Final_Spotify_Final_Data_Analysis

October 3, 2023

0.1 Importing pandas,numpy,seaborn & matplotlib

[79]:

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

[80]:

```
sns.set_style("darkgrid")
```

0.2 Data Importing -

[81]:

```
df = pd.read_csv(r"C:\Users\amitm\Desktop\data.csv")
df.drop("Unnamed: 0", axis = 1, inplace =True)
df.head()
```

[81]:

```
   acousticness  danceability  duration_ms  energy  instrumentalness  key  \
0        0.0102         0.833       204600   0.434          0.021900    2
1        0.1990         0.743       326933   0.359          0.006110    1
2        0.0344         0.838       185707   0.412          0.000234    2
3        0.6040         0.494       199413   0.338          0.510000    5
4        0.1800         0.678       392893   0.561          0.512000    5

   liveness  loudness  mode  speechiness    tempo  time_signature  valence  \
0    0.1650    -8.795     1       0.4310  150.062             4.0    0.286
1    0.1370   -10.401     1       0.0794  160.083             4.0    0.588
2    0.1590    -7.148     1       0.2890   75.044             4.0    0.173
3    0.0922   -15.236     1       0.0261   86.468             4.0    0.230
4    0.4390   -11.648     0       0.0694  174.004             4.0    0.904

   target      song_title            artist
0       1        Mask Off            Future
1       1         Redbone  Childish Gambino
2       1    Xanny Family            Future
3       1  Master Of None       Beach House
4       1  Parallel Lines       Junior Boys
```

[82]:

```
df.head()
```

```
[82]:    acousticness  danceability  duration_ms  energy  instrumentalness  key  \
      0        0.0102         0.833       204600   0.434          0.021900    2
      1        0.1990         0.743       326933   0.359          0.006110    1
      2        0.0344         0.838       185707   0.412          0.000234    2
      3        0.6040         0.494       199413   0.338          0.510000    5
      4        0.1800         0.678       392893   0.561          0.512000    5

         liveness  loudness  mode  speechiness    tempo  time_signature  valence  \
      0    0.1650    -8.795     1       0.4310  150.062             4.0    0.286
      1    0.1370   -10.401     1       0.0794  160.083             4.0    0.588
      2    0.1590    -7.148     1       0.2890   75.044             4.0    0.173
      3    0.0922   -15.236     1       0.0261   86.468             4.0    0.230
      4    0.4390   -11.648     0       0.0694  174.004             4.0    0.904

         target      song_title            artist
      0       1        Mask Off            Future
      1       1         Redbone  Childish Gambino
      2       1    Xanny Family            Future
      3       1  Master Of None       Beach House
      4       1  Parallel Lines       Junior Boys
```

0.3 data cleaning -

```
[83]: df.isna().sum()
```

```
[83]: acousticness        0
      danceability        0
      duration_ms         0
      energy              0
      instrumentalness    0
      key                 0
      liveness            0
      loudness            0
      mode                0
      speechiness         0
      tempo               0
      time_signature      0
      valence             0
      target              0
      song_title          0
      artist              0
      dtype: int64
```

```
[84]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2017 entries, 0 to 2016
Data columns (total 16 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   acousticness      2017 non-null   float64
 1   danceability      2017 non-null   float64
 2   duration_ms       2017 non-null   int64
 3   energy            2017 non-null   float64
 4   instrumentalness  2017 non-null   float64
 5   key               2017 non-null   int64
 6   liveness          2017 non-null   float64
 7   loudness          2017 non-null   float64
 8   mode              2017 non-null   int64
 9   speechiness       2017 non-null   float64
 10  tempo             2017 non-null   float64
 11  time_signature    2017 non-null   float64
 12  valence           2017 non-null   float64
 13  target            2017 non-null   int64
 14  song_title        2017 non-null   object
 15  artist            2017 non-null   object
dtypes: float64(10), int64(4), object(2)
memory usage: 252.2+ KB
```

[85]:

```
df.shape
```

[85]:

```
(2017, 16)
```

[86]:

```
df.columns
```

[86]:

```
Index(['acousticness', 'danceability', 'duration_ms', 'energy',
       'instrumentalness', 'key', 'liveness', 'loudness', 'mode',
       'speechiness', 'tempo', 'time_signature', 'valence', 'target',
       'song_title', 'artist'],
      dtype='object')
```

[87]:

```
len(df.columns)
```

[87]:

```
16
```

[88]:

```
df.describe()
```

[88]:

```
       acousticness  danceability   duration_ms       energy  \
count   2017.000000   2017.000000  2.017000e+03  2017.000000
mean       0.187590      0.618422  2.463062e+05     0.681577
std        0.259989      0.161029  8.198181e+04     0.210273
min        0.000003      0.122000  1.604200e+04     0.014800
25%        0.009630      0.514000  2.000150e+05     0.563000
50%        0.063300      0.631000  2.292610e+05     0.715000
75%        0.265000      0.738000  2.703330e+05     0.846000
max        0.995000      0.984000  1.004627e+06     0.998000
```

```
       instrumentalness          key     liveness     loudness         mode  \
count       2017.000000  2017.000000  2017.000000  2017.000000  2017.000000
mean           0.133286     5.342588     0.190844    -7.085624     0.612295
std            0.273162     3.648240     0.155453     3.761684     0.487347
min            0.000000     0.000000     0.018800   -33.097000     0.000000
25%            0.000000     2.000000     0.092300    -8.394000     0.000000
50%            0.000076     6.000000     0.127000    -6.248000     1.000000
75%            0.054000     9.000000     0.247000    -4.746000     1.000000
max            0.976000    11.000000     0.969000    -0.307000     1.000000

       speechiness        tempo  time_signature      valence       target
count  2017.000000  2017.000000     2017.000000  2017.000000  2017.000000
mean      0.092664   121.603272        3.968270     0.496815     0.505702
std       0.089931    26.685604        0.255853     0.247195     0.500091
min       0.023100    47.859000        1.000000     0.034800     0.000000
25%       0.037500   100.189000        4.000000     0.295000     0.000000
50%       0.054900   121.427000        4.000000     0.492000     1.000000
75%       0.108000   137.849000        4.000000     0.691000     1.000000
max       0.816000   219.331000        5.000000     0.992000     1.000000
```

0.4 DATA ANALYSIS -

1 Top 10 Popular Artists?

[89]:

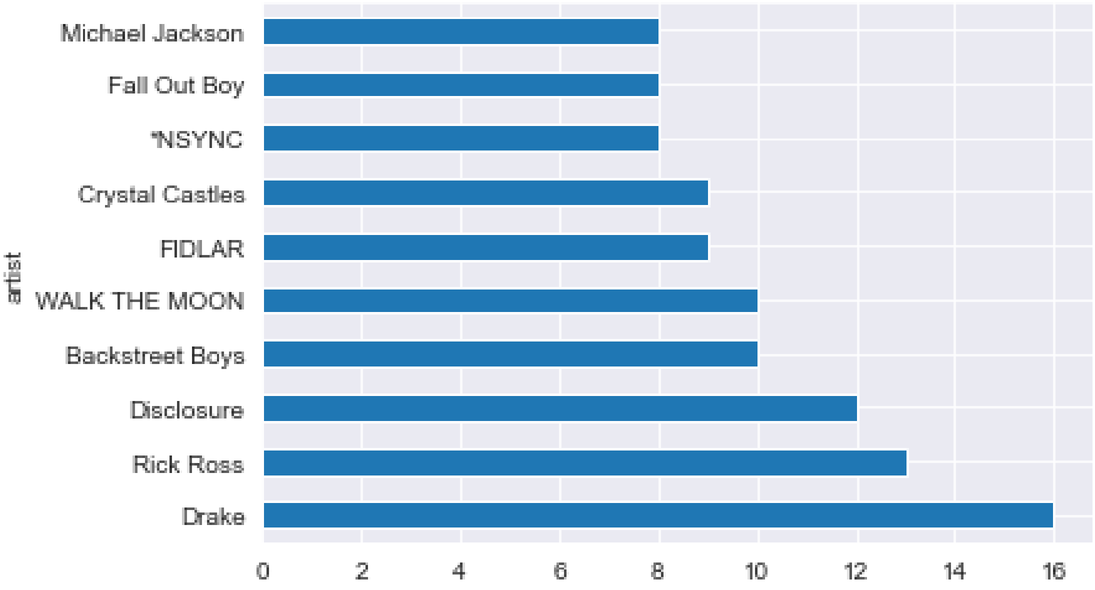
```
top_ten_artists = df.groupby("artist").count().sort_values(by="song_title",␣
 ↪ascending=False)["song_title"][:10]
top_ten_artists
```

[89]:

```
artist
Drake                  16
Rick Ross              13
Disclosure             12
Backstreet Boys        10
WALK THE MOON          10
FIDLAR                  9
Crystal Castles         9
*NSYNC                  8
Fall Out Boy            8
Michael Jackson         8
Name: song_title, dtype: int64
```

[90]:

```
top_ten_artists.plot.barh()
plt.show()
```

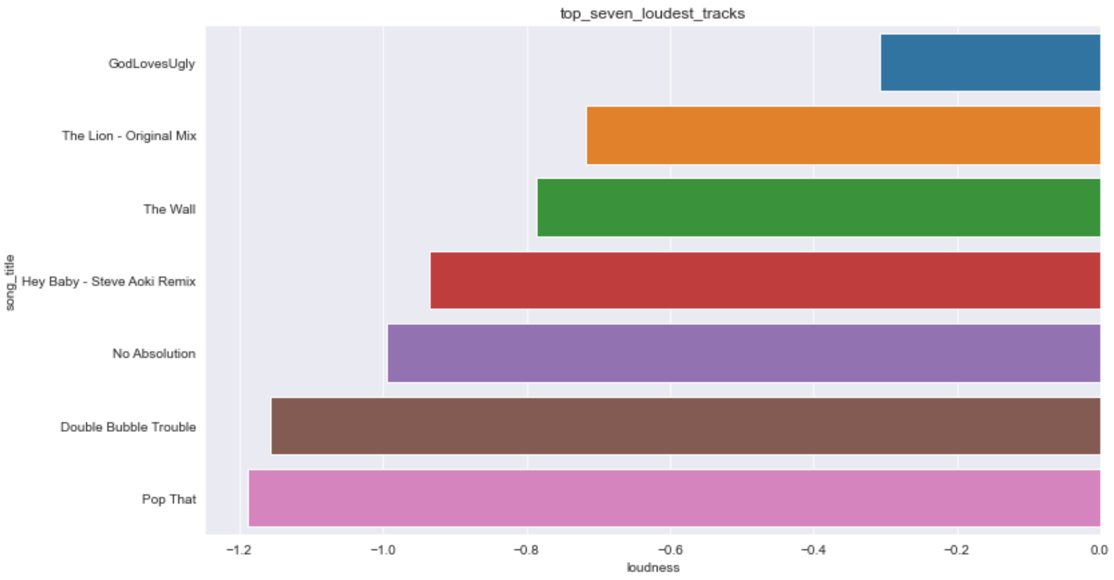


1.1 Top 7 Loudest tracks?

```
[91]: top_seven_loudest_tracks = df[["loudness", "song_title"]].
       ↪sort_values(by="loudness",ascending = False)[:7]
      top_seven_loudest_tracks
```

```
[91]:       loudness                     song_title
      195     -0.307                   GodLovesUgly
      636     -0.718         The Lion - Original Mix
      1443    -0.787                       The Wall
      2010    -0.935    Hey Baby - Steve Aoki Remix
      1299    -0.994                  No Absolution
      205     -1.157           Double Bubble Trouble
      629     -1.188                       Pop That
```

```
[92]: plt.figure(figsize=(12,7))
      sns.barplot(x="loudness" , y= "song_title",data =top_seven_loudest_tracks)
      plt.title("top_seven_loudest_tracks")
      plt.show()
```

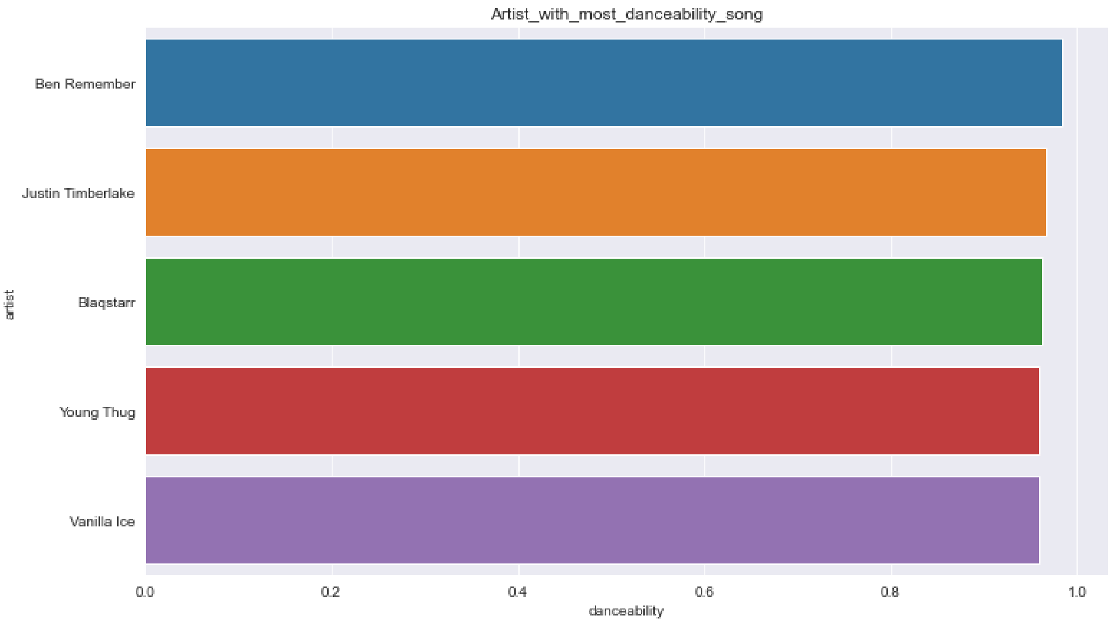


1.2 Artists with more danceability songs?

```
[93]: top_five_artists_danceable_songs=df[["artist", "song_title", "danceability"]].
       ↪sort_values(by="danceability",ascending=False)[:5]
      top_five_artists_danceable_songs
```

```
[93]:                 artist              song_title  danceability
      1433       Ben Remember  Flashwind - Radio Edit         0.984
      1901  Justin Timberlake                SexyBack         0.967
      604           Blaqstarr       Check Me Out Like         0.962
      32           Young Thug             Best Friend         0.959
      1957        Vanilla Ice            Ice Ice Baby         0.959
```

```
[94]: plt.figure(figsize=(12,7))
      sns.barplot(x="danceability" , y= "artist", data␣
       ↪=top_five_artists_danceable_songs)
      plt.title("Artist_with_most_danceability_song")
      plt.show()
```



1.3 Top 10 Instrumental songs?

[95]:

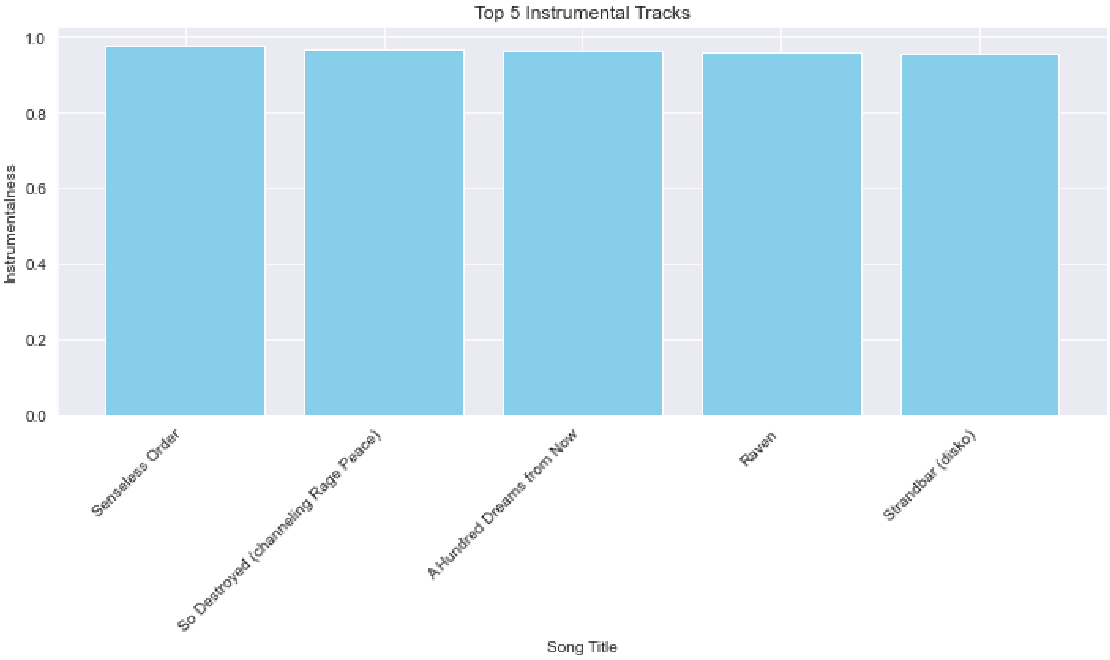
```
top_ten_instrumental_tracks = df[["song_title", "artist", "instrumentalness"]].
 ↪sort_values(by="instrumentalness",ascending = False) [:5]
top_ten_instrumental_tracks
```

[95]:

```
                                   song_title              artist  \
1313                          Senseless Order  Signs of the Swarm
271   So Destroyed (channeling Rage Peace)         Prince Rama
1575                A Hundred Dreams from Now          Ray Bryant
1619                                    Raven        John Dahlbäck
725                         Strandbar (disko)          Todd Terje

      instrumentalness
1313             0.976
271              0.968
1575             0.964
1619             0.958
725              0.957
```

[121]:

```
song_titles = top_ten_instrumental_tracks["song_title"]
instrumentalness_values = top_ten_instrumental_tracks["instrumentalness"]
# Creating a bar chart
plt.figure(figsize=(10, 6))
plt.bar(song_titles, instrumentalness_values, color='skyblue')
plt.xlabel("Song Title")
plt.ylabel("Instrumentalness")
plt.title("Top 5 Instrumental Tracks")
plt.xticks(rotation=45, ha="right")
# Showing the plot
plt.tight_layout()
plt.show()
```



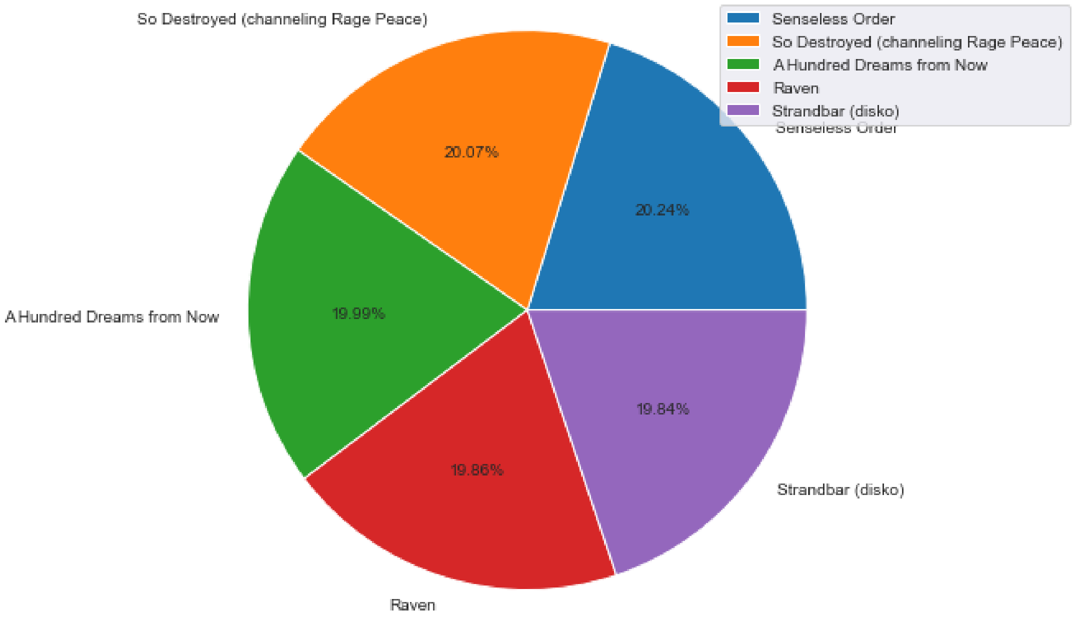
[97]:

```
data = top_ten_instrumental_tracks["instrumentalness"]
```

1.4 Top 5 instrumental songs - visualizing via pie chart-

[98]:

```
plt.figure(figsize=(12, 7))
plt.pie(data, autopct='%1.2f%%',labels = top_ten_instrumental_tracks.song_title)
plt.axis('equal')
plt.legend(top_ten_instrumental_tracks.song_title, loc="best")
plt.show()
```



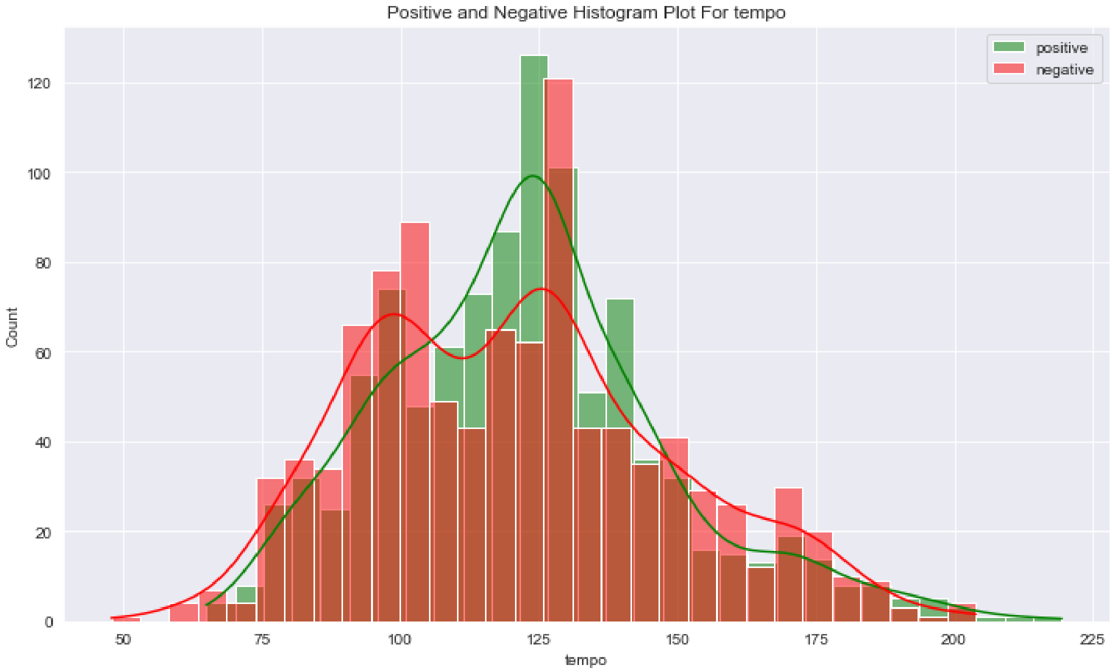
1.5 Multiple feature plot-

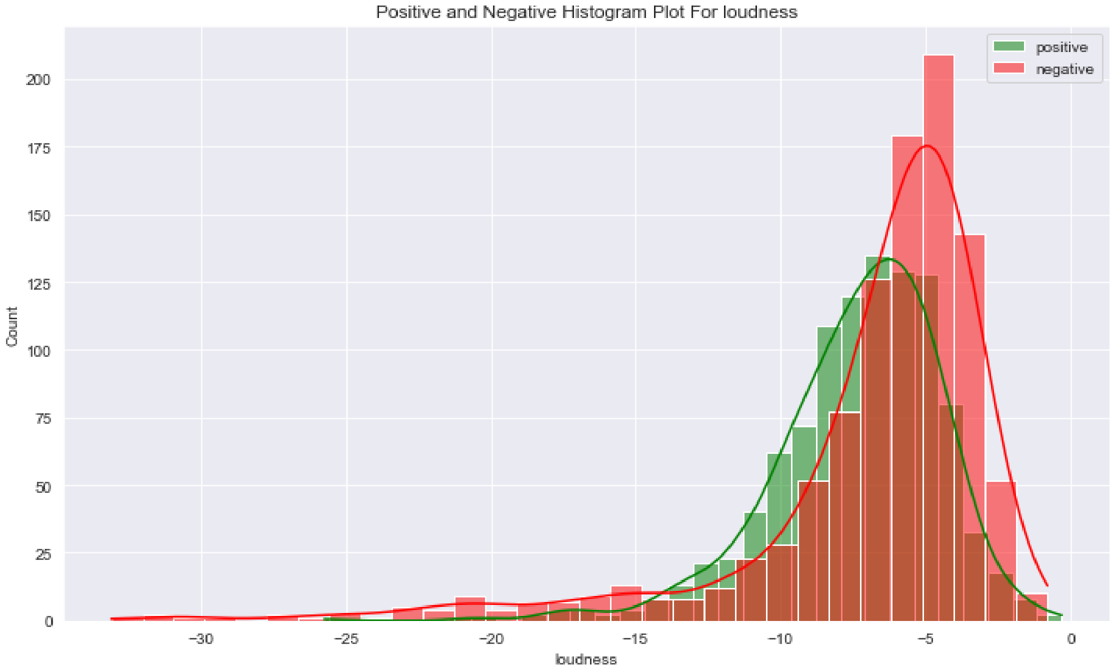
[102]:

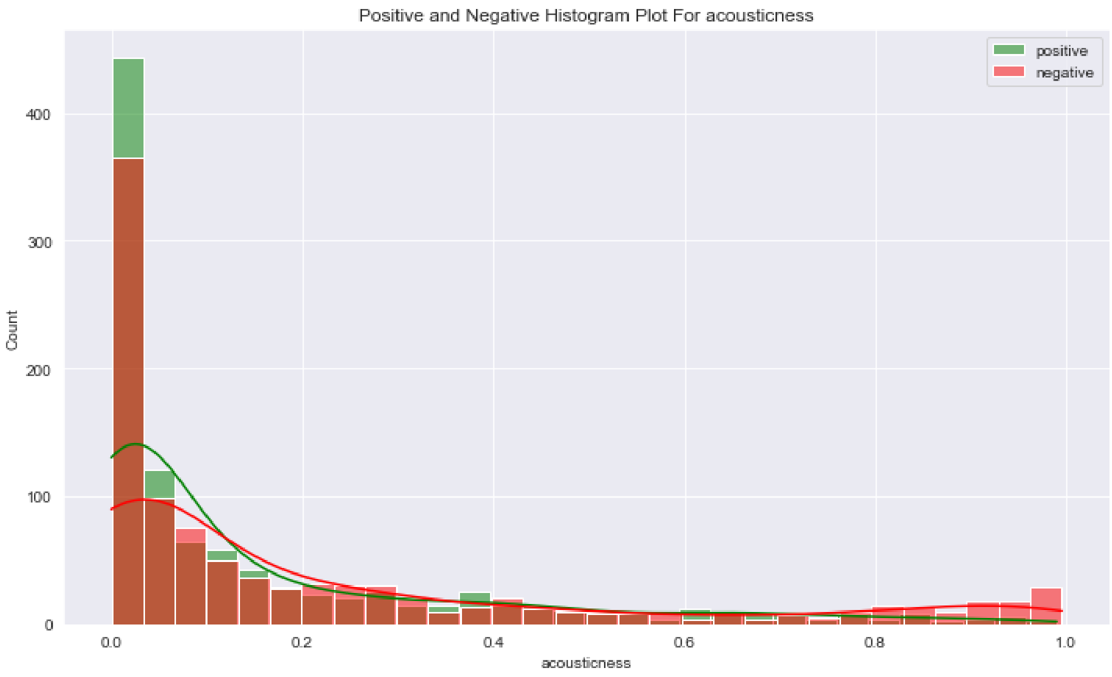
```
interest_feature_cols =␣
 ↪["tempo","loudness","acousticness","danceability","duration_ms","energy","instrumentalness"
                          "liveness","speechiness","valence"]
```

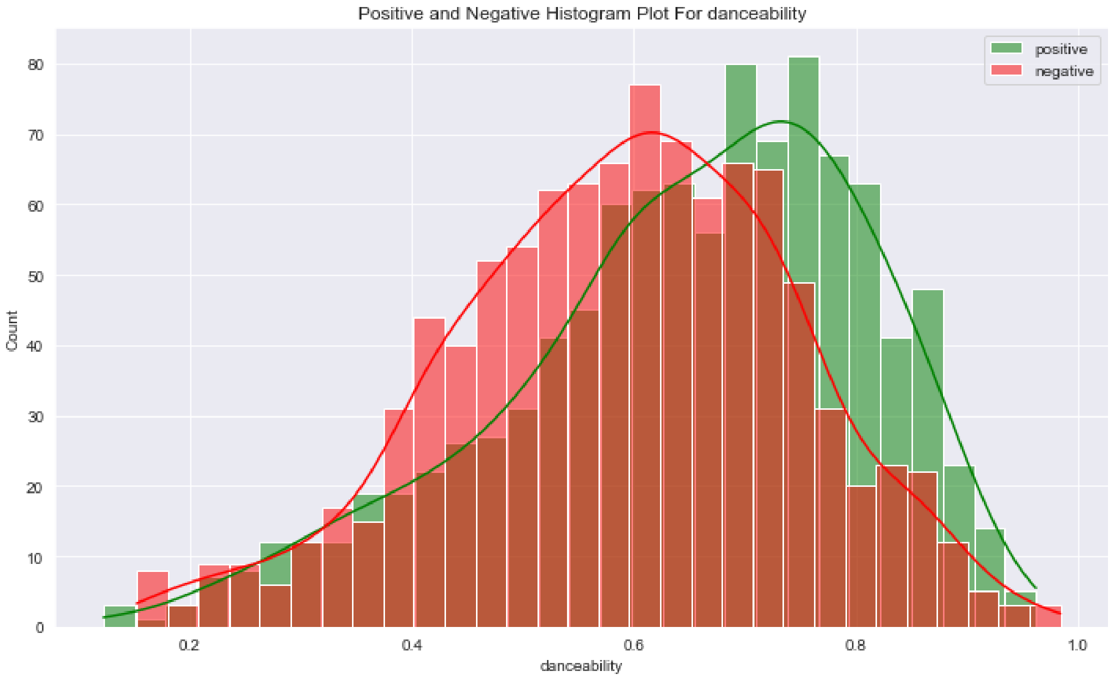
[103]:

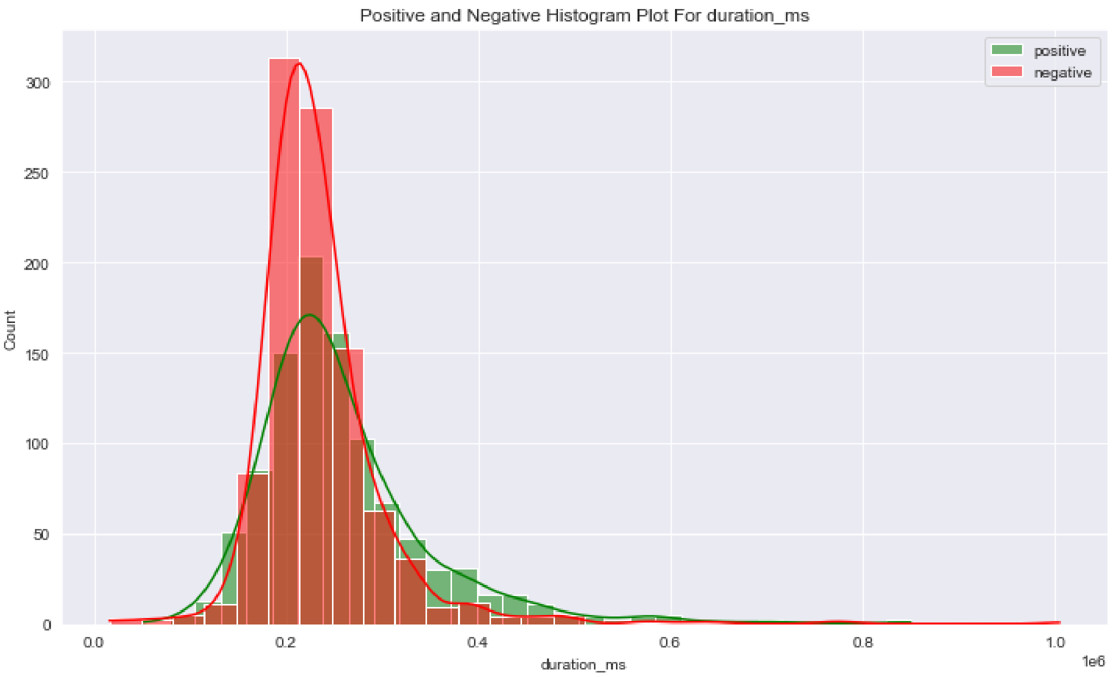
```
for feature_col in interest_feature_cols:
    pos_data = df[df["target"] == 1][feature_col]
    neg_data = df[df["target"] == 0][feature_col]

    plt.figure(figsize=(12, 7))

    sns.histplot(pos_data, bins=30, label="positive", color="green", kde=True)
    sns.histplot(neg_data, bins=30, label="negative", color="red", kde=True)

    plt.legend(loc="upper right")
    plt.title(f"Positive and Negative Histogram Plot For {feature_col}")
    plt.show()
```

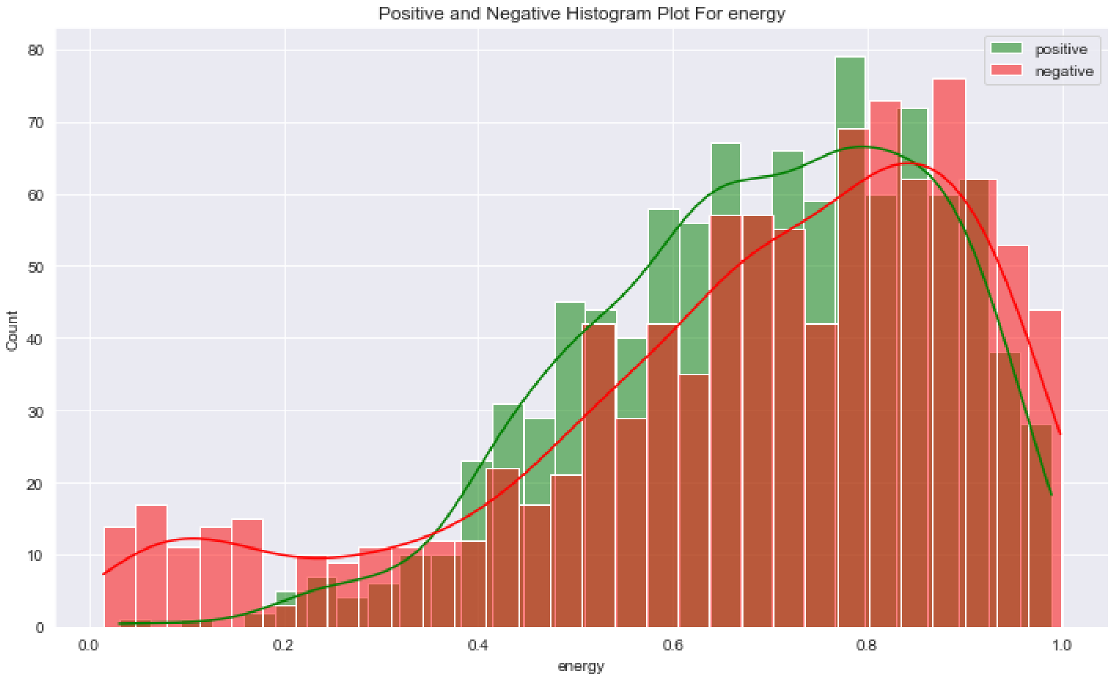

Positive and Negative Histogram Plot For tempo
positive
negative
Count
0
20
40
60
80
100
120
tempo
50
75
100
125
150
175
200
225

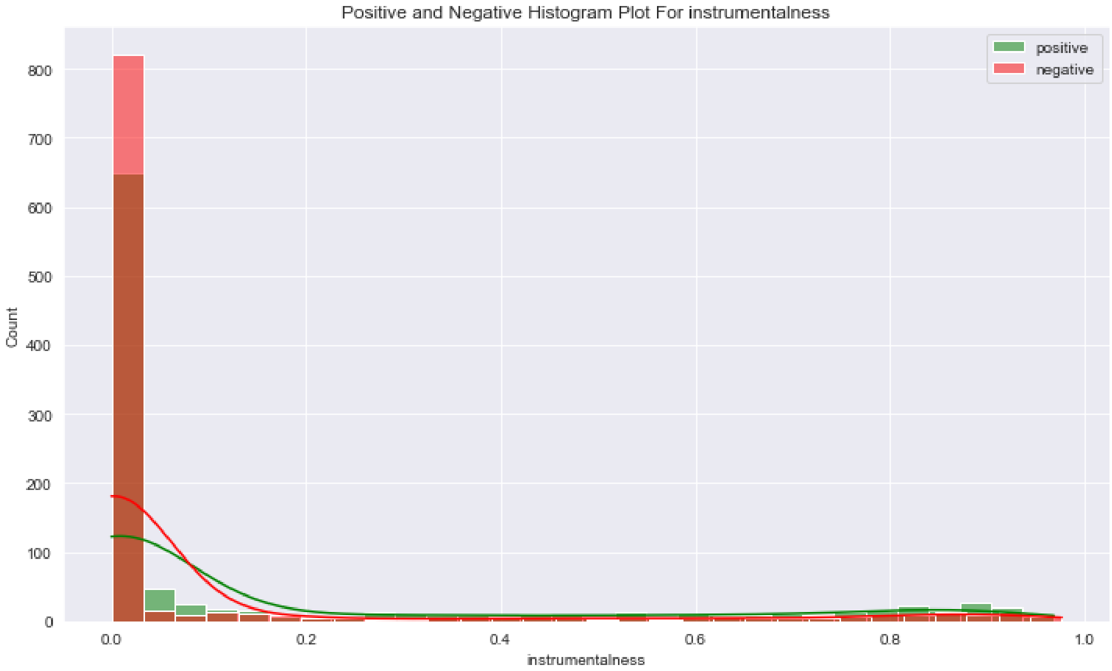

Positive and Negative Histogram Plot For loudness
positive
negative
Count
0
25
50
75
100
125
150
175
200
loudness
−30
−25
−20
−15
−10
−5
0

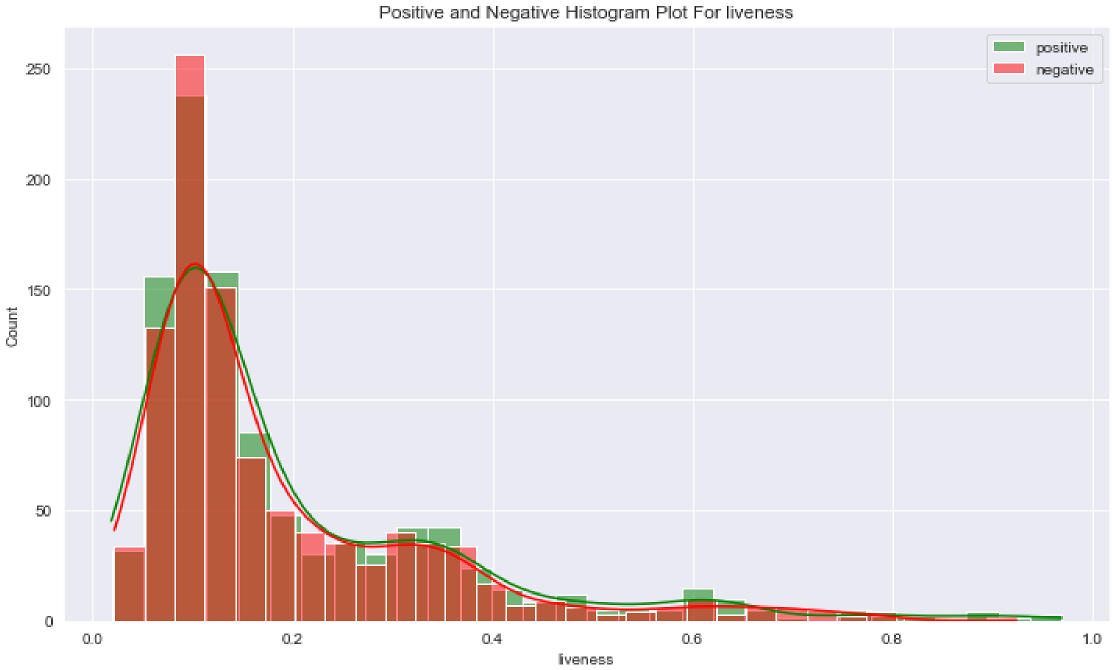

Positive and Negative Histogram Plot For acousticness
positive
negative
Count
0
100
200
300
400
0.0
0.2
0.4
0.6
0.8
1.0
acousticness

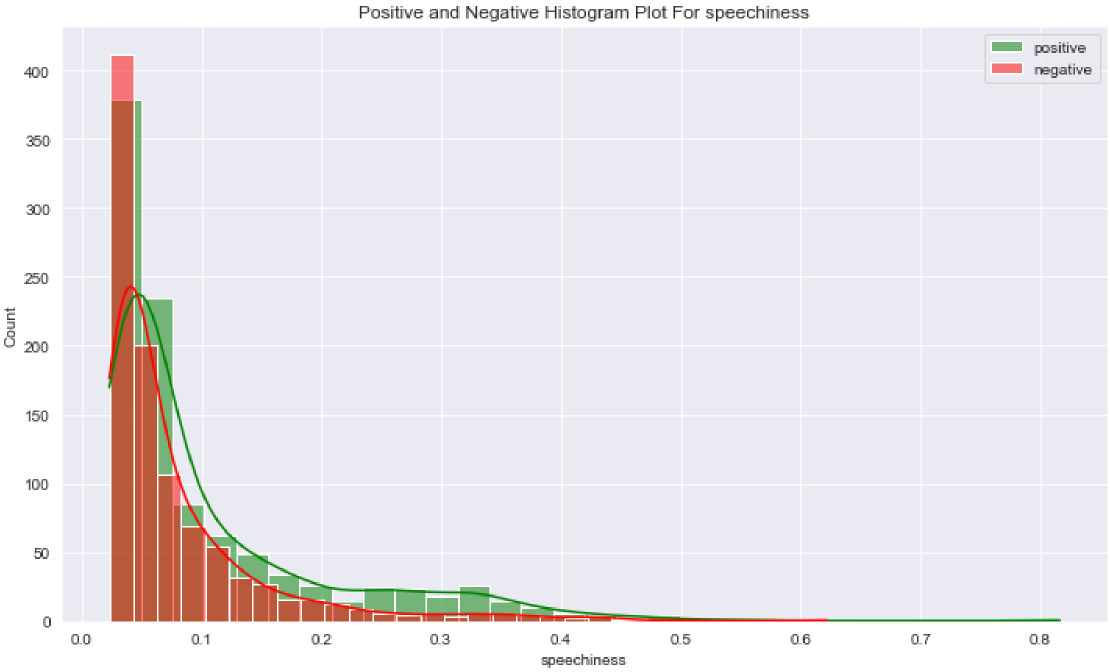

Positive and Negative Histogram Plot For danceability
positive
negative
Count
0
10
20
30
40
50
60
70
80
0.2
0.4
0.6
0.8
1.0
danceability

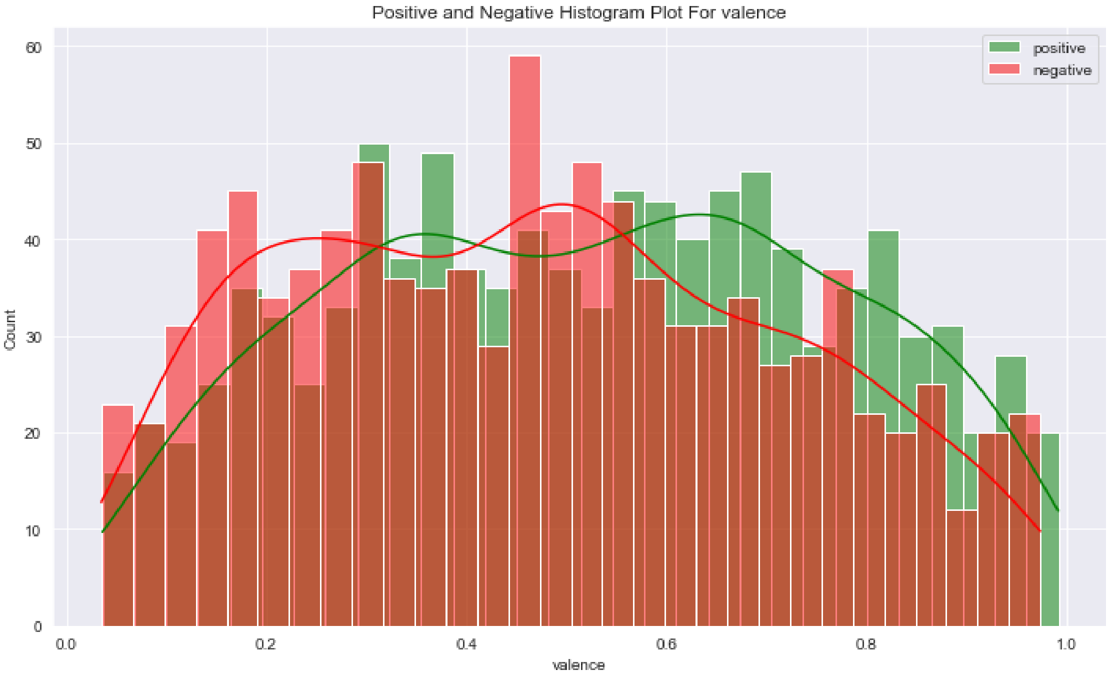

Positive and Negative Histogram Plot For duration_ms
positive
negative
Count
0
50
100
150
200
250
300
0.0
0.2
0.4
0.6
0.8
1.0
1e6
duration_ms


Positive and Negative Histogram Plot For energy
positive
negative
Count
0
10
20
30
40
50
60
70
80
0.0
0.2
0.4
0.6
0.8
1.0
energy


Positive and Negative Histogram Plot For instrumentalness
positive
negative
Count
0
100
200
300
400
500
600
700
800
0.0
0.2
0.4
0.6
0.8
1.0
instrumentalness


Positive and Negative Histogram Plot For liveness
positive
negative
Count
0
50
100
150
200
250
0.0
0.2
0.4
0.6
0.8
1.0
liveness


Positive and Negative Histogram Plot For speechiness
positive
negative
Count
0
50
100
150
200
250
300
350
400
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
speechiness


Positive and Negative Histogram Plot For valence
positive
negative
Count
0
10
20
30
40
50
60
0.0
0.2
0.4
0.6
0.8
1.0
valence

1.6 Top 10 energetic tracks?

```
[104]: top_ten_energetic_tracks = df[["energy", "song_title","artist"]].
         ↪sort_values(by="energy",ascending = True)[:10]
       top_ten_energetic_tracks
```

```
[104]:       energy                                          song_title  \
       1594  0.0148              Lyric Pieces, Book I Op. 12: I. Arietta
       1595  0.0156  String Quartet No. 4 in C Major, D. 46: II. An…
       1537  0.0161                                        Blue in Green
       1598  0.0230  Piano Quartet in E flat, Op.47: 3. Andante can…
       1596  0.0288              8 Fantasiestücke, Op.12 : 1. Des Abends
       1545  0.0291                                 Blue and Sentimental
       1530  0.0295                                   I'm a Fool to Want You
       1531  0.0302            I Was So Young, and You Were So Beautiful
       817   0.0310  Mozart: Requiem in D Minor, K. 626: VIII. Lacr…
       1876  0.0347             Nocturne No.1 In B Flat Minor, Op.9 No.1

                          artist
       1594         Edvard Grieg
       1595       Franz Schubert
       1537          Miles Davis
       1598      Robert Schumann
       1596      Robert Schumann
       1545          Julian Dash
       1530     Passport Quartet
       1531         Bill Charlap
       817   Nikolaus Harnoncourt
       1876       Frédéric Chopin
```

1.7 most popular artist?

```
[105]: artist_counts = df["artist"].value_counts()
       most_popular_artist = artist_counts.idxmax()
       song_count = artist_counts.max()
       print(f"The most popular artist is {most_popular_artist} with {song_count}␣
         ↪songs.")
```

```
The most popular artist is Drake with 16 songs.
```

```
[106]: df.head()
```

```
[106]:    acousticness  danceability  duration_ms  energy  instrumentalness  key  \
       0        0.0102         0.833       204600   0.434          0.021900    2
       1        0.1990         0.743       326933   0.359          0.006110    1
       2        0.0344         0.838       185707   0.412          0.000234    2
       3        0.6040         0.494       199413   0.338          0.510000    5
       4        0.1800         0.678       392893   0.561          0.512000    5
```

```
   liveness  loudness  mode  speechiness    tempo  time_signature  valence  \
0    0.1650    -8.795     1       0.4310  150.062             4.0    0.286
1    0.1370   -10.401     1       0.0794  160.083             4.0    0.588
2    0.1590    -7.148     1       0.2890   75.044             4.0    0.173
3    0.0922   -15.236     1       0.0261   86.468             4.0    0.230
4    0.4390   -11.648     0       0.0694  174.004             4.0    0.904

   target      song_title            artist
0       1        Mask Off            Future
1       1         Redbone  Childish Gambino
2       1    Xanny Family            Future
3       1  Master Of None       Beach House
4       1  Parallel Lines       Junior Boys
```

1.8 Most Common Song or most trending song?

[107]:
```
common_duration = df["duration_ms"].value_counts().idxmax()
most_common_song = df[df["duration_ms"] == common_duration]["song_title"].
 ↪iloc[0]
print("Most Common Duration:", common_duration, "seconds")
print("Top 1 Song with this Duration:", most_common_song)
```

```
Most Common Duration: 192000 seconds
Top 1 Song with this Duration: Kerosene
```

1.9 top 10 tracks with most valence

[108]:
```
top_10_tracks = df[["song_title", "artist"]].sort_values(by="valence",␣
 ↪ascending=False)[:10]
top_10_tracks
```

```
---------------------------------------------------------------------------
KeyError                                  Traceback (most recent call last)
Input In [108], in <cell line: 1>()
----> 1 top_10_tracks =␣
 ↪df[["song_title", "artist"]].sort_values(by="valence", ascending=False)[:10]
      2 top_10_tracks

File ~\anaconda3\lib\site-packages\pandas\util\_decorators.py:311, in␣
 ↪deprecate_nonkeyword_arguments.<locals>.decorate.<locals>.wrapper(*args,␣
 ↪**kwargs)
    305 if len(args) > num_allow_args:
    306     warnings.warn(
    307         msg.format(arguments=arguments),
    308         FutureWarning,
    309         stacklevel=stacklevel,
    310     )
--> 311 return func(*args, **kwargs)

File ~\anaconda3\lib\site-packages\pandas\core\frame.py:6322, in DataFrame.
 ↪sort_values(self, by, axis, ascending, inplace, kind, na_position,␣
 ↪ignore_index, key)
   6318 elif len(by):
   6319     # len(by) == 1
   6321     by = by[0]
-> 6322     k = self._get_label_or_level_values(by, axis=axis)
   6324     # need to rewrap column in Series to apply key function
   6325     if key is not None:
   6326         # error: Incompatible types in assignment (expression has type
   6327         # "Series", variable has type "ndarray")

File ~\anaconda3\lib\site-packages\pandas\core\generic.py:1840, in NDFrame.
 ↪_get_label_or_level_values(self, key, axis)
   1838     values = self.axes[axis].get_level_values(key)._values
   1839 else:
-> 1840     raise KeyError(key)
   1842 # Check for duplicates
   1843 if values.ndim > 1:

KeyError: 'valence'
```

2 handling ERRORS

[110]:

```
# Renaming
df.rename(columns={'valence': 'new_valence'}, inplace=True)
```

[111]:

```
df.columns
```

[111]:

```
Index(['acousticness', 'danceability', 'duration_ms', 'energy',
       'instrumentalness', 'key', 'liveness', 'loudness', 'mode',
       'speechiness', 'tempo', 'time_signature', 'new_valence', 'target',
       'song_title', 'artist'],
      dtype='object')
```

[122]:

```
# Sorting the DataFrame by the "new_valence" column in descending order
top_ten_tracks = df.sort_values(by="new_valence",␣
 ↪ascending=False)[["song_title", "new_valence"]][:5]
# Displaying the top ten tracks
print(top_ten_tracks)
```

```
                                       song_title  new_valence
460                        Abataka - Original Mix        0.992
912           I'm Walkin' - 2002 Digital Remaster        0.975
```

```
1966  To Roz Bikini (Itsy, Bitsy, Teenie, Weenie)        0.974
207                                    Look at You        0.973
48                               Azon de ma gnin kpevi        0.973
```

```
[113]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2017 entries, 0 to 2016
Data columns (total 16 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   acousticness      2017 non-null   float64
 1   danceability      2017 non-null   float64
 2   duration_ms       2017 non-null   int64
 3   energy            2017 non-null   float64
 4   instrumentalness  2017 non-null   float64
 5   key               2017 non-null   int64
 6   liveness          2017 non-null   float64
 7   loudness          2017 non-null   float64
 8   mode              2017 non-null   int64
 9   speechiness       2017 non-null   float64
 10  tempo             2017 non-null   float64
 11  time_signature    2017 non-null   float64
 12  new_valence       2017 non-null   float64
 13  target            2017 non-null   int64
 14  song_title        2017 non-null   object
 15  artist            2017 non-null   object
dtypes: float64(10), int64(4), object(2)
memory usage: 252.2+ KB
```

3 most trending genre?

```
[123]: # Assuming i have already loaded my data into a DataFrame named 'df'
       # Defining a function to apply the DAX formula to each row
       def calculate_genre(row):
           if row['danceability'] >= 0.7 and row['energy'] >= 0.7:
               return "High Energy Dance"
           elif row['acousticness'] >= 0.7:
               return "Low Energy Acoustic"
           elif row['new_valence'] >= 0.7:
               return "Happy Pop"
           elif row['new_valence'] < 0.3:
               return "Sad Pop"
           elif row['instrumentalness'] >= 0.5:
               return "Instrumental"
           elif row['speechiness'] >= 0.5:
               return "Spoken Word"
```

```
    elif row['tempo'] > 120:
        return "Upbeat"
    else:
        return "Other"

# Applying the DAX formula to create the 'genre' column
df['genre'] = df.apply(calculate_genre, axis=1)
```

[124]:

```
df.columns
```

[124]:

```
Index(['acousticness', 'danceability', 'duration_ms', 'energy',
       'instrumentalness', 'key', 'liveness', 'loudness', 'mode',
       'speechiness', 'tempo', 'time_signature', 'new_valence', 'target',
       'song_title', 'artist', 'genre'],
      dtype='object')
```

3.1 Merging the current dataset with the genre dataset which i created using DAX func on POWER BI

[125]:

```
xlsx_file_path = r'C:\Users\amitm\Desktop\Spotify_EDA\COUNT OF TRACKS BY GENRE.
 ↪xlsx'

# Loading the Excel data into a DataFrame
df_power_bi = pd.read_excel(xlsx_file_path)

# Checking the first few rows of the DataFrame to ensure it loaded correctly
print(df_power_bi.head())
```

```
               genre  song_title
0             Upbeat         407
1            Sad Pop         391
2              Other         339
3          Happy Pop         324
4  High Energy Dance         310
```

[126]:

```
# Merging the two DataFrames on the 'genre' column
merged_df = df.merge(df_power_bi, on='genre', how='left')
```

[118]:

```
print(merged_df.shape)
```

```
(2017, 18)
```

[127]:

```
print(merged_df.head())
```

```
   acousticness  danceability  duration_ms  energy  instrumentalness  key  \
0        0.0102         0.833       204600   0.434          0.021900    2
1        0.1990         0.743       326933   0.359          0.006110    1
2        0.0344         0.838       185707   0.412          0.000234    2
3        0.6040         0.494       199413   0.338          0.510000    5
```

```
4       0.1800         0.678       392893   0.561          0.512000    5

   liveness  loudness  mode  speechiness    tempo  time_signature  \
0    0.1650    -8.795     1       0.4310  150.062             4.0
1    0.1370   -10.401     1       0.0794  160.083             4.0
2    0.1590    -7.148     1       0.2890   75.044             4.0
3    0.0922   -15.236     1       0.0261   86.468             4.0
4    0.4390   -11.648     0       0.0694  174.004             4.0

   new_valence  target     song_title_x            artist      genre  \
0        0.286       1         Mask Off            Future    Sad Pop
1        0.588       1          Redbone  Childish Gambino     Upbeat
2        0.173       1     Xanny Family            Future    Sad Pop
3        0.230       1   Master Of None       Beach House    Sad Pop
4        0.904       1   Parallel Lines       Junior Boys  Happy Pop

   song_title_y
0           391
1           407
2           391
3           391
4           324
```

[119]:

```
# Defining the criteria and corresponding genre labels
criteria = [
    (merged_df['tempo'] > 120),
    (merged_df['danceability'] >= 0.7) & (merged_df['energy'] >= 0.7),
    (merged_df['acousticness'] >= 0.7),
    (merged_df['new_valence'] >= 0.7),
    (merged_df['new_valence'] < 0.3),
    (merged_df['instrumentalness'] >= 0.5),
    (merged_df['speechiness'] >= 0.5)
]
genre_labels = [
    "Upbeat",
    "High Energy Dance",
    "Low Energy Acoustic",
    "Happy Pop",
    "Sad Pop",
    "Instrumental",
    "Spoken Word"
]

# Creating a new column 'popularity_score' based on the criteria and labels
merged_df['popularity_score'] = np.select(criteria, genre_labels,␣
 ↪default="Other")
```

```python
# Counting the occurrences of each genre in 'popularity_score' to find the most␣
 ↪trending genre
most_trending_genre = merged_df['popularity_score'].value_counts().idxmax()
print("Most Trending Genre:", most_trending_genre)
```

```
Most Trending Genre: Upbeat
```

[120]:

```python
# Listing all the column names in the DataFrame
column_names = df.columns.tolist()
print("Column Names:")
for column_name in column_names:
    print(column_name)
```

```
Column Names:
acousticness
danceability
duration_ms
energy
instrumentalness
key
liveness
loudness
mode
speechiness
tempo
time_signature
new_valence
target
song_title
artist
genre
```

[77]:

```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2017 entries, 0 to 2016
Data columns (total 17 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   acousticness      2017 non-null   float64
 1   danceability      2017 non-null   float64
 2   duration_ms       2017 non-null   int64
 3   energy            2017 non-null   float64
 4   instrumentalness  2017 non-null   float64
 5   key               2017 non-null   int64
 6   liveness          2017 non-null   float64
 7   loudness          2017 non-null   float64
 8   mode              2017 non-null   int64
 9   speechiness       2017 non-null   float64
 10  tempo             2017 non-null   float64
 11  time_signature    2017 non-null   float64
 12  new_valence       2017 non-null   float64
 13  target            2017 non-null   int64
 14  song_title        2017 non-null   object
 15  artist            2017 non-null   object
 16  genre             2017 non-null   object
dtypes: float64(10), int64(4), object(3)
memory usage: 268.0+ KB
```

[128]:
```
import os
os.getcwd()
```

[128]:
```
'C:\\Users\\amitm'
```

3.2 THANKYOU!