In [1]:
```python
import pandas as pd
import numpy as np
from sklearn import cluster

data = pd.read_csv(r"C:\Users\User21\Downloads\Spotify-2000.csv")
print(data.head())
```

```
   Index                   Title             Artist            Top Genre  \
0      1                 Sunrise        Norah Jones      adult standards   
1      2             Black Night        Deep Purple           album rock   
2      3          Clint Eastwood           Gorillaz  alternative hip hop   
3      4           The Pretender       Foo Fighters    alternative metal   
4      5  Waitin' On A Sunny Day  Bruce Springsteen         classic rock   

   Year  Beats Per Minute (BPM)  Energy  Danceability  Loudness (dB)  \
0  2004                     157      30            53            -14   
1  2000                     135      79            50            -11   
2  2001                     168      69            66             -9   
3  2007                     173      96            43             -4   
4  2002                     106      82            58             -5   

   Liveness  Valence Length (Duration)  Acousticness  Speechiness  Popularity  
0        11       68               201            94            3          71  
1        17       81               207            17            7          39  
2         7       52               341             2           17          69  
3         3       37               269             0            4          76  
4        10       87               256             1            3          59  
```

In [2]:
```python
data = data.drop("Index", axis=1)
```

In [3]:
```python
print(data.corr())
```

```
                            Year  Beats Per Minute (BPM)    Energy  \
Year                    1.000000                0.012570  0.147235   
Beats Per Minute (BPM)  0.012570                1.000000  0.156644   
Energy                  0.147235                0.156644  1.000000   
Danceability            0.077493               -0.140602  0.139616   
Loudness (dB)           0.343764                0.092927  0.735711   
Liveness                0.019017                0.016256  0.174118   
Valence                -0.166163                0.059653  0.405175   
Acousticness           -0.132946               -0.122472 -0.665156   
Speechiness             0.054097                0.085598  0.205865   
Popularity             -0.158962               -0.003181  0.103393   

                        Danceability  Loudness (dB)  Liveness   Valence  \
Year                        0.077493       0.343764  0.019017 -0.166163   
Beats Per Minute (BPM)     -0.140602       0.092927  0.016256  0.059653   
Energy                      0.139616       0.735711  0.174118  0.405175   
Danceability                1.000000       0.044235 -0.103063  0.514564   
Loudness (dB)               0.044235       1.000000  0.098257  0.147041   
Liveness                   -0.103063       0.098257  1.000000  0.050667   
Valence                     0.514564       0.147041  0.050667  1.000000   
Acousticness               -0.135769      -0.451635 -0.046206 -0.239729   
Speechiness                 0.125229       0.125090  0.092594  0.107102   
Popularity                  0.144344       0.165527 -0.111978  0.095911   

                        Acousticness  Speechiness  Popularity  
Year                       -0.132946     0.054097   -0.158962  
Beats Per Minute (BPM)     -0.122472     0.085598   -0.003181  
Energy                     -0.665156     0.205865    0.103393  
Danceability               -0.135769     0.125229    0.144344  
Loudness (dB)              -0.451635     0.125090    0.165527  
Liveness                   -0.046206     0.092594   -0.111978  
Valence                    -0.239729     0.107102    0.095911  
Acousticness                1.000000    -0.098256   -0.087604  
Speechiness                -0.098256     1.000000    0.111689  
Popularity                 -0.087604     0.111689    1.000000  
```

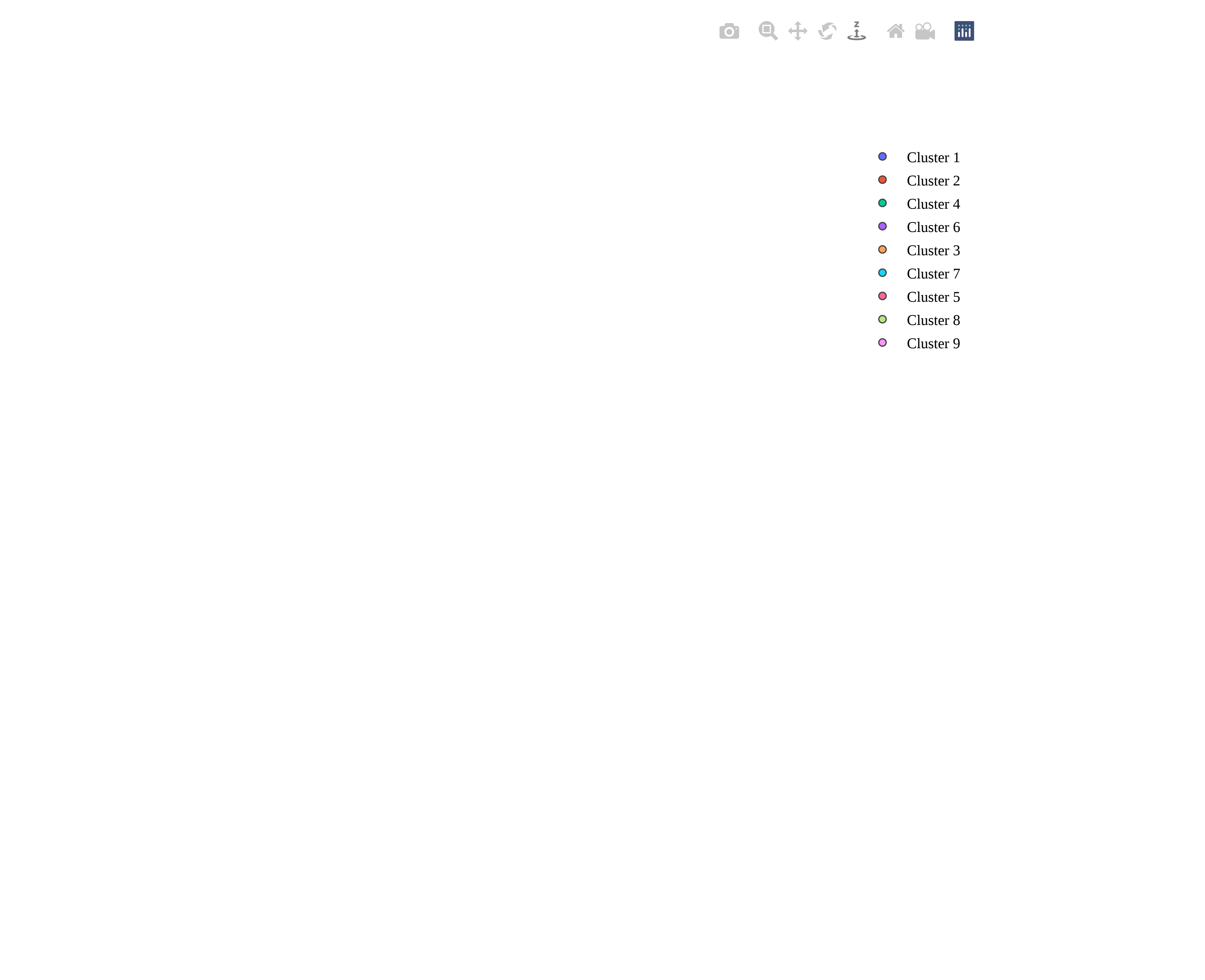
In [4]:
```python
data2 = data[["Beats Per Minute (BPM)", "Loudness (dB)",
              "Liveness", "Valence", "Acousticness",
              "Speechiness"]]

from sklearn.preprocessing import MinMaxScaler
for i in data.columns:
    MinMaxScaler(i)

from sklearn.cluster import KMeans
kmeans = KMeans(n_clusters=10)
clusters = kmeans.fit_predict(data2)
```

In [5]:
```python
data["Music Segments"] = clusters
MinMaxScaler(data["Music Segments"])
data["Music Segments"] = data["Music Segments"].map({1: "Cluster 1", 2:
    "Cluster 2", 3: "Cluster 3", 4: "Cluster 4", 5: "Cluster 5",
    6: "Cluster 6", 7: "Cluster 7", 8: "Cluster 8",
    9: "Cluster 9", 10: "Cluster 10"})
```

In [6]:
```python
print(data.head())
```

```
                    Title             Artist            Top Genre  Year  \
0                 Sunrise        Norah Jones      adult standards  2004   
1             Black Night        Deep Purple           album rock  2000   
2          Clint Eastwood           Gorillaz  alternative hip hop  2001   
3           The Pretender       Foo Fighters    alternative metal  2007   
4  Waitin' On A Sunny Day  Bruce Springsteen         classic rock  2002   

   Beats Per Minute (BPM)  Energy  Danceability  Loudness (dB)  Liveness  \
0                     157      30            53            -14        11   
1                     135      79            50            -11        17   
2                     168      69            66             -9         7   
3                     173      96            43             -4         3   
4                     106      82            58             -5        10   

   Valence Length (Duration)  Acousticness  Speechiness  Popularity  \
0       68               201            94            3          71   
1       81               207            17            7          39   
2       52               341             2           17          69   
3       37               269             0            4          76   
4       87               256             1            3          59   

  Music Segments  
0      Cluster 1  
1      Cluster 2  
2      Cluster 4  
3      Cluster 4  
4      Cluster 6  
```

In [7]:
```python
import plotly.graph_objects as go
PLOT = go.Figure()
for i in list(data["Music Segments"].unique()):


    PLOT.add_trace(go.Scatter3d(x = data[data["Music Segments"]== i]['Beats Per Minute (BPM)'],
                                y = data[data["Music Segments"] == i]['Energy'],
                                z = data[data["Music Segments"] == i]['Danceability'],
                                mode = 'markers',marker_size = 6, marker_line_width = 1,
                                name = str(i)))
PLOT.update_traces(hovertemplate='Beats Per Minute (BPM): %{x} <br>Energy: %{y} <br>Danceability: %{z}')


PLOT.update_layout(width = 800, height = 800, autosize = True, showlegend = True,
                   scene = dict(xaxis=dict(title = 'Beats Per Minute (BPM)', titlefont_color = 'black'),
                                yaxis=dict(title = 'Energy', titlefont_color = 'black'),
                                zaxis=dict(title = 'Danceability', titlefont_color = 'black')),
                   font = dict(family = "Gilroy", color  = 'black', size = 12))
```



In [ ]: