```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from google.colab import files
uploaded=files.upload()
```

```
Choose files vgogte.csv
• vgogte.csv(text/csv) - 1270253 bytes, last modified: 24/12/2023 - 100% done
Saving vgogte.csv to vgogte.csv
```

```
import io
file_name = "vgogte.csv"
df = pd.read_csv(io.StringIO(uploaded[file_name].decode('utf-8')))
print(df.head())
```

```
                         Name Platform Year_of_Release         Genre  \
0               'Wii Sports'      Wii            2006        Sports
1         'Super Mario Bros.'      NES            1985      Platform
2            'Mario Kart Wii'      Wii            2008        Racing
3         'Wii Sports Resort'      Wii            2009        Sports
4  'Pokemon Red/Pokemon Blue'       GB            1996  Role-Playing

  Publisher NA_Sales EU_Sales  JP_Sales  Global_Sales
0  Nintendo    41.36    28.96      3.77         82.53
1  Nintendo    29.08     3.58      6.81         40.24
2  Nintendo    15.68    12.76      3.79         35.52
3  Nintendo    15.61    10.93      3.28         32.77
4  Nintendo    11.27     8.89     10.22         31.37
```

```
df.info()
df.describe()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 16612 entries, 0 to 16611
Data columns (total 9 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   Name             16610 non-null  object
 1   Platform         16611 non-null  object
 2   Year_of_Release  16345 non-null  object
 3   Genre            16610 non-null  object
 4   Publisher        16559 non-null  object
 5   NA_Sales         16587 non-null  object
 6   EU_Sales         16586 non-null  object
 7   JP_Sales         16596 non-null  float64
 8   Global_Sales     16596 non-null  float64
dtypes: float64(2), object(7)
memory usage: 1.1+ MB
```

| | JP_Sales | Global_Sales |
|---|---|---|
| **count** | 16596.000000 | 16596.000000 |
| **mean** | 0.077531 | 0.534790 |
| **std** | 0.305723 | 1.552465 |
| **min** | 0.000000 | 0.000000 |
| **25%** | 0.000000 | 0.060000 |
| **50%** | 0.000000 | 0.170000 |
| **75%** | 0.040000 | 0.470000 |
| **max** | 10.220000 | 82.530000 |

```
df.isnull().sum()
```

```
Name                 2
Platform             1
Year_of_Release    267
Genre                2
Publisher           53
NA_Sales            25
EU_Sales            26
JP_Sales            16
Global_Sales        16
dtype: int64
```

```
import pandas as pd
```

```
# Convert columns 'A' and 'B' to numeric, coercing errors to NaN
df['NA_Sales'] = pd.to_numeric(df['NA_Sales'], errors='coerce')
df['EU_Sales'] = pd.to_numeric(df['EU_Sales'], errors='coerce')
df['JP_Sales'] = pd.to_numeric(df['JP_Sales'], errors='coerce')

# Drop rows with NaN values (non-convertible strings)
df = df.dropna()

# Convert the columns to float
df['NA_Sales'] = df['NA_Sales'].astype(float)
df['EU_Sales'] = df['EU_Sales'].astype(float)
df['JP_Sales'] = df['JP_Sales'].astype(float)
# Check the data types after conversion
print(df.dtypes)
print(df)
```

```
Name               object
Platform           object
Year_of_Release    object
Genre              object
Publisher          object
NA_Sales          float64
EU_Sales          float64
JP_Sales          float64
Global_Sales      float64
dtype: object
                                Name Platform Year_of_Release         Genre  \
0                        'Wii Sports'      Wii            2006        Sports
1                    'Super Mario Bros.'      NES            1985      Platform
2                       'Mario Kart Wii'      Wii            2008        Racing
3                    'Wii Sports Resort'      Wii            2009        Sports
4             'Pokemon Red/Pokemon Blue'       GB            1996  Role-Playing
...                                  ...      ...             ...           ...
16607  'Samurai Warriors: Sanada Maru'      PS3            2016        Action
16608                 'LMA Manager 2007'     X360            2006        Sports
16609         'Haitaka no Psychedelica'      PSV            2016     Adventure
16610                'Spirits & Spells'      GBA            2003      Platform
16611             'Winning Post 8 2016'      PSV            2016    Simulation

             Publisher  NA_Sales  EU_Sales  JP_Sales  Global_Sales
0            Nintendo     41.36     28.96      3.77         82.53
1            Nintendo     29.08      3.58      6.81         40.24
2            Nintendo     15.68     12.76      3.79         35.52
3            Nintendo     15.61     10.93      3.28         32.77
4            Nintendo     11.27      8.89     10.22         31.37
...               ...       ...       ...       ...           ...
16607    'Tecmo Koei'      0.00      0.00      0.01          0.01
16608     Codemasters      0.00      0.01      0.00          0.01
16609  'Idea Factory'      0.00      0.00      0.01          0.01
16610         Wanadoo      0.01      0.00      0.00          0.01
16611    'Tecmo Koei'      0.00      0.00      0.01          0.01

[16216 rows x 9 columns]
```

```
df['Name'] = df['Name'].astype('str')
df['Platform'] = df['Platform'].astype('str')
df['Year_of_Release'] = df['Year_of_Release'].astype('str')
df['Genre'] = df['Genre'].astype('str')
df['Publisher'] = df['Publisher'].astype('str')
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 16216 entries, 0 to 16611
Data columns (total 9 columns):
 #   Column           Non-Null Count  Dtype
---  ------           --------------  -----
 0   Name             16216 non-null  object
 1   Platform         16216 non-null  object
 2   Year_of_Release  16216 non-null  object
 3   Genre            16216 non-null  object
 4   Publisher        16216 non-null  object
 5   NA_Sales         16216 non-null  float64
 6   EU_Sales         16216 non-null  float64
 7   JP_Sales         16216 non-null  float64
 8   Global_Sales     16216 non-null  float64
dtypes: float64(4), object(5)
memory usage: 1.2+ MB
```

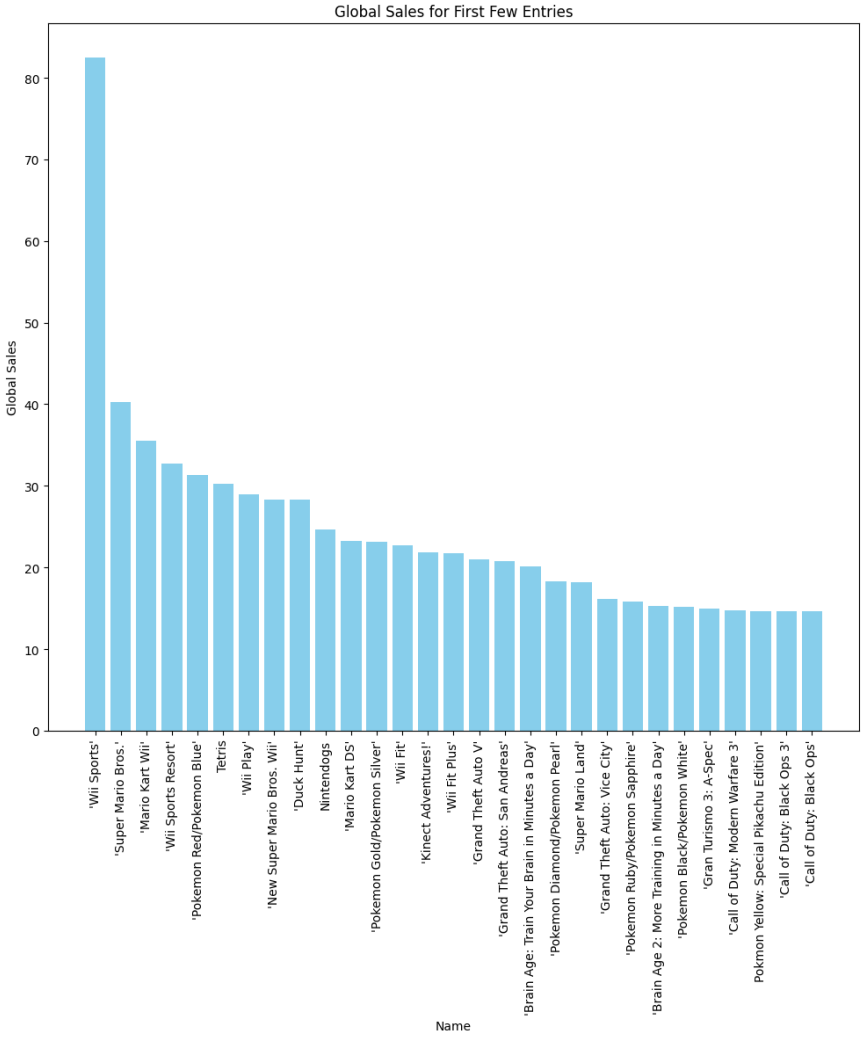
```
df.replace('', np.nan, inplace=True)

# Function to replace missing values using z-score method
def replace_missing_with_zscore(df, column):
    mean = df[column].mean()
    std_dev = df[column].std()
    missing_values = df[column].isnull()

    # Calculate z-scores for non-missing values
    z_scores = (df[column] - mean) / std_dev

    # Replace missing values with mean of non-missing values
    df.loc[missing_values, column] = mean

# Replace missing values in each column with z-score method
for column in df.columns:
    if df[column].dtype != 'object':  # Process only numerical columns
        replace_missing_with_zscore(df, column)
df.isnull().sum()
```

```
Name               0
Platform           0
Year_of_Release    0
Genre              0
Publisher          0
NA_Sales           0
EU_Sales           0
JP_Sales           0
Global_Sales       0
dtype: int64
```

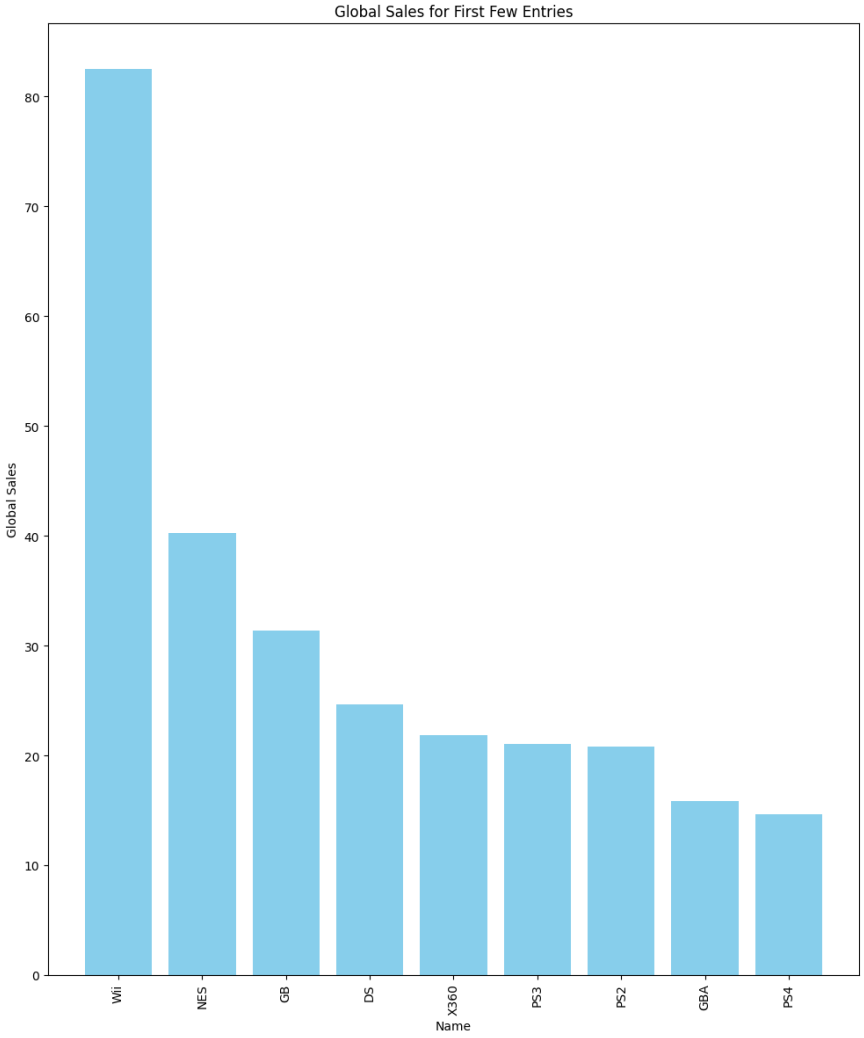
```
feature_names = df.columns
print ("feature names: ",feature_names)
```

```
feature names:  Index(['Name', 'Platform', 'Year_of_Release', 'Genre', 'Publisher', 'NA_Sales',
       'EU_Sales', 'JP_Sales', 'Global_Sales'],
      dtype='object')
```

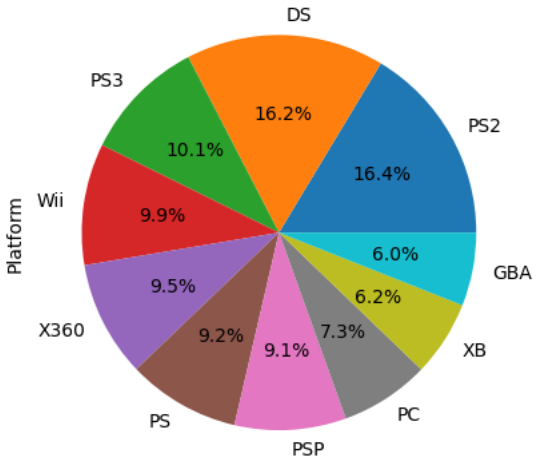
```
# Assuming you have already loaded your dataset into a DataFrame named 'df'

# Selecting the first few entries (let's say 10 entries)
num_entries_to_plot = 30
subset_df = df.head(num_entries_to_plot)

# Extracting the 'Names' and 'Global_sales' columns from the subset
names = subset_df['Name']
global_sales = subset_df['Global_Sales']

# Creating a bar plot
plt.figure(figsize=(10, 12))
plt.bar(names, global_sales, color='skyblue')
plt.xlabel('Name')
plt.ylabel('Global Sales')
plt.title('Global Sales for First Few Entries')
plt.xticks(rotation=90)  # Rotate x-axis labels for better readability if needed
plt.tight_layout()

plt.show()
```




```
# Assuming you have already loaded your dataset into a DataFrame named 'df'

# Selecting the first few entries (let's say 10 entries)
num_entries_to_plot = 30
subset_df = df.head(num_entries_to_plot)

# Extracting the 'Names' and 'Global_sales' columns from the subset
names = subset_df['Platform']
global_sales = subset_df['Global_Sales']

# Creating a bar plot
plt.figure(figsize=(10, 12))
plt.bar(names, global_sales, color='skyblue')
plt.xlabel('Name')
plt.ylabel('Global Sales')
plt.title('Global Sales for First Few Entries')
plt.xticks(rotation=90)  # Rotate x-axis labels for better readability if needed
plt.tight_layout()

plt.show()
```




```
# prompt: create a pie chart for top 10  "platform"

df.Platform.value_counts().head(10).plot.pie(autopct='%1.1f%%')
plt.show()
```



```
# Calculate Q1 (25th percentile)
Q1 = df['NA_Sales'].quantile(0.25)

# Calculate Q3 (75th percentile)
Q3 = df['NA_Sales'].quantile(0.75)

# Calculate IQR (Interquartile Range)
IQR = Q3 - Q1

# Calculate lower and upper bounds for outliers
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

# Detect outliers
outliers = df[(df['NA_Sales'] < lower_bound) | (df['NA_Sales'] > upper_bound)]

print("Lower bound for outliers:", lower_bound)
print("Upper bound for outliers:", upper_bound)
print("Outliers:")
print(outliers)
```

```
Lower bound for outliers: -0.36
Upper bound for outliers: 0.6
Outliers:
                                     Name Platform Year_of_Release  \
0                             'Wii Sports'      Wii            2006
1                       'Super Mario Bros.'      NES            1985
2                          'Mario Kart Wii'      Wii            2008
3                       'Wii Sports Resort'      Wii            2009
4                 'Pokemon Red/Pokemon Blue'       GB            1996
...                                      ...      ...             ...
2966                   'NBA Street Vol. 2'       XB            2003
2970                  'NCAA Football 2005'       XB            2004
2986  'Cars: Mater-National Championship'       DS            2007
3015                  'Adventures of Tron'     2600            1981
3061                     'Keystone Kapers'     2600            1982

              Genre              Publisher  NA_Sales  EU_Sales  JP_Sales  \
0            Sports               Nintendo     41.36     28.96      3.77
1          Platform               Nintendo     29.08      3.58      6.81
2            Racing               Nintendo     15.68     12.76      3.79
3            Sports               Nintendo     15.61     10.93      3.28
4     Role-Playing               Nintendo     11.27      8.89     10.22
...            ...                    ...       ...       ...       ...
2966         Sports     'Electronic Arts'      0.62      0.04      0.00
2970         Sports     'Electronic Arts'      0.63      0.02      0.00
2986         Racing                   THQ      0.63      0.00      0.00
3015         Action  'Mattel Interactive'      0.63      0.03      0.00
3061         Action            Activision      0.62      0.04      0.00

      Global_Sales
0            82.53
1            40.24
2            35.52
3            32.77
4            31.37
...            ...
2966          0.68
2970          0.68
2986          0.68
3015          0.67
3061          0.66

[1643 rows x 9 columns]
```

```
# Calculate Q1 (25th percentile)
Q1 = df['EU_Sales'].quantile(0.25)

# Calculate Q3 (75th percentile)
Q3 = df['EU_Sales'].quantile(0.75)

# Calculate IQR (Interquartile Range)
IQR = Q3 - Q1

# Calculate lower and upper bounds for outliers
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

# Detect outliers
outliers = df[(df['EU_Sales'] < lower_bound) | (df['EU_Sales'] > upper_bound)]

print("Lower bound for outliers:", lower_bound)
print("Upper bound for outliers:", upper_bound)
print("Outliers:")
print(outliers)
```

```
Lower bound for outliers: -0.165
Upper bound for outliers: 0.275
Outliers:
                                          Name Platform Year_of_Release  \
0                                  'Wii Sports'      Wii            2006
1                              'Super Mario Bros.'      NES            1985
2                                 'Mario Kart Wii'      Wii            2008
3                              'Wii Sports Resort'      Wii            2009
4                        'Pokemon Red/Pokemon Blue'       GB            1996
...                                             ...      ...             ...
5483                      'We Sing Deutsche Hits'      Wii            2011
5487                                 'The X-Factor'      Wii            2010
5568                          'Batman: Arkham Asylum'       PC            2009
5726  'Gold\'s Gym: Cardio Workout (Others sales)'      Wii            2008
5760                             'SingStar Take That'      PS3            2009

              Genre                       Publisher  NA_Sales  EU_Sales  \
0            Sports                        Nintendo     41.36     28.96
1          Platform                        Nintendo     29.08      3.58
2            Racing                        Nintendo     15.68     12.76
3            Sports                        Nintendo     15.61     10.93
4     Role-Playing                        Nintendo     11.27      8.89
...            ...                             ...       ...       ...
5483          Misc                 'Nordic Games'      0.00      0.29
5487          Misc                  'Deep Silver'      0.00      0.28
5568        Action            'Eidos Interactive'      0.00      0.28
5726        Sports                        Ubisoft      0.00      0.29
5760          Misc  'Sony Computer Entertainment'      0.00      0.28

      JP_Sales  Global_Sales
0         3.77         82.53
1         6.81         40.24
2         3.79         35.52
3         3.28         32.77
4        10.22         31.37
...        ...           ...
5483      0.00          0.33
5487      0.00          0.33
5568      0.00          0.32
5726      0.00          0.31
5760      0.00          0.31

[2011 rows x 9 columns]
```

```
# Calculate Q1 (25th percentile)
Q1 = df['JP_Sales'].quantile(0.25)

# Calculate Q3 (75th percentile)
Q3 = df['JP_Sales'].quantile(0.75)

# Calculate IQR (Interquartile Range)
IQR = Q3 - Q1

# Calculate lower and upper bounds for outliers
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

# Detect outliers
outliers = df[(df['JP_Sales'] < lower_bound) | (df['JP_Sales'] > upper_bound)]

print("Lower bound for outliers:", lower_bound)
print("Upper bound for outliers:", upper_bound)
print("Outliers:")
print(outliers)
```

```
Lower bound for outliers: -0.06
Upper bound for outliers: 0.1
Outliers:
                                                  Name Platform  \
0                                         'Wii Sports'      Wii
1                                    'Super Mario Bros.'      NES
2                                       'Mario Kart Wii'      Wii
3                                    'Wii Sports Resort'      Wii
4                              'Pokemon Red/Pokemon Blue'       GB
...                                                  ...      ...
10349  'Mobile Suit Gundam Age: Universe Accel / Cosm...      PSP
10352         'Dragon Ball Z Super Gokuden: Kakusei-Hen'     SNES
10353               'Busou Shinki: Battle Masters Mk. 2'      PSP
10356                    'Fate/Extella: The Umbral Star'      PS4
10357                       'Fairy Tail: Portable Guild'      PSP

      Year_of_Release         Genre                       Publisher  NA_Sales  \
0                2006        Sports                        Nintendo     41.36
1                1985      Platform                        Nintendo     29.08
2                2008        Racing                        Nintendo     15.68
3                2009        Sports                        Nintendo     15.61
4                1996  Role-Playing                        Nintendo     11.27
...               ...           ...                             ...       ...
10349            2012        Action            'Namco Bandai Games'      0.00
10352            1995  Role-Playing            'Namco Bandai Games'      0.00
10353            2011        Action  'Konami Digital Entertainment'      0.00
10356            2016        Action                           PQube      0.00
10357            2010      Fighting  'Konami Digital Entertainment'      0.00

       EU_Sales  JP_Sales  Global_Sales
0         28.96      3.77         82.53
1          3.58      6.81         40.24
2         12.76      3.79         35.52
3         10.93      3.28         32.77
4          8.89     10.22         31.37
...         ...       ...           ...
10349      0.00      0.11          0.11
10352      0.00      0.11          0.11
10353      0.00      0.11          0.11
10356      0.00      0.11          0.11
10357      0.00      0.11          0.11

[2391 rows x 9 columns]
```

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from sklearn.svm import SVR
from sklearn.metrics import mean_squared_error, r2_score


# Encode categorical variables (if 'Platform' is categorical)
label_encoder = LabelEncoder()
df['Platform'] = label_encoder.fit_transform(df['Platform'])

# Define features and target variable
features = ['Platform', 'EU_Sales', 'JP_Sales', 'NA_Sales']
target = 'Global_Sales'

X = df[features]
y = df[target]

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
import pandas as pd
from sklearn.cluster import KMeans
import matplotlib.pyplot as plt


# Considering 'EU_Sales', 'JP_Sales', 'NA_Sales' for clustering
features = ['EU_Sales', 'JP_Sales', 'NA_Sales']
X = df[features]

# Choosing the number of clusters (you can change this value)
num_clusters = 3

# Initialize KMeans with the number of clusters
kmeans = KMeans(n_clusters=num_clusters, random_state=42)

# Fit KMeans to the data
kmeans.fit(X)

# Getting cluster labels and centroids
cluster_labels = kmeans.labels_
centroids = kmeans.cluster_centers_

# Adding cluster labels to the dataset
df['Cluster'] = cluster_labels

# Visualizing the clusters (for 2D data)
plt.figure(figsize=(8, 6))
plt.scatter(X['EU_Sales'], X['NA_Sales'], c=cluster_labels, cmap='viridis', s=50, alpha=0.5)
plt.scatter(centroids[:, 0], centroids[:, 2], marker='o', c='red', s=200, label='Centroids')
plt.xlabel('EU Sales')
plt.ylabel('NA Sales')
plt.title('KMeans Clustering')
plt.legend()
plt.show()

# Print cluster centers
print("Cluster Centers:")
for i, centroid in enumerate(centroids):
    print(f"Cluster {i+1}: {centroid}")
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: The default value of `n_init` will change fro
  warnings.warn(
```