matrix, accuracy_score, classific
ation_report
from sklearn.metrics import roc_auc_score,roc_curve
import statsmodels.formula.api as smf
import matplotlib.pyplot as plt
from sklearn.neighbors import KNeighborsClassifier
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.naive_bayes import GaussianNB
from sklearn import tree
from sklearn.ensemble import RandomForestClassifier
from sklearn.ensemble import GradientBoostingClassifier
from xgboost import XGBClassifier
from lightgbm import LGBMClassifier
from catboost import CatBoostClassifier
from sklearn.neighbors import KNeighborsRegressor
from warnings import filterwarnings
from sklearn.metrics import r2_score,mean_squared_error
from sklearn.ensemble import RandomForestRegressor
from sklearn.linear_model import LinearRegression
```

```python
import numpy as np
import pandas as pd
import statsmodels.api as sm
import statsmodels.formula.api as smf
import seaborn as sns
from sklearn.preprocessing import scale
from sklearn.model_selection import train_test_split, GridSearchCV, cro
ss_val_score
from sklearn.metrics import confusion_matrix, accuracy_score, classific
ation_report
from sklearn.metrics import roc_auc_score,roc_curve
import statsmodels.formula.api as smf
import matplotlib.pyplot as plt
from sklearn.neighbors import KNeighborsClassifier
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
from sklearn.naive_bayes import GaussianNB
from sklearn import tree
from sklearn.ensemble import RandomForestClassifier
from sklearn.ensemble import GradientBoostingClassifier
from xgboost import XGBClassifier
from lightgbm import LGBMClassifier
from catboost import CatBoostClassifier

from warnings import filterwarnings
filterwarnings('ignore')
filterwarnings('ignore')
```

Introducing the data set and understanding variables

In [49]:
```python
df = pd.read_excel("../Siparis-Tablosu.xlsx", sheet_name="Sipariş Detay
ı")
```

In [50]:
```python
df.head()
```

Out[50]:

	Order ID	ProductName	DiscountRate	Sales$	Profit	Amount	Category	SubCategory
0	BN-2011-7407039	Enermax Note Cards, Premium	0.5	45	-26	3	Office Supplies	Paper
1	AZ-2011-9050313	Dania Corner Shelving, Traditional	0.0	854	290	7	Furniture	Bookcases
2	AZ-2011-6674300	Binney & Smith Sketch Pad, Easy-Erase	0.0	140	21	3	Office Supplies	Art
3	BN-2011-2819714	Boston Markers, Easy-Erase	0.5	27	-22	2	Office Supplies	Art
4	BN-2011-2819714	Eldon Folders, Single Width	0.5	17	-1	2	Office Supplies	Storage

In [48]:

```
print({"data_types": df.dtypes,
       "          "
      "data_Shape:":df.shape})
```

```
{'data_types': Order ID         object
ProductName      object
DiscountRate    float64
Sales             int64
Profit            int64
Amount            int64
Category         object
SubCategory      object
dtype: object, '          data_Shape:': (8047, 8)}
```

Here we can have an initial idea about the distribution of variables

In [51]:

```
df.describe().T
```

Out[51]:

	count	mean	std	min	25%	50%	75%	max

	count	mean	std	min	25%	50%	75%	max
DiscountRate	8047.0	0.110047	0.181773	0.0	0.0	0.0	0.1	0.85
Sales$	8047.0	291.845657	485.212156	3.0	48.0	117.0	313.0	6517.00
Profit	8047.0	35.198211	178.125844	-3060.0	1.0	14.0	47.0	2476.00
Amount	8047.0	3.772089	2.203369	1.0	2.0	3.0	5.0	14.00

In [56]:
```
df.describe(include="all").T
```

Out[56]:

	count	unique	top	freq	mean	std	min	25%	50%	75%	max
Order ID	8047	4117	AZ-2014-7040665	11	NaN	NaN	NaN	NaN	NaN	NaN	NaN
ProductName	8047	1810	Eldon File Cart, Single Width	26	NaN	NaN	NaN	NaN	NaN	NaN	NaN
DiscountRate	8047	NaN	NaN	NaN	0.110047	0.181773	0	0	0	0.1	0.85
Sales$	8047	NaN	NaN	NaN	291.846	485.212	3	48	117	313	6517
Profit	8047	NaN	NaN	NaN	35.1982	178.126	-3060	1	14	47	2476
Amount	8047	NaN	NaN	NaN	3.77209	2.20337	1	2	3	5	14
Category	8047	3	Office Supplies	5286	NaN	NaN	NaN	NaN	NaN	NaN	NaN
SubCategory	8047	17	Art	1152	NaN	NaN	NaN	NaN	NaN	NaN	NaN

In [52]:
```
df.corr()
```

Out[52]:

	DiscountRate	Sales$	Profit	Amount
DiscountRate	1.000000	-0.026350	-0.351328	0.003686
Sales$	-0.026350	1.000000	0.441217	0.353441

	DiscountRate	Sales$	Profit	Amount
Profit	-0.351328	0.441217	1.000000	0.098670
Amount	0.003686	0.353441	0.098670	1.000000

In [55]:
```
df.isnull().mean() # checking null value
```

Out[55]:
```
Order ID        0.0
ProductName     0.0
DiscountRate    0.0
Sales$          0.0
Profit          0.0
Amount          0.0
Category        0.0
SubCategory     0.0
dtype: float64
```

In [68]:
```
df.groupby(["DiscountRate","Category","SubCategory"]).agg({"Profit":"me
an"}) ## This way of table shows the profitability
```

Out[68]:

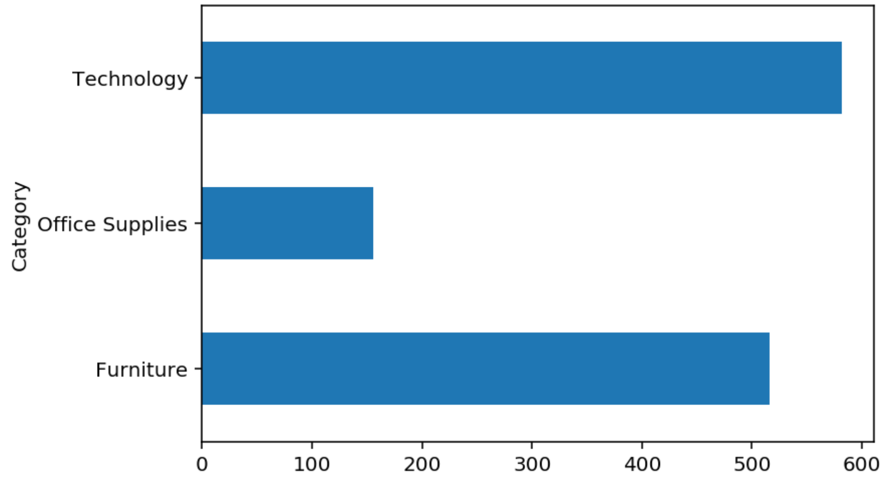
			Profit
DiscountRate	**Category**	**SubCategory**	
0.00	**Furniture**	**Bookcases**	213.420118
		Chairs	139.785714
		Furnishings	51.289963
		Tables	385.800000
	Office Supplies	**Appliances**	312.900990
...	**...**	**...**	...
0.65	**Technology**	**Machines**	-153.500000
		Phones	-548.200000
0.70	**Furniture**	**Tables**	-916.166667

			Profit
DiscountRate	Category	SubCategory	
0.80	Furniture	Furnishings	-142.000000
0.85	Furniture	Tables	-1925.000000

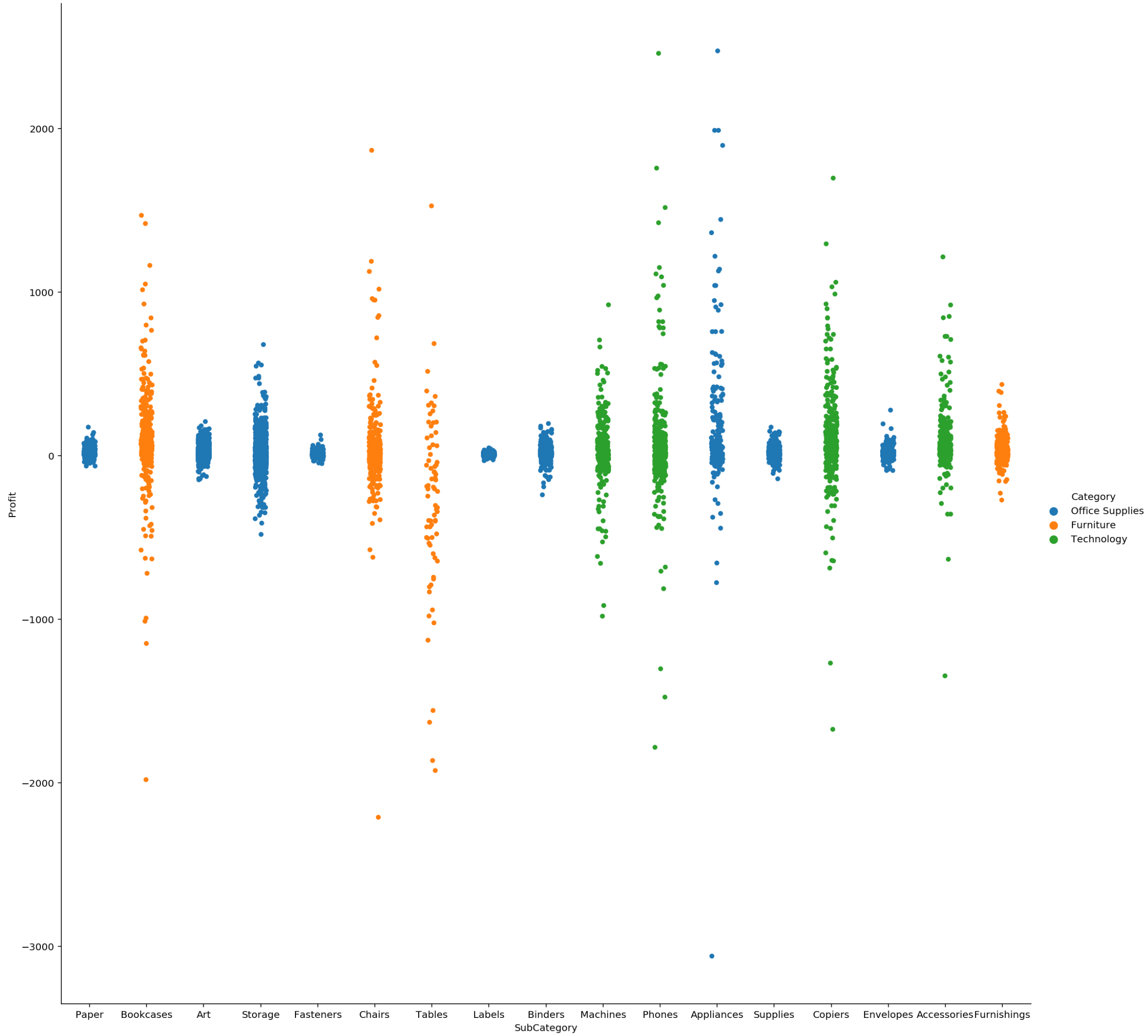
78 rows × 1 columns

Visualization

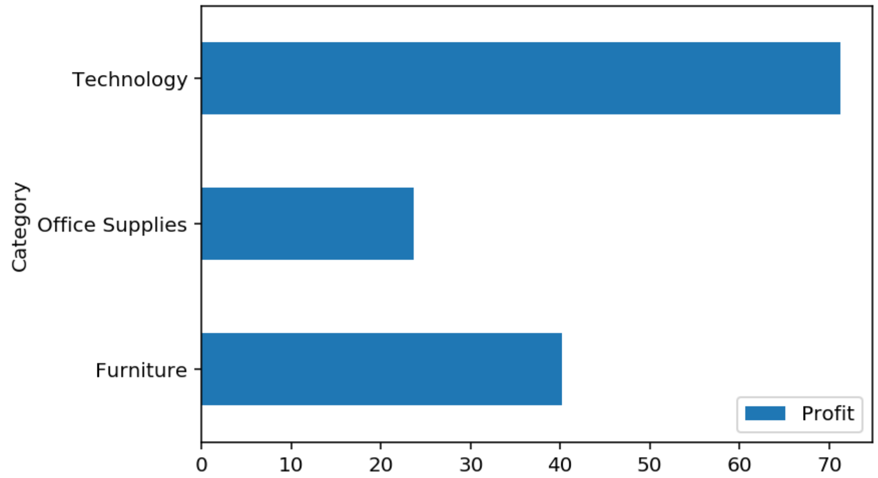
In [79]:
```
%config InlineBackend.figure_format = 'retina'
df.groupby("Category").mean()["Sales$"].plot.barh();    # Which Categor
y brings more income
```



In [107]:
```
sns.catplot(x = 'SubCategory' , y = "Profit", data = df,height=15,hue=
"Category"); # Distribution of profit margin among SubCategories
```

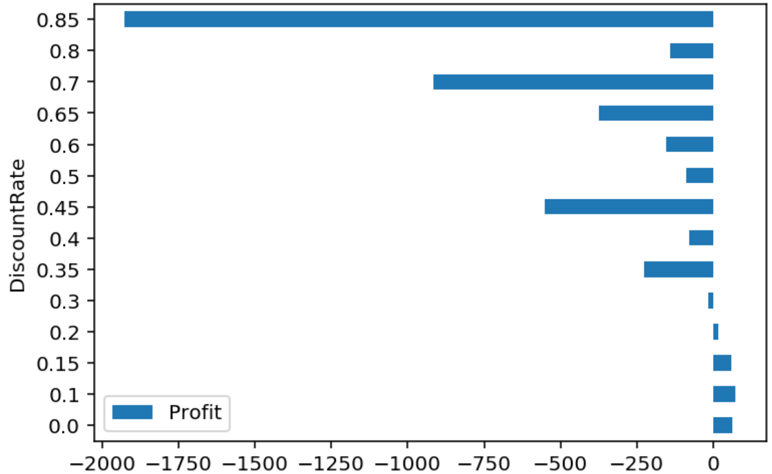


In [80]:
```
df.groupby("Category").agg({"Profit":"mean"}).plot.barh(); # Which cate
gory brings more profit
```



In [381]:
```
%config InlineBackend.figure_format = 'retina'

df.groupby("DiscountRate").agg({"Profit":"mean"}).plot.barh(); ## Here
 we are able to understand the profitability is increasing around 0,0--
0,15 discount rate.
```



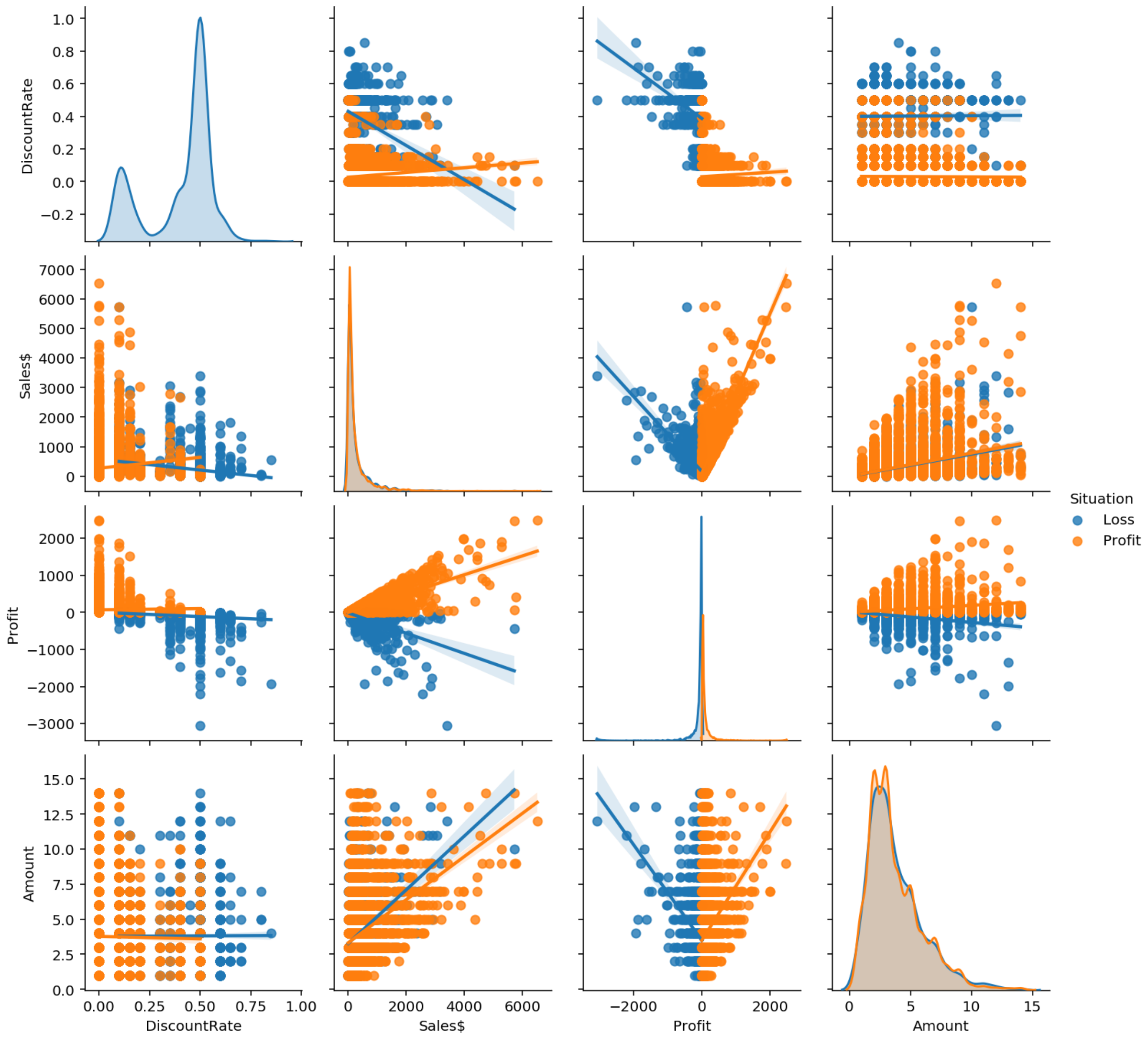
In [84]:
```
def situation(profit):
    if profit >= 0:
```

```python
        return "Profit"
    else:
        return "Loss"
```

In [85]:
```python
df["Situation"] = df["Profit"].apply(situation)
```

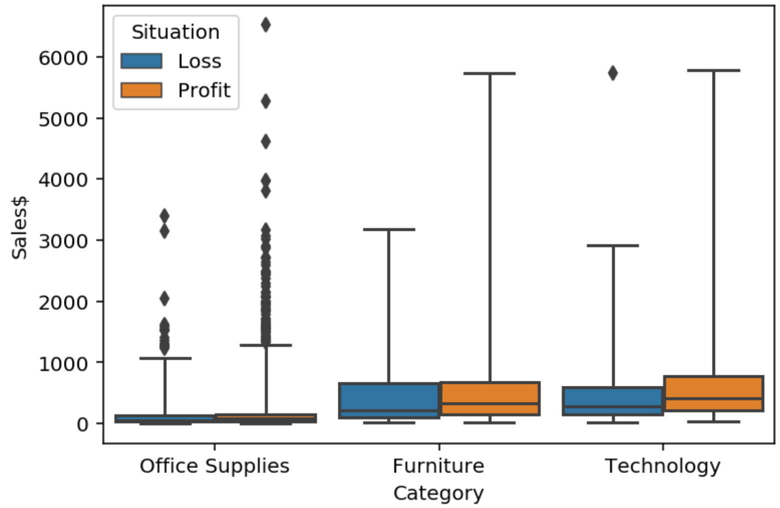
In [86]:
```python
sns.pairplot(df, vars= ["DiscountRate","Sales$","Profit","Amount"],hue=
"Situation", kind="reg") # Here we seperated the graphs according to si
tuation
```

Out[86]:
```
<seaborn.axisgrid.PairGrid at 0x21402d43b70>
```



In [379]:
```
sns.boxplot(x='Category',y='Sales$',hue = 'Situation', data = df,whis=10,width=.9) # The graph shows the relationship of Profit and Loss between Categories
```

Out[379]: <matplotlib.axes._subplots.AxesSubplot at 0x21441e82160>



Creating Machine Learning Model with KNN&RF&LogisticsRegression

In [117]:
```
def map_category(category):
    if category == 'Office Supplies':
        return 1
    elif category == 'Furniture':
        return 2
    elif category == 'Technology':
        return 3
```

In [119]:
```
df1 = df.copy()
df1["Category"] = df1["Category"].apply(map_category)
```

In [125]:
```
X = df1.drop(["Order ID","ProductName","SubCategory","Situation","Profi
t"], axis = 1)
y = df1.Profit
```

In [126]:
```
X_train, X_test, y_train, y_test = train_test_split(X,y, test_size = 0.
30,
                                                    train_size =
0.70, random_state =0)
```

In [129]:
```
knn_model = KNeighborsRegressor().fit(X_train, y_train) # Building Mode
l
```

In [130]:
```
knn_model
```

Out[130]:
```
KNeighborsRegressor(algorithm='auto', leaf_size=30, metric='minkowski',
                    metric_params=None, n_jobs=None, n_neighbors=5, p=
2,
                    weights='uniform')
```

In [131]:
```
y_pred = knn_model.predict(X_test)
```

In [134]:
```
np.sqrt(mean_squared_error(y_test,y_pred)) # Calculation the Error.
```

Out[134]:
```
167.31945028317594
```

In [139]:
```
new_data = [[0.5],[27],[2],[1]]
new_data = pd.DataFrame(new_data).T

knn_model.predict(new_data)   ##Looks like model is predicting well, ho
wever I will try to optimize the model by finding best hyperparameters.
```

Out[139]:
```
array([-18.8])
```

In [285]:
```
df.head(10)
```

Out[285]:

	Order ID	ProductName	DiscountRate	Sales$	Profit	Amount	Category	SubCategory	Situati
0	BN-2011-7407039	Enermax Note Cards, Premium	0.5	45	-26	3	Office Supplies	Paper	Lo

	Order ID	ProductName	DiscountRate	Sales$	Profit	Amount	Category	SubCategory	Situati
1	AZ-2011-9050313	Dania Corner Shelving, Traditional	0.0	854	290	7	Furniture	Bookcases	Pr
2	AZ-2011-6674300	Binney & Smith Sketch Pad, Easy-Erase	0.0	140	21	3	Office Supplies	Art	Pr
3	BN-2011-2819714	Boston Markers, Easy-Erase	0.5	27	-22	2	Office Supplies	Art	Lo
4	BN-2011-2819714	Eldon Folders, Single Width	0.5	17	-1	2	Office Supplies	Storage	Lo
5	AZ-2011-617423	Binney & Smith Pencil Sharpener, Water Color	0.0	90	21	3	Office Supplies	Art	Pr
6	AZ-2011-617423	Sanford Canvas, Fluorescent	0.0	207	77	4	Office Supplies	Art	Pr
7	AZ-2011-2918397	Bush Floating Shelf Set, Pine	0.1	155	36	1	Furniture	Bookcases	Pr
8	AZ-2011-2918397	Accos Thumb Tacks, Assorted Sizes	0.0	33	2	3	Office Supplies	Fasteners	Pr
9	AZ-2011-2918397	Smead Lockers, Industrial	0.1	716	143	4	Office Supplies	Storage	Pr

In [140]:

```
RMSE = []

for k in range(10):
    k = k+1
```

```
    knn_model = KNeighborsRegressor(n_neighbors = k).fit(X_train, y_tra
in)
    y_pred = knn_model.predict(X_train)
    rmse = np.sqrt(mean_squared_error(y_train,y_pred))
    RMSE.append(rmse)
    print("k=",k, "için RMSE value", rmse)
```

```
k= 1 için RMSE value 16.75974423995296
k= 2 için RMSE value 105.8054451062587
k= 3 için RMSE value 128.88901334867512
k= 4 için RMSE value 136.43468708221639
k= 5 için RMSE value 142.48292720692731
k= 6 için RMSE value 146.39835367344085
k= 7 için RMSE value 147.38190903606295
k= 8 için RMSE value 149.31249818838532
k= 9 için RMSE value 150.77108879815836
k= 10 için RMSE value 152.88629418251864
```

In [141]:
```
from sklearn.model_selection import GridSearchCV
```

In [157]:
```
knn_params = {"n_neighbors": np.arange(1,30,1)}
knn =KNeighborsRegressor()
```

In [158]:
```
knn_cv_model = GridSearchCV(knn,knn_params, cv =10)
```

In [159]:
```
knn_cv_model.fit(X_train, y_train)
```

Out[159]:
```
GridSearchCV(cv=10, error_score=nan,
             estimator=KNeighborsRegressor(algorithm='auto', leaf_size=
30,
                                           metric='minkowski',
                                           metric_params=None, n_jobs=N
one,
                                           n_neighbors=5, p=2,
                                           weights='uniform'),
             iid='deprecated', n_jobs=None,
             param_grid={'n_neighbors': array([ 1,  2,  3,  4,  5,  6,
7,  8,  9, 10, 11, 12, 13, 14, 15, 16, 17,
```

```
         18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29])},
               pre_dispatch='2*n_jobs', refit=True, return_train_score=Fa
lse,
               scoring=None, verbose=0)
```

In [160]:
```
knn_cv_model.best_params_["n_neighbors"]
```

Out[160]:
```
23
```

In [152]:
```
RMSE = []
RMSE_CV =[]

for k in range(10):
    k = k+1
    knn_model = KNeighborsRegressor(n_neighbors = k).fit(X_train, y_tra
in)
    y_pred = knn_model.predict(X_train)
    rmse = np.sqrt(mean_squared_error(y_train,y_pred))
    rmse_cv = np.sqrt(-1*cross_val_score(knn_model,X_train,y_train,cv=1
0,
                                         scoring = "neg_mean_squared_err
or").mean())
    RMSE.append(rmse)
    RMSE_CV.append(rmse_cv)
    print("k=",k, " RMSE value", rmse, "RMSE_CV value:", rmse_cv)
```

```
k= 1  RMSE value 16.75974423995296 RMSE_CV value: 222.1203644391432
k= 2  RMSE value 105.8054451062587 RMSE_CV value: 193.19605311150775
k= 3  RMSE value 128.88901334867512 RMSE_CV value: 184.9912315989125
k= 4  RMSE value 136.43468708221639 RMSE_CV value: 179.14293553569996
k= 5  RMSE value 142.48292720692731 RMSE_CV value: 176.14514879564152
k= 6  RMSE value 146.39835367344085 RMSE_CV value: 174.57388836995958
k= 7  RMSE value 147.38190903606295 RMSE_CV value: 171.90409750355903
k= 8  RMSE value 149.31249818838532 RMSE_CV value: 171.61344542445832
k= 9  RMSE value 150.77108879815836 RMSE_CV value: 171.99767331289104
k= 10  RMSE value 152.88629418251864 RMSE_CV value: 170.08631728475808
```

In [162]:
```
knn_tuned = KNeighborsRegressor(n_neighbors = knn_cv_model.best_params_
```

```
["n_neighbors"])
knn_tuned.fit(X_train, y_train)
```

Out[162]:
```
KNeighborsRegressor(algorithm='auto', leaf_size=30, metric='minkowski',
                    metric_params=None, n_jobs=None, n_neighbors=23, p=
2,
                    weights='uniform')
```

In [163]:
```
np.sqrt(mean_squared_error(y_test,knn_tuned.predict(X_test))) # Our mea
n squared error has decreased from 167 to 151
```

Out[163]:
```
151.28093134200765
```

In [174]:
```
new_data = [[0.5],[116],[5],[1]]
new_data = pd.DataFrame(new_data).T
y_pred1=knn_tuned.predict(X)
```

In [177]:
```
k_t = pd.DataFrame({"Prediction": y_pred1[0:10],
                    "Real_vallue": y[0:10]})
k_t
```

Out[177]:

	Prediction	Real_vallue
0	-4.173913	-26
1	107.695652	290
2	21.347826	21
3	-2.739130	-22
4	-2.869565	-1
5	20.652174	21
6	-20.086957	77
7	28.521739	36
8	7.739130	2
9	81.130435	143

LogisticRegression

In [216]:
```
def situation_num(profit):
    if profit >= 0:
        return 1
    else:
        return 0
```

In [221]:
```
df2 = df1.copy()
```

In [222]:
```
df2["Profit"] = df2["Profit"].apply(situation_num)
```

In [233]:
```
X1 = df2.drop(["Order ID","ProductName","SubCategory","Situation","Prof
it"], axis = 1)
y1 = df2.Profit
```

In [240]:
```
X1_train, X1_test, y1_train, y1_test = train_test_split(X1,y1, test_siz
e = 0.30,
                                                            train_size =

0.70, random_state =0)
```

In [248]:
```
from sklearn.linear_model import LogisticRegression
loj = LogisticRegression(solver = "liblinear")
loj_model = loj.fit(X1_train,y1_train)
#loj_model.coef_
```

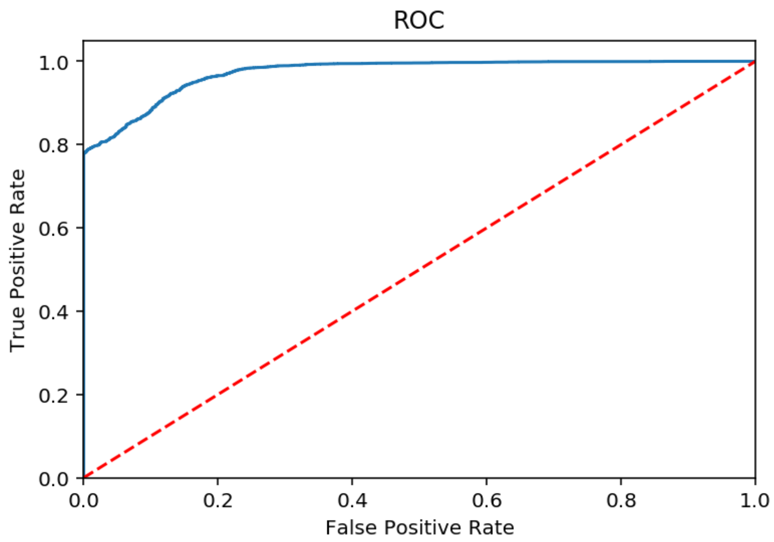
In [249]:
```
y_pred = loj_model.predict(X1)
```

In [250]:
```
accuracy_score(y1,y_pred)
```

Out[250]: 0.9343854852740152

In [257]:
```
logit_roc_auc = roc_auc_score(y1, loj_model.predict(X1))
```

```
fpr, tpr, thresholds = roc_curve(y1, loj_model.predict_proba(X1)[:,1])
plt.figure()
plt.plot(fpr, tpr, label='AUC (area = %0.2f)' % logit_roc_auc)
plt.plot([0, 1], [0, 1],'r--')
plt.xlim([-0, 1.0])
plt.ylim([-0, 1.05])
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('ROC')
plt.show()
```



In [258]:
```
cross_val_score(loj_model,X1_test,y1_test,cv=10).mean()
```

Out[258]: 0.9399660505469635

Random Forest

In [353]:
```
df3 = df1.copy()
x = df3.drop(["Order ID","ProductName","SubCategory","Situation","Profi
```

```
t"], axis = 1)
y = df3.Profit
```

In [354]:
```
x_train, x_test, y_train, y_test = train_test_split(x,y, test_size = 0.
30,
                                                    train_size =
0.70, random_state =0)
```

In [355]:
```
forest = RandomForestRegressor(n_estimators= 100,
                              criterion= "mse",
                              random_state= 1,
                              n_jobs= -1)

forest.fit(x_train,y_train)
forest_train_pred = forest.predict(x_train)
forest_test_pred = forest.predict(x_test)
print('MSE train data: %.3f, MSE test data: %.3f' % (
mean_squared_error(y_train,forest_train_pred),
mean_squared_error(y_test,forest_test_pred)))
print('R2 train data: %.3f, R2 test data: %.3f' % (
r2_score(y_train,forest_train_pred),
r2_score(y_test,forest_test_pred)))
```

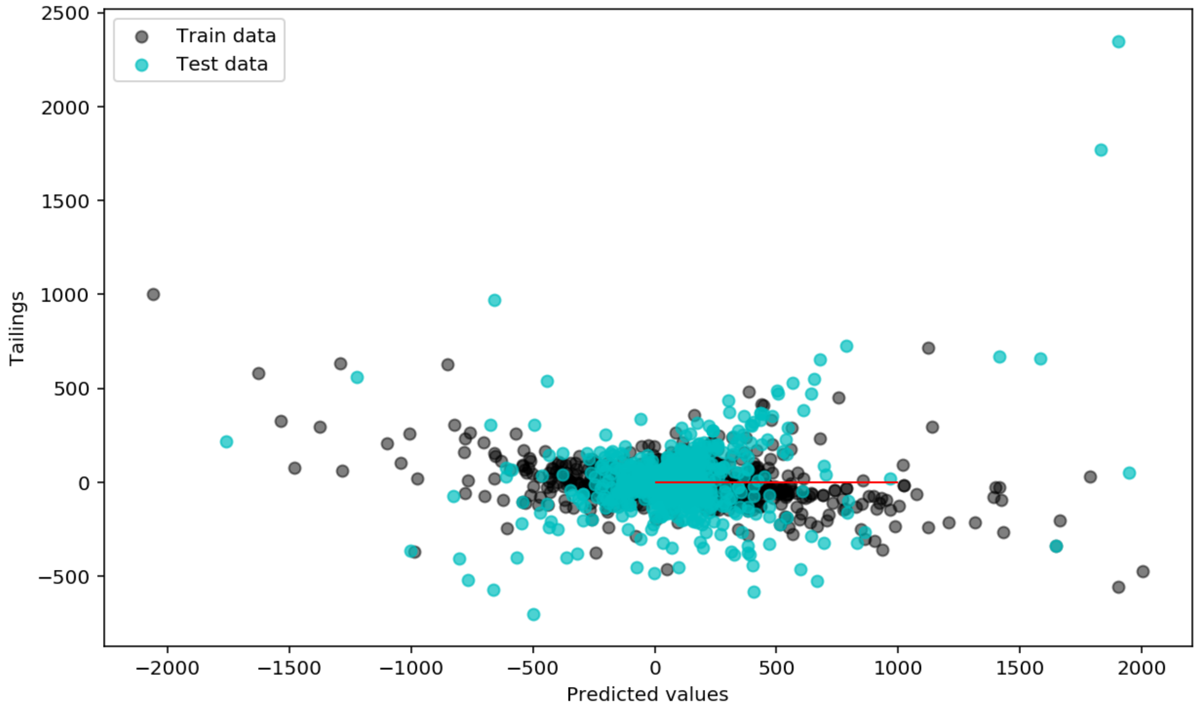
```
MSE train data: 2218.922, MSE test data: 11646.519
R2 train data: 0.934, R2 test data: 0.565
```

In [356]:
```
import matplotlib.pyplot as pl

pl.figure(figsize=(10,6))

pl.scatter(forest_train_pred,forest_train_pred - y_train,
          c = 'black', marker = 'o', s = 35, alpha = 0.5,
          label = 'Train data')
pl.scatter(forest_test_pred,forest_test_pred - y_test,
          c = 'c', marker = 'o', s = 35, alpha = 0.7,
          label = 'Test data')
pl.xlabel('Predicted values')
pl.ylabel('Tailings')
```

```
pl.legend(loc = 'upper left')
pl.hlines(y = 0, xmin = 0, xmax = 1000, lw = 1, color = 'red')
pl.show()
```



In [357]:
```
new_data = [[0.0],[854],[7],[2]]
new_data = pd.DataFrame(new_data).T
y_pred2 = forest.predict(x)
```

In [358]:
```
pd.DataFrame({"Prediction": y_pred2[0:10],
              "Real_value": y[0:10]})
```

Out[358]:

	Prediction	Real_value
0	-19.991333	-26
1	233.349476	290

	Prediction	Real_value
2	30.047036	21
3	-18.110399	-22
4	-5.982603	-1
5	23.482197	21
6	55.557492	77
7	29.007286	36
8	9.125724	2
9	217.410214	143

OPTIMIZING THE RF MODEL

In [296]:
```
from skompiler import skompile
print(skompile(loj_model.predict).to("python/code"))
```

```
__step__(np.array([-12.663198247298308, -0.00019396995738446554,
    0.004325903389729509, -0.20139586398564668]) @ x + 3.66589204797219
64)
```

In [359]:
```
forest.score(x_train,y_train)
```

Out[359]:
```
0.9344599073047634
```

In [360]:
```
rf_params = {"n_estimators": np.arange(1,30,1)}
rf =RandomForestRegressor()
```

In [361]:
```
rf_cv_model = GridSearchCV(forest,rf_params, cv =10)
```

In [362]:
```
rf_cv_model.fit(x_train,y_train)
```

Out[362]:
```
GridSearchCV(cv=10, error_score=nan,
             estimator=RandomForestRegressor(bootstrap=True, ccp_alpha=
0.0,
                                             criterion='mse', max_depth
=None,
                                             max_features='auto',
                                             max_leaf_nodes=None,
                                             max_samples=None,
                                             min_impurity_decrease=0.0,
                                             min_impurity_split=None,
                                             min_samples_leaf=1,
                                             min_samples_split=2,
                                             min_weight_fraction_leaf=
0.0,
                                             n_estimators=100, n_jobs=-
1,
                                             oob_score=False, random_st
ate=1,
                                             verbose=0, warm_start=Fals
e),
             iid='deprecated', n_jobs=None,
             param_grid={'n_estimators': array([ 1,  2,  3,  4,  5,  6,
  7,  8,  9, 10, 11, 12, 13, 14, 15, 16, 17,
       18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29])},
             pre_dispatch='2*n_jobs', refit=True, return_train_score=Fa
lse,
             scoring=None, verbose=0)
```

In [366]:
```
rf_cv_model.best_params_
```

Out[366]:
```
{'n_estimators': 27}
```

In [367]:
```
rf_tuned = RandomForestRegressor(n_estimators= 27)
```

In [368]:
```
rf_tuned.fit(x_train, y_train)
```

Out[368]:
```
RandomForestRegressor(bootstrap=True, ccp_alpha=0.0, criterion='mse',
                      max_depth=None, max_features='auto', max_leaf_nod
```

```
es=None,
                                max_samples=None, min_impurity_decrease=0.0,
                                min_impurity_split=None, min_samples_leaf=1,
                                min_samples_split=2, min_weight_fraction_leaf=0.
0,
                                n_estimators=27, n_jobs=None, oob_score=False,
                                random_state=None, verbose=0, warm_start=False)
```

In [369]:
```
rf_tuned.score(x_train,y_train)
```

Out[369]:
```
0.9238740175820388
```

In [373]:
```
np.sqrt(mean_squared_error(y_test,forest.predict(x_test)))
```

Out[373]:
```
107.91904137208944
```

In [372]:
```
np.sqrt(mean_squared_error(y_test,rf_tuned.predict(x_test))) # Comparin
 the MSE, we have little better result with optimized parameters.
```

Out[372]:
```
105.86392308133048
```

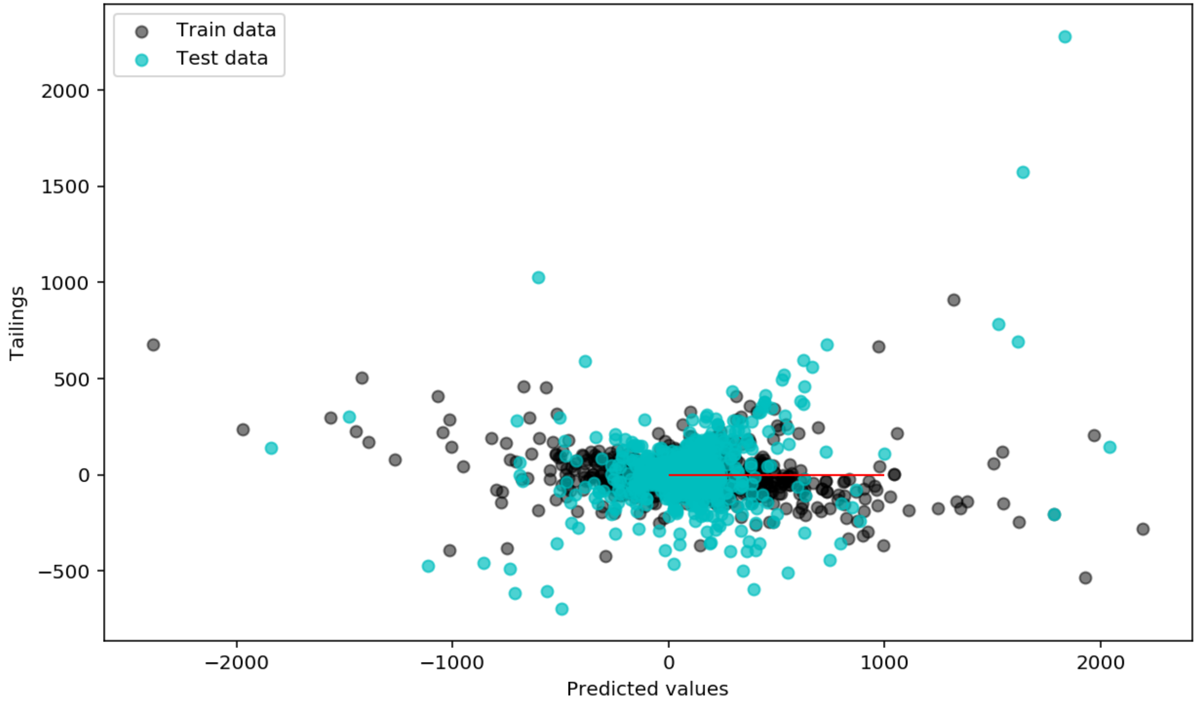
In [370]:
```
rf_tuned = RandomForestRegressor(n_estimators= 27)


rf_tuned.fit(x_train, y_train)
forest_train_pred = rf_tuned.predict(x_train)
forest_test_pred = rf_tuned.predict(x_test)
print('MSE train data: %.3f, MSE test data: %.3f' % (
mean_squared_error(y_train,forest_train_pred),
mean_squared_error(y_test,forest_test_pred)))
print('R2 train data: %.3f, R2 test data: %.3f' % (
r2_score(y_train,forest_train_pred),
r2_score(y_test,forest_test_pred)))
```

```
MSE train data: 2127.071, MSE test data: 11207.170
R2 train data: 0.937, R2 test data: 0.581
```

In [371]:
```
pl.figure(figsize=(10,6))
```

```
pl.scatter(forest_train_pred,forest_train_pred - y_train,
           c = 'black', marker = 'o', s = 35, alpha = 0.5,
           label = 'Train data')
pl.scatter(forest_test_pred,forest_test_pred - y_test,
           c = 'c', marker = 'o', s = 35, alpha = 0.7,
           label = 'Test data')
pl.xlabel('Predicted values')
pl.ylabel('Tailings')
pl.legend(loc = 'upper left')
pl.hlines(y = 0, xmin = 0, xmax = 1000, lw = 1, color = 'red')
pl.show()
```



[My Linkedin link] (https://www.linkedin.com/in/volkan-eymir-akçora/)

In [383]:
```
! jupyter nbconvert --to html OrdersProject.ipynb
```

```
[NbConvertApp] Converting notebook OrdersProject.ipynb to html
[NbConvertApp] Writing 1498707 bytes to OrdersProject.html
```

>>
Volkan
Eymir
Akçora