```
from google.colab import drive
```

```
drive.mount('/content/gdrive')
```

```
Drive already mounted at /content/gdrive; to attempt to forcibly remount, call drive.mount("/content/gdrive", force_remount=True).
```

```
import pandas as pd
import numpy as np
import os
import matplotlib.pyplot as plt
from sklearn.decomposition import PCA
```

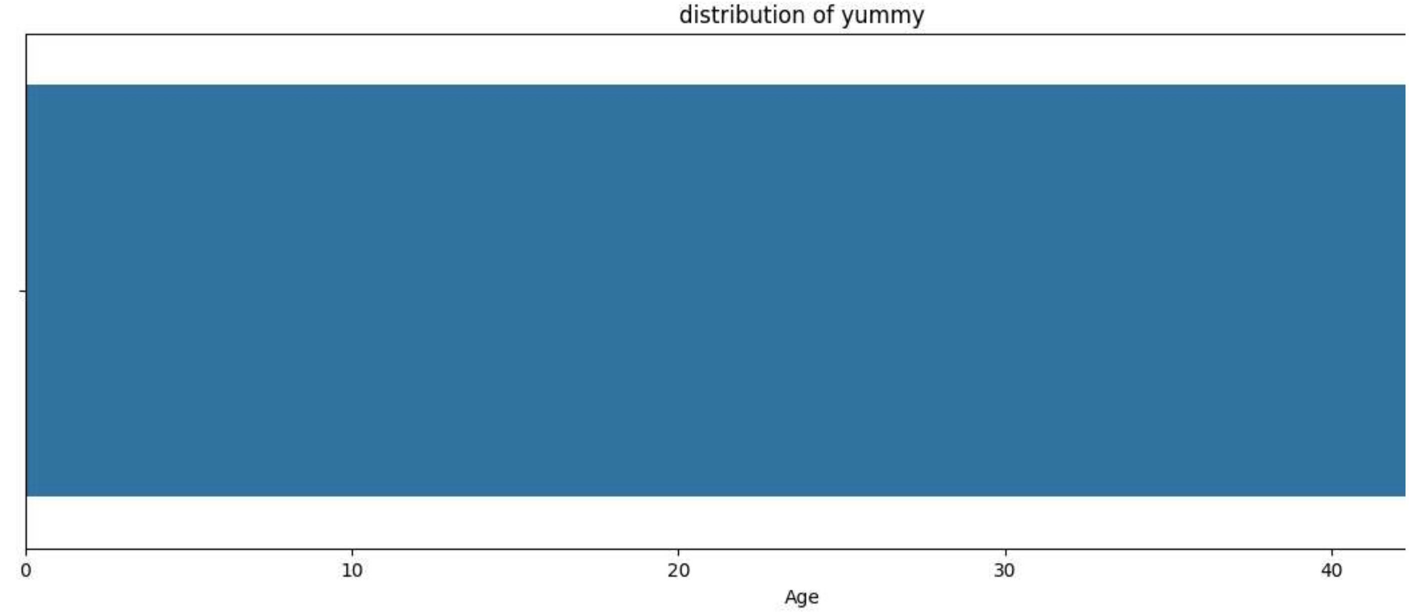
```
df = pd.read_csv('/content/gdrive/MyDrive/mcdonalds.csv')
```

```
df.head()
```

	yummy	convenient	spicy	fattening	greasy	fast	cheap	tasty	expensive	healthy	disgusting	Like	Age	VisitFrequency	Gender
0	No	Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	-3	61	Every three months	Female
1	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	+2	51	Every three months	Female
2	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	+1	62	Every three months	Female
3	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	+4	69	Once a week	Female
4	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	No	+2	49	Once a month	Male

```
import seaborn as sns
plt.figure(figsize=(15,5))
plt.title('distribution of yummy')
sns.barplot(x='Age',data=df)
```

```
<Axes: title={'center': 'distribution of yummy'}, xlabel='Age'>
```



```
df.describe(include="all")
```

	yummy	convenient	spicy	fattening	greasy	fast	cheap	tasty	expensive	healthy	disgusting	Like	Age	VisitFrequency
count	1453	1453	1453	1453	1453	1453	1453	1453	1453	1453	1453	1453	1453.000000	1453
unique	2	2	2	2	2	2	2	2	2	2	2	11	NaN	6
top	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	+3	NaN	Once a month
freq	803	1319	1317	1260	765	1308	870	936	933	1164	1100	229	NaN	439

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1453 entries, 0 to 1452
Data columns (total 15 columns):
 #   Column          Non-Null Count  Dtype 
---  ------          --------------  ----- 
 0   yummy           1453 non-null   object
 1   convenient      1453 non-null   object
 2   spicy           1453 non-null   object
 3   fattening       1453 non-null   object
 4   greasy          1453 non-null   object
 5   fast            1453 non-null   object
 6   cheap           1453 non-null   object
 7   tasty           1453 non-null   object
 8   expensive       1453 non-null   object
 9   healthy         1453 non-null   object
 10  disgusting      1453 non-null   object
 11  Like            1453 non-null   object
 12  Age             1453 non-null   int64 
 13  VisitFrequency  1453 non-null   object
 14  Gender          1453 non-null   object
dtypes: int64(1), object(14)
memory usage: 170.4+ KB
```

```
df.shape
```

```
(1453, 15)
```

```
#check NaN Values
df.isna().sum()
```

```
yummy             0
convenient        0
spicy             0
fattening         0
greasy            0
fast              0
cheap             0
tasty             0
expensive         0
healthy           0
disgusting        0
Like              0
Age               0
VisitFrequency    0
Gender            0
dtype: int64
```

```
df.Age.describe([.75,.90,.95,.99])
```

```
count    1453.000000
mean       44.604955
std        14.221178
min        18.000000
50%        45.000000
75%        57.000000
90%        63.000000
95%        66.000000
99%        70.000000
max        71.000000
Name: Age, dtype: float64
```

```
#distribution of Age
plt.figure(figsize=(15,5))
plt.title("distribution of Age")
sns.distplot(df['Age'])
```

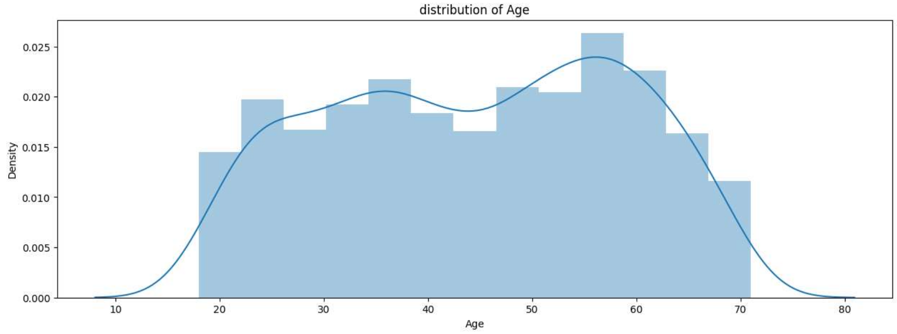
```
<ipython-input-19-34b028f839f5>:4: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(df['Age'])
<Axes: title={'center': 'distribution of Age'}, xlabel='Age', ylabel='Density'>
```



```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
df["yummy"]=le.fit_transform(df["yummy"])
df["convenient"]=le.fit_transform(df["convenient"])
df["spicy"]=le.fit_transform(df["spicy"])
df["fattening"]=le.fit_transform(df["fattening"])
df["greasy"]=le.fit_transform(df["greasy"])
df["fast"]=le.fit_transform(df["fast"])
df["cheap"]=le.fit_transform(df["cheap"])
df["tasty"]=le.fit_transform(df["tasty"])
df["expensive"]=le.fit_transform(df["expensive"])
df["healthy"]=le.fit_transform(df["healthy"])
df["disgusting"]=le.fit_transform(df["disgusting"])
df["Like"]=le.fit_transform(df["Like"])
df["Age"]=le.fit_transform(df["Age"])
df["VisitFrequency"]=le.fit_transform(df["VisitFrequency"])
df["Gender"]=le.fit_transform(df["Gender"])
```

```
df.shape
```

```
(1453, 15)
```

```
df.columns
```

```
Index(['yummy', 'convenient', 'spicy', 'fattening', 'greasy', 'fast', 'cheap',
       'tasty', 'expensive', 'healthy', 'disgusting', 'Like', 'Age',
       'VisitFrequency', 'Gender'],
      dtype='object')
```

```
# columns to keep:
data= df[['yummy', 'convenient', 'spicy', 'fattening', 'greasy', 'fast', 'cheap',
       'tasty', 'expensive', 'healthy', 'disgusting', 'Like', 'Age',
       'VisitFrequency', 'Gender']].rename({'Gender':'label'},axis=1)
```

```
df.head(2)
```

```
from sklearn.model_selection import train_test_split
```

0 0 1 0 1 0 1 1 0 1 0

```
X = data.iloc[:, data.columns != 'label']
y = data.iloc[:, data.columns == 'label']
```

```
# split the data into test and train by maintaing same distribution of output variable 'y_true'[stratify=y_true]
X_train, test_df, y_train, y_test = train_test_split(X, y, stratify=y,test_size=0.2)
# split the train data into train and cross calidation by maintaining same distrubution of output varaible 'y_train'[stratify=y_true]
train_df, cv_df, ytrain, y_cv = train_test_split(X_train, y_train,stratify=y_train, test_size=0.2)
```

```
print('Number of data points in train data:', train_df.shape[0])
print('Number of data points in test data:', test_df.shape[0])
print('Number of data points in cross validation data:',df.shape[0])
```

```
Number of data points in train data: 929
Number of data points in test data: 291
Number of data points in cross validation data: 1453
```

```
test_df.head(2)
```

	yummy	convenient	spicy	fattening	greasy	fast	cheap	tasty	expensive	health
1090	0	1	0	1	0	0	0	1	0	
1252	0	1	0	1	0	1	1	1	0	

```
y_test.head(2)
```

	label
1090	1
1252	1

```
from sklearn.neighbors import KNeighborsClassifier
```

```
knn = KNeighborsClassifier()
```

```
knn.fit(X_train,y_train)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/neighbors/_classification.py:215: DataC
  return self._fit(X, y)
```

▾ KNeighborsClassifier

KNeighborsClassifier()

```
kYPred = knn.predict(X_train)
```

```
from sklearn.metrics import classification_report
from sklearn.metrics import confusion_matrix
```

```
print(classification_report(y_train,kYPred))
```

```
              precision    recall  f1-score   support

           0       0.69      0.78      0.73       630
           1       0.69      0.58      0.63       532

    accuracy                           0.69      1162
   macro avg       0.69      0.68      0.68      1162
weighted avg       0.69      0.69      0.69      1162
```

```
confusion_matrix(y_train,kYPred)
```

```
array([[489, 141],
       [221, 311]])
```

```
import pickle
```

```
pickle.dump(knn,open('knnmodel','wb'))
```