SURUTHI S

225229141

Pizza Liking Prediction using KNN

In [ ]:

Step 2 : Importing Dataset

In [2]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score
```

In [23]:
```
import warnings
warnings.filterwarnings("ignore")
```

In [3]:
```
df = pd.read_csv("pizza.csv")
df
```

Out[3]:

	age	weight	likepizza
0	50	65	0
1	20	55	1
2	15	40	1
3	70	65	0
4	30	70	1
5	75	60	0

In [4]:
```
df.head()
```

Out[4]:

	age	weight	likepizza
0	50	65	0
1	20	55	1
2	15	40	1
3	70	65	0
4	30	70	1

In [7]:
```
df.columns
```

Out[7]:
```
Index(['age', 'weight', 'likepizza'], dtype='object')
```

In [8]:
```
df.info
```

Out[8]:
```
<bound method DataFrame.info of    age  weight  likepizza
0   50      65          0
1   20      55          1
2   15      40          1
3   70      65          0
4   30      70          1
5   75      60          0>
```

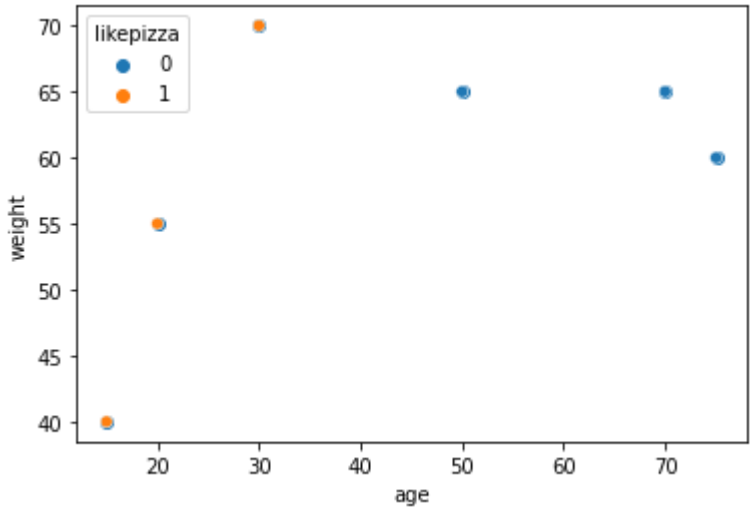
In [9]:
```
df.shape
```

Out[9]:
```
(6, 3)
```

Step 3 : Vizualize Relationship

In [10]:
```
plt.xlabel("age")
plt.ylabel("weight")
plt.scatter(df.age, df.weight)


plot = sns.scatterplot(x=df.age,y=df.weight,hue=df.likepizza)
```



Step 4 : Prepare X Matrix and Y vector

In [15]:
```
x_df = df[['age','weight']]

y_df = df[['likepizza']]

print(x_df)
print(y_df)
```

```
   age  weight
0   50      65
1   20      55
2   15      40
3   70      65
4   30      70
5   75      60

   likepizza
0          0
1          1
2          1
3          0
4          1
5          0
```

Step 5: Examine X and Y

In [21]:
```
print(x_df)
print("Type of X Matrix",type(x_df))
print(y_df)
print("Type of Y Vector ",type(y_df))
```

```
   age  weight
0   50      65
1   20      55
2   15      40
3   70      65
4   30      70
5   75      60

Type of X Matrix <class 'pandas.core.frame.DataFrame'>

   likepizza
0          0
1          1
2          1
3          0
4          1
5          0

Type of Y Vector  <class 'pandas.core.frame.DataFrame'>
```

Step 6 : Model Building

In [24]:
```
# creating Instance for the model

knn = KNeighborsClassifier(n_neighbors=2)

# Training / Fitting Data

knn.fit(x_df,y_df)
```

Out[24]:
```
KNeighborsClassifier(n_neighbors=2)
```

Step 7 : Model Testing

Will a Person who is 25 years old with weight 50kgs Like Pizza or not ? The answer should be 1 (ie Yes)

In [25]:
```
print(knn.predict([[25,50]]))
```

```
[1]
```

Will a Person who is 60 years old with weight 60 kgs Like Pizza or not ? The answer should be 0 (ie No)

In [26]:
```
print(knn.predict([[60,60]]))
```

```
[0]
```

In [27]:
```
print(knn.score(x_df,y_df))
```

```
1.0
```

Step 8 : Change n_neighbors = 3

In [28]:
```
# creating Instance for the model

knn = KNeighborsClassifier(n_neighbors=3)

# Training / Fitting Data

knn.fit(x_df,y_df)

# predicting the outcomes

# when age = 25 and weight = 50
print(knn.predict([[25,50]]))


# when age = 60 and weight = 60
print(knn.predict([[60,60]]))
```

```
[1]
[0]
```

The results when n_neighbors = 2 is same as n_neighbors = 3

Step 9 : Predict on entire dataset

In [29]:
```
y_pred = knn.predict(x_df)
y_pred
```

Out[29]:
```
array([0, 1, 1, 0, 1, 0], dtype=int64)
```

Step 10 : Accuracy Function

In [30]:
```
def accuracy(actual,pred):
    return sum(actual == pred)/float(actual.shape[0])
```

Step 11 : Find Accuracy

In [32]:
```
y_np = y_df.to_numpy()
y_pred = y_pred.reshape(6,1)

accuracy(y_np, y_pred)
```

Out[32]:
```
array([1.])
```

Step 12 : Prediction on Test Set

In [33]:
```
test = pd.read_csv("pizza_test.csv")
```

In [34]:
```
test.head()
```

Out[34]:

	age	weight	likepizza
0	48	68	1
1	35	45	1
2	15	40	0
3	55	65	0

In [35]:
```
test.info
```

Out[35]:
```
<bound method DataFrame.info of    age  weight  likepizza
0   48      68          1
1   35      45          1
2   15      40          0
3   55      65          0>
```

In [36]:
```
test.shape
```

Out[36]:
```
(4, 3)
```

In [37]:
```
test.columns
```

Out[37]:
```
Index(['age', 'weight', 'likepizza'], dtype='object')
```

In [38]:
```
x_test = test.drop("likepizza",axis='columns')
y_test = test[['likepizza']]
```

In [41]:
```
print(x_test,y_test)
```

```
   age  weight
0   48      68
1   35      45
2   15      40
3   55      65

    likepizza
0           1
1           1
2           0
3           0
```

In [43]:
```
knn = KNeighborsClassifier(n_neighbors=2)
```

In [44]:
```
knn.fit(x_test,y_test)
```

Out[44]:
```
KNeighborsClassifier(n_neighbors=2)
```

In [50]:
```
y_pred_test = knn.predict(x_test)

y_test_np = y_test.to_numpy()

y_pred_test = y_pred_test.reshape(4,1)


accuracy(y_test_np, y_pred_test)
```

Out[50]:
```
array([0.5])
```

Step 13 : Find the best value for k

In [51]:
```
scores=[]
for i in range(1,4):
    knn = KNeighborsClassifier(n_neighbors=i)
    knn.fit(x_df,y_df)
    y_pred_test = knn.predict(x_test)
    y_test_np = y_test.to_numpy()
    y_pred_test = y_pred_test.reshape(4,1)
    acc = accuracy(y_test_np, y_pred_test)
    scores.append((i,float(acc)))
```

In [52]:
```
scores
```

Out[52]:
```
[(1, 0.5), (2, 0.5), (3, 0.5)]
```

Step 14 : accuracy_score function

In [54]:
```
# training dataset

score1 = accuracy_score(y_np, y_pred)
print(score1)
```

```
1.0
```

In [53]:
```
# testing dataset

score = accuracy_score(y_test_np, y_pred_test)
print(score)
```

```
0.5
```

In [ ]: