Trial 1 with default params

Loading Modules

In [ ]:
```
from sklearn import tree
from sklearn.metrics import classification_report,accuracy_score,confusion_matrix
from sklearn.model_selection import train_test_split
import pandas as pd
import numpy as np
```

Loading Data

In [ ]:
```
df = pd.read_csv("../processed.csv")
df
```

Out[ ]:

	Initial_Price	Final_Price	Win_Flag	Mac_Flag	Linux_Flag	Positive_Reviews	Negative_Reviews	Memory_MB	Storage_MB	target
0	52.0	52.0	True	True	False	57.0	7.0	1024	50	1
1	0.0	0.0	True	True	False	53.0	6.0	2048	3072	1
2	0.0	0.0	True	False	False	133.0	69.0	2048	100	0
3	530.0	530.0	True	False	False	22.0	9.0	2048	500	0
4	229.0	229.0	True	True	True	226.0	44.0	2048	1500	1
...	...	...	...	...	...	...	...	...	...	...
57467	85.0	85.0	True	False	False	0.0	4.0	4096	200	-1
57468	349.0	349.0	True	True	False	2.0	1.0	1024	1024	1
57469	164.0	164.0	True	False	False	8.0	1.0	4096	20480	1
57470	610.0	610.0	True	False	False	1.0	0.0	4096	3072	1
57471	570.0	285.0	True	False	False	0.0	1.0	1024	2048	-1

57472 rows × 10 columns

Splitting Data 33% test and 66% train

In [ ]:
```
y = df["target"]
X = df.drop(labels=["target"],axis=1)


X_train, X_test, y_train, y_test = train_test_split(
        X, y, test_size=0.33, random_state=100,shuffle=True)
```

Building model

In [ ]:
```
dt = tree.DecisionTreeClassifier()
dt.fit(X_train,y_train)
```

Out[ ]:
```
DecisionTreeClassifier()
```

Model evaluation

In [ ]:
```
preds = dt.predict(X_test)
accuracy_score(y_test,preds)
```

Out[ ]:
```
0.896077190762417
```

Important metrics

In [ ]:
```
print(classification_report(y_test,preds))
```

	precision	recall	f1-score	support
-1	0.78	0.78	0.78	2123
0	0.79	0.80	0.79	3563
1	0.94	0.94	0.94	13280
accuracy			0.90	18966
macro avg	0.84	0.84	0.84	18966
weighted avg	0.90	0.90	0.90	18966

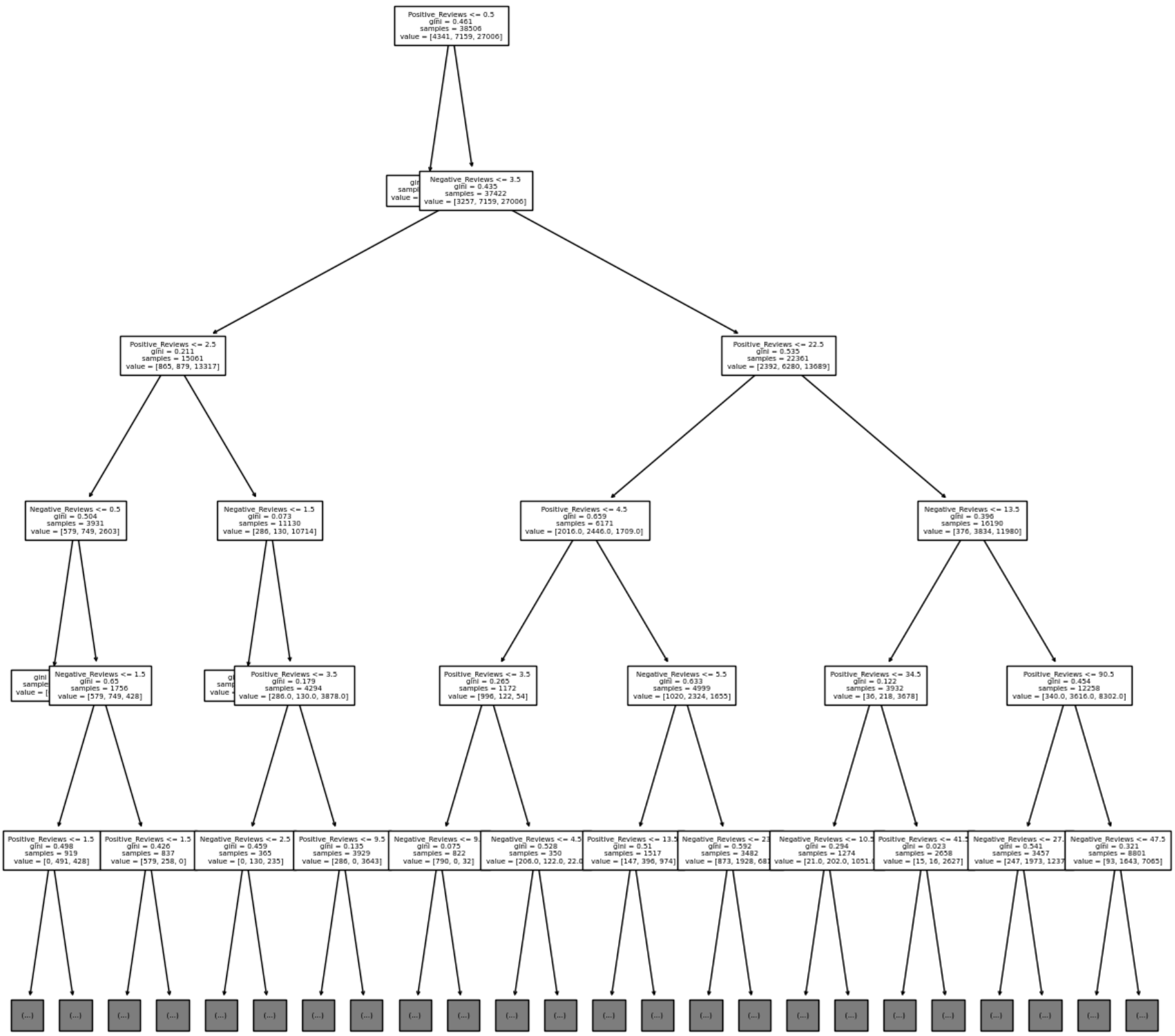
Confusion Matrix Display

In [ ]:
```
confusion_matrix(y_test, preds)
```

Out[ ]:
```
array([[ 1666,   233,   224],
       [  220,  2837,   506],
       [  261,   527, 12492]], dtype=int64)
```

Plotting Tree

In [ ]:
```
fig=tree.plot_tree(dt,max_depth=5, feature_names=dt.feature_names_in_,
                   fontsize=5)[0].figure
fig.set_size_inches(15, 15)
```



Displaying Tree info

In [ ]:
```
dt.get_n_leaves()
```

Out[ ]: 3228

In [ ]:
```
dt.get_depth()
```

Out[ ]: 34

Conclusion

1. Decision Tree fitting got accuracy of 89% on test data which is more than KNN or bayes
2. By far most effective for this data

Trial 2 with setting max_depth, leaves and changing criterion of split

Loading modules and functions

In [ ]:
```
from sklearn import tree
from sklearn.metrics import classification_report,accuracy_score,confusion_matrix
from sklearn.model_selection import train_test_split
import pandas as pd
import numpy as np
```

Loading Data

In [ ]:
```
df = pd.read_csv("../processed.csv")
df
```

Out[ ]:

	Initial_Price	Final_Price	Win_Flag	Mac_Flag	Linux_Flag	Positive_Reviews	Negative_Reviews	Memory_MB	Storage_MB	target
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3	530.0	530.0	True	False	False	22.0	9.0	2048	500	0
4	229.0	229.0	True	True	True	226.0	44.0	2048	1500	1
...	...	...	...	...	...	...	...	...	...	...
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57472 rows × 10 columns

Splitting Data for 33% test and 66% train

In [ ]:
```
y = df["target"]
X = df.drop(labels=["target"],axis=1)


X_train, X_test, y_train, y_test = train_test_split(
        X, y, test_size=0.33, random_state=100,shuffle=True)
```

Model fitting and evaluation

In [ ]:
```
dt = tree.DecisionTreeClassifier(criterion="entropy",max_depth=50,max_leaf_nodes=10000)
dt.fit(X_train,y_train)

preds = dt.predict(X_test)
accuracy_score(y_test,preds)
```

Out[ ]:
```
0.8976062427501845
```

Important Metrics

In [ ]:
```
print(classification_report(y_test, preds))
```

```
              precision    recall  f1-score   support

          -1       0.78      0.78      0.78      2123
           0       0.79      0.79      0.79      3563
           1       0.94      0.94      0.94     13280

    accuracy                           0.90     18966
   macro avg       0.84      0.84      0.84     18966
weighted avg       0.90      0.90      0.90     18966
```

Confusion Matrix Display

In [ ]:
```
confusion_matrix(y_test, preds)
```

Out[ ]:
```
array([[ 1665,   239,   219],
       [  212,  2832,   519],
       [  250,   503, 12527]], dtype=int64)
```

Tree info

In [ ]:
```
dt.get_depth()
```

Out[ ]:
```
36
```

In [ ]:
```
dt.get_n_leaves()
```

Out[ ]:
```
3097
```

2nd trial Conclusion

1. Changing criterion from gini index to entropy didn't increase accuracy much
2. adding max depth and max leaves also didnt increase