数据:

来自于kaggle

- Warding totem: An item that a player can put on the map to reveal the nearby area. Very useful for map/objectives control.
- Minions: NPC that belong to both teams. They give gold when killed by players.
- Jungle minions: NPC that belong to NO TEAM. They give gold and buffs when killed by players.
- Elite monsters: Monsters with high hp/damage that give a massive bonus (gold/XP/stats) when killed by a team.
- Dragons: Elite monster which gives team bonus when killed. The 4th dragon killed by a team gives a massive stats bonus. The 5th dragon (Elder Dragon) offers a huge advantage to the team.
- Herald: Elite monster which gives stats bonus when killed by the player. It helps to push a lane and destroys structures.
- Towers: Structures you have to destroy to reach the enemy Nexus. They give gold.
- Level: Champion level. Start at 1. Max is 18.

```
<bound method NDFrame.head of          gameId  blueWins  ...  redCSPerMin  redGoldPerMin
0     4519157822         0  ...         19.7         1656.7
1     4523371949         0  ...         24.0         1762.0
2     4521474530         0  ...         20.3         1728.5
3     4524384067         0  ...         23.5         1647.8
4     4436033771         0  ...         22.5         1740.4
...          ...       ...  ...          ...            ...
9874  4527873286         1  ...         22.9         1524.6
9875  4527797466         1  ...         20.6         1545.6
9876  4527713716         0  ...         26.1         1831.9
9877  4527628313         0  ...         24.7         1529.8
9878  4523772935         1  ...         20.1         1533.9

[9879 rows x 40 columns]>

Process finished with exit code 0
```

1.了解数据的大致信息

```
data.shape
```

```
(9879, 40)
```

```
data.describe()
```

```
             gameId     blueWins  ...  redCSPerMin  redGoldPerMin
count  9.879000e+03  9879.000000  ...  9879.000000    9879.000000
mean   4.500084e+09     0.499038  ...    21.734923    1648.904140
std    2.757328e+07     0.500024  ...     2.191167     149.088841
min    4.295358e+09     0.000000  ...    10.700000    1121.200000
25%    4.483301e+09     0.000000  ...    20.300000    1542.750000
50%    4.510920e+09     0.000000  ...    21.800000    1637.800000
75%    4.521733e+09     1.000000  ...    23.300000    1741.850000
max    4.527991e+09     1.000000  ...    28.900000    2273.200000

[8 rows x 40 columns]
```

```
data.head
```

```
<bound method NDFrame.head of           gameId  blueWins  ...  redCSPerMin  redGoldPerMin
0     4519157822         0  ...         19.7         1656.7
1     4523371949         0  ...         24.0         1762.0
2     4521474530         0  ...         20.3         1728.5
3     4524384067         0  ...         23.5         1647.8
4     4436033771         0  ...         22.5         1740.4
...          ...       ...  ...          ...            ...
9874  4527873286         1  ...         22.9         1524.6
9875  4527797466         1  ...         20.6         1545.6
9876  4527713716         0  ...         26.1         1831.9
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9878  4523772935         1  ...         20.1         1533.9

[9879 rows x 40 columns]>

Process finished with exit code 0
```

2.预处理

```
labels=np.array(data["Winner"])
features=data.drop("Winner",axis=1)
feature_list=list(features.columns)
features=np.array(features)
```

3.查看特征之间的相关程度

绘制热力图

```
corr = df.corr()
sns.heatmap(corr,
            xticklabels=corr.columns.values,
            yticklabels=corr.columns.values)
```

进行 T-Test...

4.训练模型前需要先对数据集进行划分

```
# 产生X, y, 即特征值与目标值
target_name = 'Winner'
X = df.drop('Winner', axis=1)
y = df[target_name]

# 将数据分为训练和测试数据集
# 注意参数 stratify = y 意味着在产生训练和测试数据中, 离职的员工的百分比等于原来总的数据中的离职的员工的百分比
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.15, random_state=123, stratify=y)
# 显示前5行数据
df.head()
```

5.开始训练

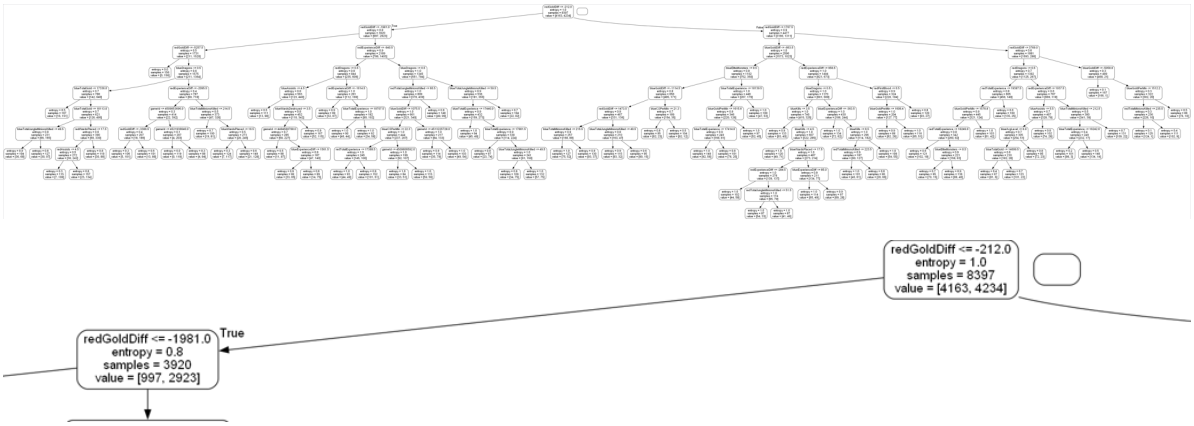
```
# 实例化
dtree = tree.DecisionTreeClassifier(
    criterion='entropy',
    #max_depth=3, # 定义树的深度, 可以用来防止过拟合
    min_weight_fraction_leaf=0.01 # 定义叶子节点最少需要包含多少个样本(使用百分比表达),
防止过拟合
    )
# 训练
dtree = dtree.fit(X_train,y_train)
# 指标计算
dt_roc_auc = roc_auc_score(y_test, dtree.predict(X_test))
print ("决策树 AUC = %2.2f" % dt_roc_auc)
print(classification_report(y_test, dtree.predict(X_test)))
```

```
决策树 AUC = 0.72
              precision    recall  f1-score   support

           0       0.75      0.70      0.72       786
           1       0.69      0.74      0.71       696

    accuracy                           0.72      1482
   macro avg       0.72      0.72      0.72      1482
weighted avg       0.72      0.72      0.72      1482
```

6.树模型的可视化

```
from sklearn.tree import export_graphviz
import pydot
```

```
export_graphviz(dtree,out_file="tree.dot",feature_names=feature_list,rounded=Tru
e,precision=1)
(graph,) = pydot.graph_from_dot_file("tree.dot")
graph.write_png("tree.png")
```



可以看到有多个分支

7.最后看看预测的效果

```
true_data=pd.DataFrame(data={"id":[i for i in
range(100)],"actual":y_test[:100]})
plt.plot(true_data["id"],y_test[:100],"bp",label="actual")
plt.plot(true_data["id"],dtree.predict(X_test)[:100],"rp",label="prediction")

plt.legend()
plt.xlabel("id")
plt.ylabel("blueWin")
plt.title("Actual and Predicted Values")
plt.show()
```

8.用户输入

```
lis = ['blueFirstBlood'
                  ,'blueKills'
                  ,'blueDeaths'
                  ,'blueAssists'
                  ,'blueEliteMonsters'
                  ,'blueDragons'
                  ,'blueHeralds'
                  ,'blueTowersDestroyed'
                  ,'blueTotalGold'
                  ,'blueTotalMinionsKilled'
                  ,'redAssists'
                  ,'redEliteMonsters'
                  ,'redDragons'
                  ,'redHeralds'
                  ,'redTowersDestroyed'
                  ,'redTotalGold'
                  ,'redTotalMinionsKilled']
lol_data = []
for i in range(17):
    print("Please Iuput " + lis[i] + " : ", end='')
    s = int(input())
    lol_data.append([s])

lol_data = np.array(lol_data)
header = np.array(lis)
with open('lol.csv', 'w', newline='') as f:
    f_csv = csv.writer(f)
```

```
    f_csv.writerow(header)
    f_csv.writerows(lol_data.T)

want_data = pd.read_csv(r'lol.csv')

print()
if dtree.predict(want_data) == 1:
    print("BlueTeamWin, Probability: " + str(dtree.predict_proba(want_data)[0]
[1]))
else:
    print("BlueTeamLose, Probability: " + str(dtree.predict_proba(want_data)[0]
[0]))

import os

os.remove('lol.csv')
```

这是我们截取到的比赛第10min的画面，通过反复观看录像用人眼获取数据并输入:

```
Please Iuput blueFirstBlood : 1
Please Iuput blueKills : 1
Please Iuput blueDeaths : 2
Please Iuput blueAssists : 2
Please Iuput blueEliteMonsters : 2
Please Iuput blueDragons : 2
Please Iuput blueHeralds : 1
Please Iuput blueTowersDestroyed : 8
Please Iuput blueTotalGold : 15000
Please Iuput blueTotalMinionsKilled : 303
Please Iuput redAssists : 2
Please Iuput redEliteMonsters : 0
Please Iuput redDragons : 4
Please Iuput redHeralds : 1
Please Iuput redTowersDestroyed : 6
Please Iuput redTotalGold : 15200
Please Iuput redTotalMinionsKilled : 289

BlueTeamWin, Probability: 0.6215686274509804
```

最终得到T1决赛胜利的概率为百分之62(虽然最终还是输了)

不懂

roc_auc_score()

```
dt_roc_auc = roc_auc_score(y_test, dtree.predict(X_test))
```