

```
In [1]: import pandas as pd
```

```
In [2]: df = pd.read_csv("golf_dataset_long_format.csv")
df.head()
```

Out[2]:

	Temperature	Humidity	Wind	Outlook	Play
0	3.3	49	1	3	1
1	3.3	49	1	3	0
2	3.3	49	1	3	0
3	3.3	49	1	3	1
4	3.3	49	1	3	1

```
In [3]: cols = list(df.columns)
print(cols)
```

['Temperature', 'Humidity', 'Wind', 'Outlook', 'Play']

```
In [4]: df.shape
```

Out[4]: (7665, 5)

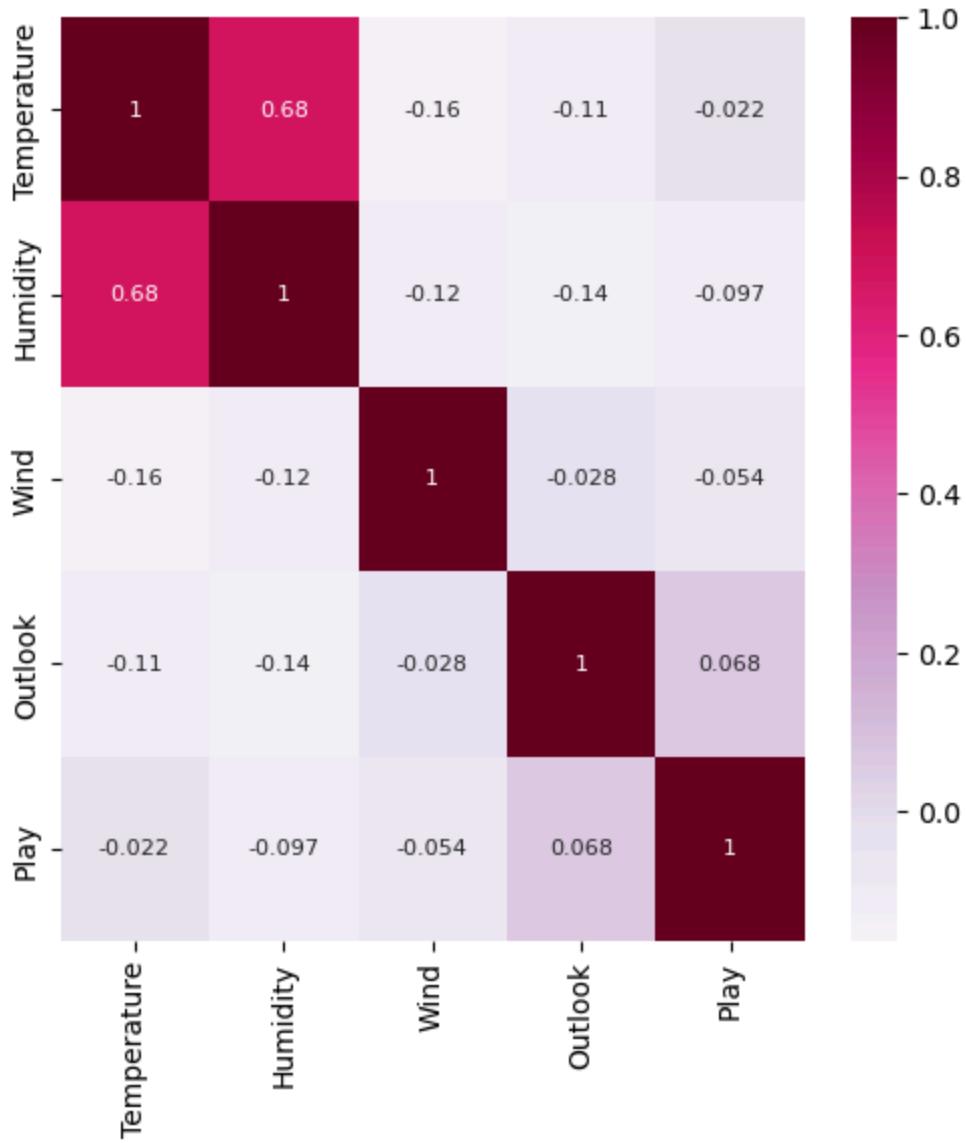
```
In [5]: corrmat = df.corr()
top_corr_features = corrmat.index
corrmat
```

	Temperature	Humidity	Wind	Outlook	Play
Temperature	1.000000	0.683181	-0.162446	-0.113775	-0.021652
Humidity	0.683181	1.000000	-0.115711	-0.139317	-0.096551
Wind	-0.162446	-0.115711	1.000000	-0.028279	-0.054290
Outlook	-0.113775	-0.139317	-0.028279	1.000000	0.068390
Play	-0.021652	-0.096551	-0.054290	0.068390	1.000000

```
In [6]: import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [7]: plt.figure(figsize=(6,6))
sns.heatmap(df[top_corr_features].corr(), annot=True, cmap="PuRd", annot_kws={"fontsi
```

Out[7]: <Axes: >



```
In [8]: feature_cols= df.columns.drop(['Play'])
print(feature_cols)
```

```
Index(['Temperature', 'Humidity', 'Wind', 'Outlook'], dtype='object')
```

```
In [9]: X = df[feature_cols]
X.head()
```

Out[9]:

	Temperature	Humidity	Wind	Outlook
0	3.3	49	1	3
1	3.3	49	1	3
2	3.3	49	1	3
3	3.3	49	1	3
4	3.3	49	1	3

```
In [10]: y = df.Play  
y.head()
```

```
Out[10]: 0    1  
1    0  
2    0  
3    1  
4    1  
Name: Play, dtype: int64
```

```
In [11]: from sklearn.model_selection import train_test_split
```

```
In [12]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.35, random_
```

```
In [13]: len(y_train)
```

```
Out[13]: 4982
```

```
In [14]: len(y_test)
```

```
Out[14]: 2683
```

```
In [15]: from sklearn.svm import SVC  
clf = SVC(kernel='rbf', random_state = 30)
```

```
In [16]: model= clf.fit(X_train, y_train)
```

```
In [17]: y_pred = model.predict(X_test)
```

```
In [18]: len(y_pred)
```

```
Out[18]: 2683
```

```
In [19]: len(y_test)
```

```
Out[19]: 2683
```

```
In [20]: y = pd.DataFrame({"Actual": y_test, "Predicted": y_pred})  
y.head()
```

```
Out[20]:
```

	Actual	Predicted
1736	0	0
6056	0	0
7651	0	0
4467	1	0
7340	0	0

In [21]: `y.tail()`

Out[21]:

	Actual	Predicted
2249	0	0
5956	0	0
1675	0	0
948	0	0
684	0	0

In [22]: `y.sample(10)`

Out[22]:

	Actual	Predicted
99	1	0
7221	0	0
1150	0	0
6741	0	0
5138	0	0
2843	1	0
6954	0	0
1592	0	0
5145	0	0
4924	0	0

In [23]: `from sklearn import metrics`

In [24]: `c_mtrx = metrics.confusion_matrix(y_test, y_pred)`
`print("Confusion Matrix")`
`print(c_mtrx)`

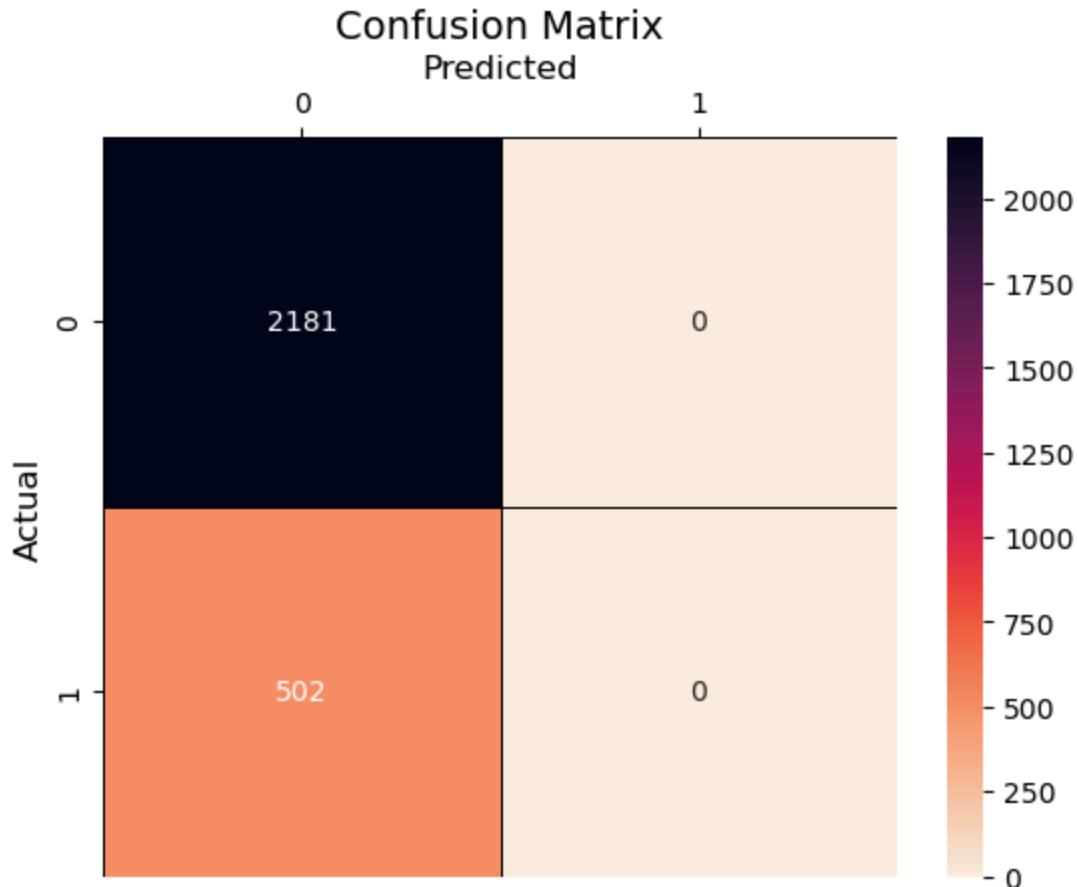
Confusion Matrix

```
[[2181    0]
 [ 502    0]]
```

In [25]: `# Create the heatmap`
`ax = sns.heatmap(c_mtrx, annot=True, fmt='d', cbar=True, cmap="rocket_r", linewidths=1)`
`# fmt='d' for integer format, using a colormap similar to the image`
`# Set predicted labels on top`
`ax.xaxis.tick_top() # Move the x-axis ticks (Predicted Labels) to the top`
`ax.xaxis.set_label_position('top') # Move the x-axis label ('Predicted') to the top`
`# Set the axis labels and title`

```
ax.set_xlabel('Predicted', fontsize=12)
ax.set_ylabel('Actual', fontsize=12)
ax.set_title('Confusion Matrix', fontsize=14)
```

Out[25]: Text(0.5, 1.0, 'Confusion Matrix')



```
In [26]: #[row, column]
#(Actual, Predict)
TN = c_mtrx[0, 0]
FP = c_mtrx[0, 1]
FN = c_mtrx[1, 0]
TP = c_mtrx[1, 1]

print("TN: ", TN, "\tFP: ", FP)
print("FN: ", FN, "\tTP: ", TP)
```

TN: 2181 FP: 0
 FN: 502 TP: 0

```
In [27]: print('Metrics computed from a confusion matrix')
print("Accuracy:\t", metrics.accuracy_score(y_test, y_pred))
print("Sensitivity:\t", metrics.recall_score(y_test, y_pred))
print("Specificity:\t", TN / (TN + FP))
print("Precision:\t", metrics.precision_score(y_test, y_pred))
print("Classification Error:", 1 - metrics.accuracy_score(y_test, y_pred))
print("False_Positive_Rate:", 1 - TN / (TN + FP))
```

```
Metrics computed from a confusion matrix
Accuracy:      0.8128960119269475
Sensitivity:   0.0
Specificity:    1.0
Precision:     0.0
Classification Error: 0.1871039880730525
False_Positive_Rate: 0.0
```

```
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\metrics\_classification.py:1469:
UndefinedMetricWarning: Precision is ill-defined and being set to 0.0 due to no predicted samples. Use `zero_division` parameter to control this behavior.
    _warn_prf(average, modifier, msg_start, len(result))
```

```
In [28]: count0 = df['Play'][df.Play == 0].count()

count1 = df['Play'][df.Play == 1].count()

print("Actual Dataset")
print("0's:", count0)
print("1's:", count1)
```

Actual Dataset

```
0's: 6266
1's: 1399
```

```
In [29]: Trcount0 = sum(y_train==0)
Trcount1 = sum(y_train==1)

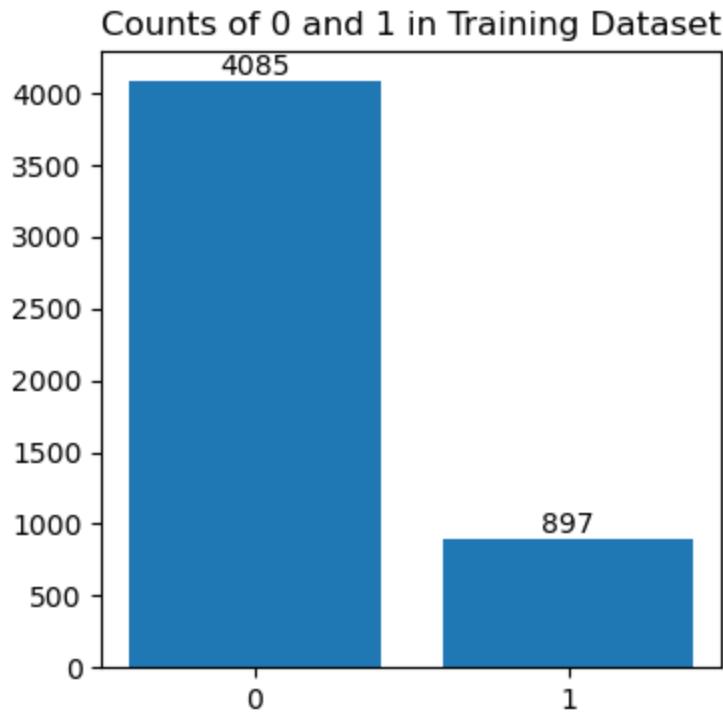
print("Trained Dataset")
print("0's:", Trcount0)
print("1's:", Trcount1)
```

Trained Dataset

```
0's: 4085
1's: 897
```

```
In [30]: # Plotting the bar chart
labels = ['0', '1']
counts = [Trcount0, Trcount1]
plt.figure(figsize=(4,4))
plt.title('Counts of 0 and 1 in Training Dataset')
plt.bar(labels, counts)
# Add annotations to the bars
for i, count in enumerate(counts):
    plt.text(i, count, str(count), ha='center', va='bottom')

plt.show()
```



In []: