

Recommendation system

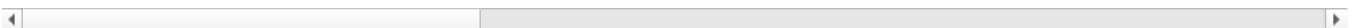
```
In [ ]: import pandas as pd
from sklearn.metrics.pairwise import cosine_similarity
from sklearn.preprocessing import StandardScaler
```

```
In [3]: df1=pd.read_csv(r"C:\Users\bhava\Downloads\spotify dataset.csv") #loading the dataset
df1
```

```
Out[3]:
```

	track_id	track_name	track_artist	track_popularity	track_album_id	track_album_name	tra
0	6f807x0ima9a1j3VPbc7VN	I Don't Care (with Justin Bieber) - Loud Luxur...	Ed Sheeran	66	2oCs0DGTsRO98Gh5ZSI2Cx	I Don't Care (with Justin Bieber) [Loud Luxury...	
1	0r7CVbZTWZgbTCYdfa2P31	Memories - Dillon Francis Remix	Maroon 5	67	63rPSO264uRjW1X5E6cWv6	Memories (Dillon Francis Remix)	
2	1z1Hg7Vb0AhHDiEmnDE79I	All the Time - Don Diablo Remix	Zara Larsson	70	1HoSmj2eLcsrR0vE9gThr4	All the Time (Don Diablo Remix)	
3	75FpbthrwQmzHIBJLuGdC7	Call You Mine - Keanu Silva Remix	The Chainsmokers	60	1nqYsOef1yKKuGOVchbsk6	Call You Mine - The Remixes	
4	1e8PAfcKUYoKkxPhrHqw4x	Someone You Loved - Future Humans Remix	Lewis Capaldi	69	7m7vv9wIQ4i0LFuJiE2zsQ	Someone You Loved (Future Humans Remix)	
...
32828	7bxnKAamR3snQ1VGLuVfC1	City Of Lights - Official Radio Edit	Lush & Simon	42	2azRoBBWEEEyhqV6sb7JrT	City Of Lights (Vocal Mix)	
32829	5Aevni09Em4575077nkWHz	Closer - Sultan & Ned Shepard Remix	Tegan and Sara	20	6kD6KLxj7s8eCE3ABvAyf5	Closer Remixed	
32830	7lmMqPP3Q1yfUHvsdn7wEo	Sweet Surrender - Radio Edit	Starkillers	14	0ltWNSY9JgxolZO4VzuCa6	Sweet Surrender (Radio Edit)	
32831	2m69mhnfQ1Oq6IGtXuYhgX	Only For You - Maor Levi Remix	Mat Zo	15	1fGrOkHnHJcStl14zNx8Jy	Only For You (Remixes)	
32832	29zWqhca3zt5NsckZqDf6c	Typhoon - Original Mix	Julian Calor	27	0X3mUOm6MhxR7PzxG95rAo	Typhoon/Storm	

32833 rows × 23 columns



```
In [13]: # Data Cleaning: Remove rows with missing values
df2=df1.dropna()
df2
```

Out[13]:

		track_id	track_name	track_artist	track_popularity		track_album_id	track_album_name	tra
0	6f807x0ima9a1j3VPbc7VN		I Don't Care (with Justin Bieber) - Loud Luxur...	Ed Sheeran	66	2oCs0DGTsRO98Gh5ZSI2Cx		I Don't Care (with Justin Bieber) [Loud Luxury...	
1	0r7CVbZTWZgbTCYdfa2P31		Memories - Dillon Francis Remix	Maroon 5	67	63rPSO264uRjW1X5E6cWv6		Memories (Dillon Francis Remix)	
2	1z1Hg7Vb0AhHDiEmnDE79I		All the Time - Don Diablo Remix	Zara Larsson	70	1HoSmj2eLcsrR0vE9gThr4		All the Time (Don Diablo Remix)	
3	75FpbthrwQmzHIBJLuGdC7		Call You Mine - Keanu Silva Remix	The Chainsmokers	60	1nqYsOef1yKKuGOVchbsk6		Call You Mine - The Remixes	
4	1e8PAfcKUYoKkxPhrHqw4x		Someone You Loved - Future Humans Remix	Lewis Capaldi	69	7m7vv9wIQ4i0LFuJiE2zsQ		Someone You Loved (Future Humans Remix)	
...
32828	7bxnKAamR3snQ1VGLuVfC1		City Of Lights - Official Radio Edit	Lush & Simon	42	2azRoBBWEEEEYhqV6sb7JrT		City Of Lights (Vocal Mix)	
32829	5Aevni09Em4575077nkWHz		Closer - Sultan & Ned Shepard Remix	Tegan and Sara	20	6kD6KLxj7s8eCE3ABvAyf5		Closer Remixed	
32830	7lmMqPP3Q1yfUHVsdn7wEo		Sweet Surrender - Radio Edit	Starkillers	14	0ltWNSY9JgxoIZO4VzuCa6		Sweet Surrender (Radio Edit)	
32831	2m69mhnfQ1Oq6IGtXuYhgX		Only For You - Maor Levi Remix	Mat Zo	15	1fGrOkHnHJcStl14zNx8Jy		Only For You (Remixes)	
32832	29zWqhca3zt5NsckZqDf6c		Typhoon - Original Mix	Julian Calor	27	0X3mUOm6MhxR7PzxG95rAo		Typhoon/Storm	

32828 rows × 23 columns

In [27]:

```
# Feature Selection: Selecting relevant columns for the recommendation system
features = ['danceability', 'energy', 'loudness', 'speechiness', 'acousticness',
            'instrumentalness', 'liveness', 'valence', 'tempo', 'duration_ms']

spotify_features = df2[features]
spotify_features
```

Out[27]:

	danceability	energy	loudness	speechiness	acousticness	instrumentalness	liveness	valence	tempo	duration_ms
0	0.748	0.916	-2.634	0.0583	0.102000	0.000000	0.0653	0.5180	122.036	194754
1	0.726	0.815	-4.969	0.0373	0.072400	0.004210	0.3570	0.6930	99.972	162600
2	0.675	0.931	-3.432	0.0742	0.079400	0.000023	0.1100	0.6130	124.008	176616
3	0.718	0.930	-3.778	0.1020	0.028700	0.000009	0.2040	0.2770	121.956	169093
4	0.650	0.833	-4.672	0.0359	0.080300	0.000000	0.0833	0.7250	123.976	189052
...
32828	0.428	0.922	-1.814	0.0936	0.076600	0.000000	0.0668	0.2100	128.170	204375
32829	0.522	0.786	-4.462	0.0420	0.001710	0.004270	0.3750	0.4000	128.041	353120
32830	0.529	0.821	-4.899	0.0481	0.108000	0.000001	0.1500	0.4360	127.989	210112
32831	0.626	0.888	-3.361	0.1090	0.007920	0.127000	0.3430	0.3080	128.008	367432
32832	0.603	0.884	-4.571	0.0385	0.000133	0.341000	0.7420	0.0894	127.984	337500

32828 rows × 10 columns

In [35]:

```
# Normalize the feature data to ensure all features are on the same scale
scaler = StandardScaler()
spotify_features_scaled = scaler.fit_transform(spotify_features)
spotify_features_scaled
```

```
Out[35]: array([[ 0.6420147 ,  1.20166767,  1.36704001, ...,  0.03192873,
                  0.04283347, -0.51880218],
                [ 0.4903842 ,  0.6433885 ,  0.58573644, ...,  0.78252502,
                 -0.77729134, -1.05617475],
                [ 0.13887713,  1.28458042,  1.10002492, ...,  0.43939529,
                 0.11613324, -0.82193285],
                ...,
                [-0.86739801,  0.6765536 ,  0.60915882, ..., -0.31977924,
                 0.26410808, -0.26213215],
                [-0.19884535,  1.04689721,  1.1237819 , ..., -0.86878681,
                 0.26481432,  2.3670727 ],
                [-0.35736815,  1.02478714,  0.71890938, ..., -1.8063888 ,
                 0.26392223,  1.86683522]])
```

```
In [41]: # Compute the cosine similarity matrix
similarity_matrix = cosine_similarity(spotify_features_scaled)
```

```
In [43]: # Function to get top 5 similar songs based on a given track index in the dataset
def get_recommendations(track_index, top_n=5):
    similarity_scores = list(enumerate(similarity_matrix[track_index]))
    similarity_scores = sorted(similarity_scores, key=lambda x: x[1], reverse=True)
    similar_tracks_indices = [i[0] for i in similarity_scores[1:top_n+1]]
    return df2.iloc[similar_tracks_indices][['track_name', 'track_artist']]
```

```
In [45]: # Example: Get recommendations for the first track in the dataset
recommended_tracks = get_recommendations(0)
recommended_tracks
```

Out[45]:

	track_name	track_artist
29684	I Don't Care (with Justin Bieber) - Loud Luxur...	Ed Sheeran
29734	I Miss You (feat. Julia Michaels) - Cahill Remix	Clean Bandit
4959	Name & Number	Shift K3Y
19639	Todavía	La Factoria
29713	Rise - TV Noise Ibiza Mix	Jonas Blue