Use Data Analytics to Study Music Streaming Patterns

Analysis Report

Introduction

Data analytics has become a critical tool for music streaming services to better understand and serve their users. The vast amounts of data generated by music streaming platforms can be analyzed to study user behavior and preferences, enabling streaming services to optimize their curation, recommendations, and ad targeting. Additionally, data analytics helps to track the popularity of different genres, evaluate the success of marketing campaigns, and continuously improve the overall user experience. By leveraging the power of data analytics, music streaming services can gain valuable insights into the music industry, consumer behavior, and the impact of individual artists and albums, thereby opening up new opportunities for growth and innovation.

Problem Statement

Analyze the data to understand a pattern in the person's music preference & recommend a playlist of songs based on that analysis

Data Collection

5 individuals who have diverse music tastes and created a playlist based on the 10 most frequently played songs of each individual.

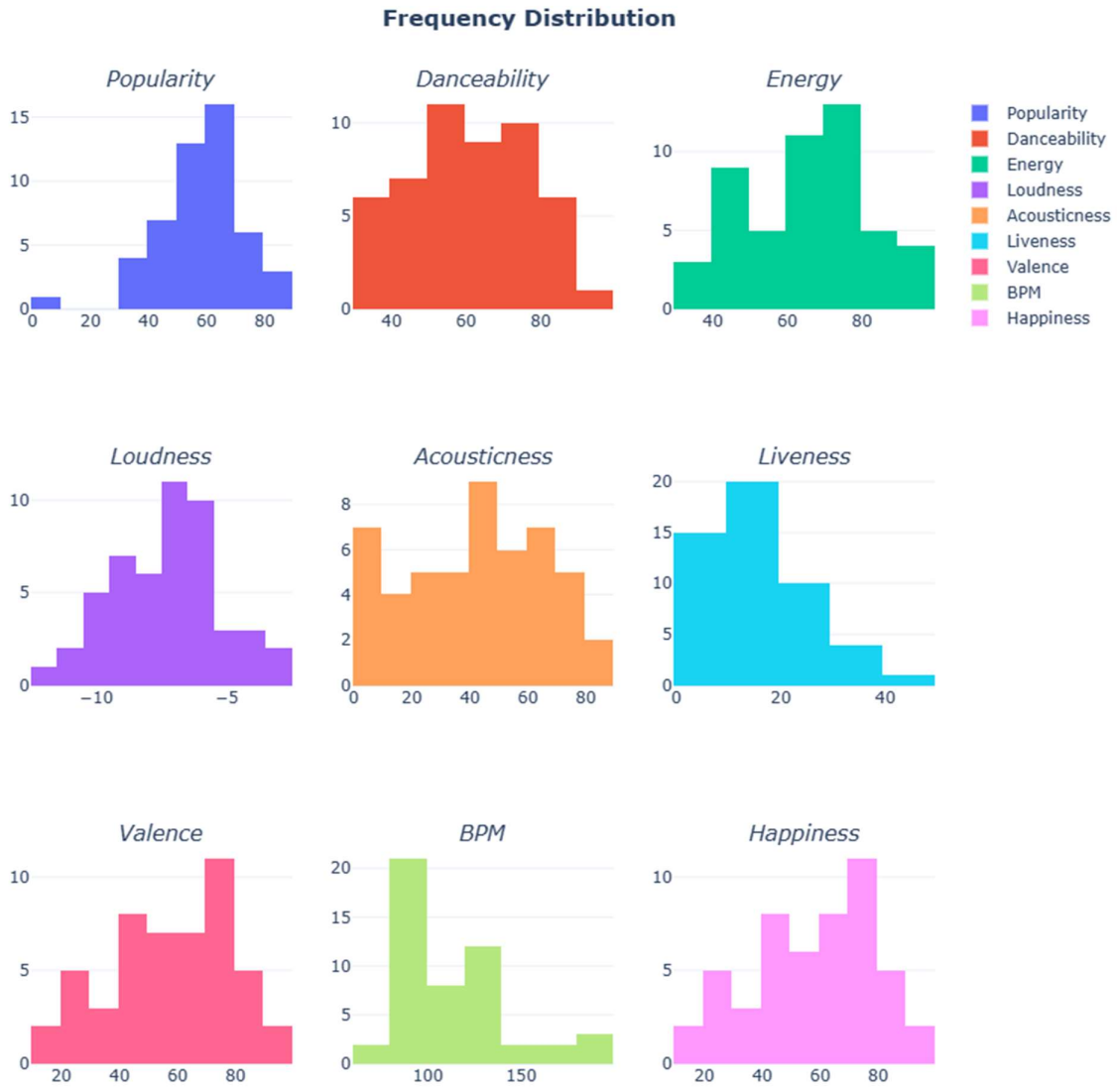
Software's Used

MS-Excel is used to tabulate the data and outline the variables that need to be focused on to understand the music streaming patterns of the 5 individuals. Tableau is used for the visually represent the data in the dashboard format.

Music Attributes

- **Beats Per Minute (BPM) -** The tempo of the song.
- **Energy -** The energy of a song - the higher the value, the more energetic. song
- **Danceability -** The higher the value, the easier it is to dance to this song.
- **Loudness -** The higher the value, the louder the song.
- **Valence -** The higher the value, the more positive mood for the song.
- **Length -** The duration of the song.
- **Acoustic -** The higher the value the more acoustic the song is.
- **Popularity -** The higher the value the more popular the song is.
- **Rnd -** A random number. Sort by this column to shuffle your playlist.

- **Liveness** – Refers directly to reverberation time
- **Happiness -** The pleasurable experience of listening



The Most important Music Attributes are considered for the drawing inferences

Through observing the distribution plot, we can immediately observe the following: -

- There is a very heavy slope downwards in the features Liveness and Energy, which we can note a slight up-tail in the distribution near the end of the plot. This indicates to us that the music styles of songs featured on Playlist of the Individuals are in general less liveness or energetic. The uptail indicates to us,

that songs with high bpm or acoustic are more likely to be selected near the upper-bound.

- Danceability appears to normally distributed with tails of the distribution featuring higher likelihoods of being listened on Spotify by Individuals

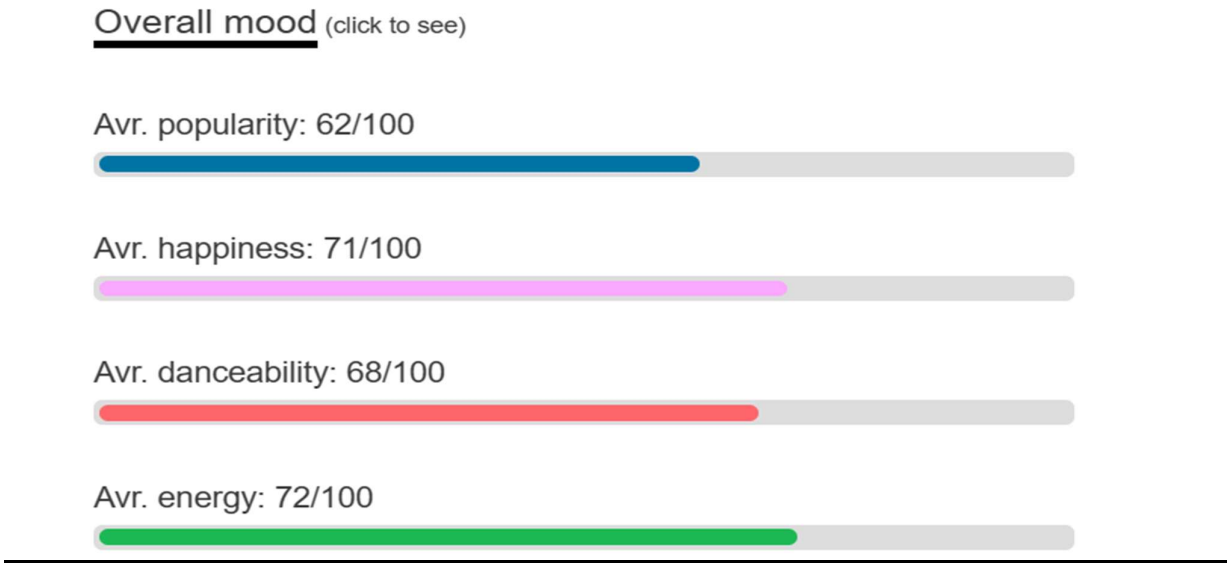
- The attributes, Valence and Energy appear to be approximately evenly (uniformly distributed). Indicating no preference for those attributes affecting the selection of music featured on Spotify.

- In sum, songs featured on Spotify tend to exhibit low acousticness, speechiness and liveness with valence and energy showing no notable impact on a song being featured on Spotify. Finally, songs approximately 60% Danceability are most commonly listened by Individuals

Analysis of Individual Playlist

Individual 1

	Popularity	*BPM*	*Danceability*	*Energy*	*Acousticness*	*Happiness*	*Liveness*	*Loudness*	*Valence*	*RND*
Popularity	1									
BPM	-0.23024	1								
Danceabili	-0.22924	0.091955	1							
Energy	0.137704	-0.06799	0.231656962	1						
Acousticne	-0.17699	-0.59239	-0.385633706	-0.30076	1					
Happiness	0.136849	0.180578	0.278548333	0.336376	-0.125119479	1				
Liveness	-0.0163	-0.20466	0.436756358	0.011177	0.241450174	-0.1842	1			
Loudness	0.156086	-0.56842	-0.138894565	0.515794	0.065425789	-0.07617	-0.32833	1		
Valence	0.136849	0.180578	0.278548333	0.336376	-0.125119479	1	-0.1842	-0.07617	1	
RND	-0.3955	0.132374	0.486508058	0.398733	0.104990144	0.17567	0.354056	0.036168	0.17567	1



Avr. acousticness: 27/100

Avr. instrumentalness: 1/100

Avr. liveness: 17/100

Avr. speechiness: 9/100

Avr. tempo: 112/200

Interpretation

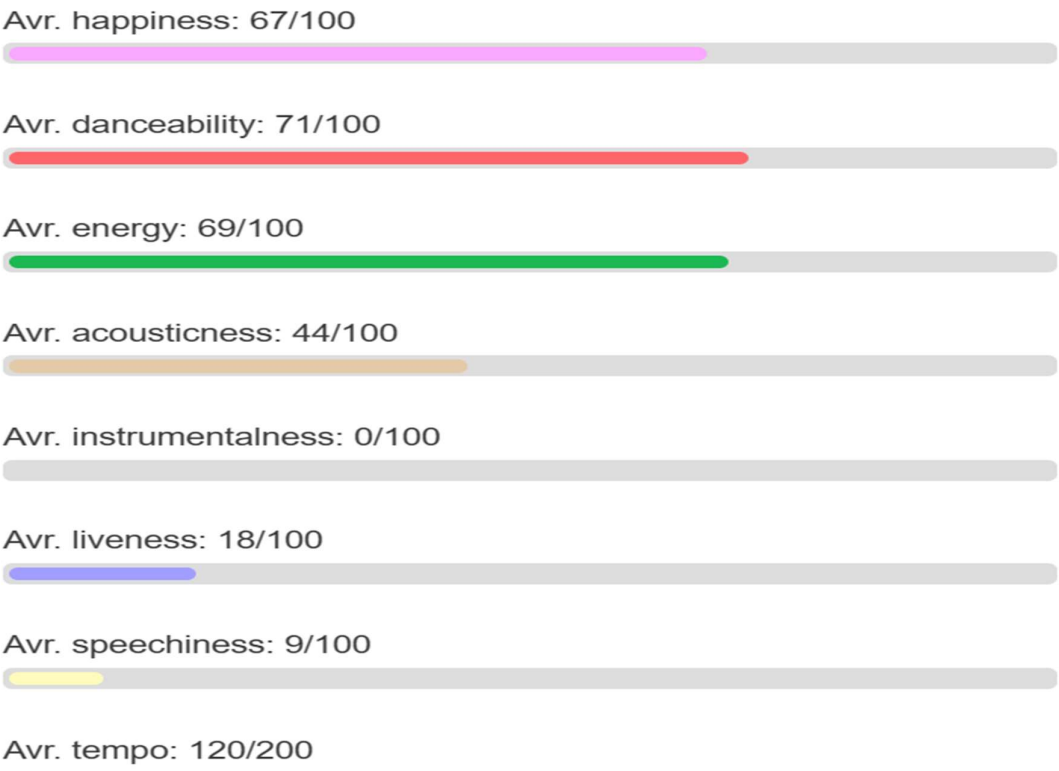
The investigation of the relationships between the various musical characteristics reveals a strong positive association between LOUDNESS and ENERGY, i.e., if the energy of the song increases, the Loudness of the song likewise increases. DANCEABILITY and LIVENESS have a high positive association as well; the more liveness in the beats, the more Danceability the song. The person numbered 1 enjoys listening to upbeat and boisterous music.

Individual 2

	Popularity	*BPM*	*Danceability*	*Energy*	*Acousticness*	*Happiness*	*Liveness*	*Loudness*	*Valence*	*RND*
Popularity	1									
BPM	0.571698	1								
Danceabili	-0.31984	-0.72379	1							
Energy	-0.30434	-0.45617	0.588682	1						
Acousticne	0.209691	0.561823	-0.72112	-0.11651	1					
Happiness	-0.34314	-0.28824	0.682215	0.861688	-0.23909	1				
Liveness	0.39519	0.482153	-0.19249	0.002614	0.503052	0.140241	1			
Loudness	-0.51535	-0.58418	0.404391	0.642453	-0.09275	0.553139	-0.15532	1		
Valence	-0.32931	-0.26661	0.668323	0.857893	-0.23213	0.999609	0.149098	0.545018	1	
RND	-0.15651	-0.31622	0.245459	0.825075	0.256286	0.555215	0.052472	0.550702	0.54782	1

Overall mood (click to see)

Avr. popularity: 49/100

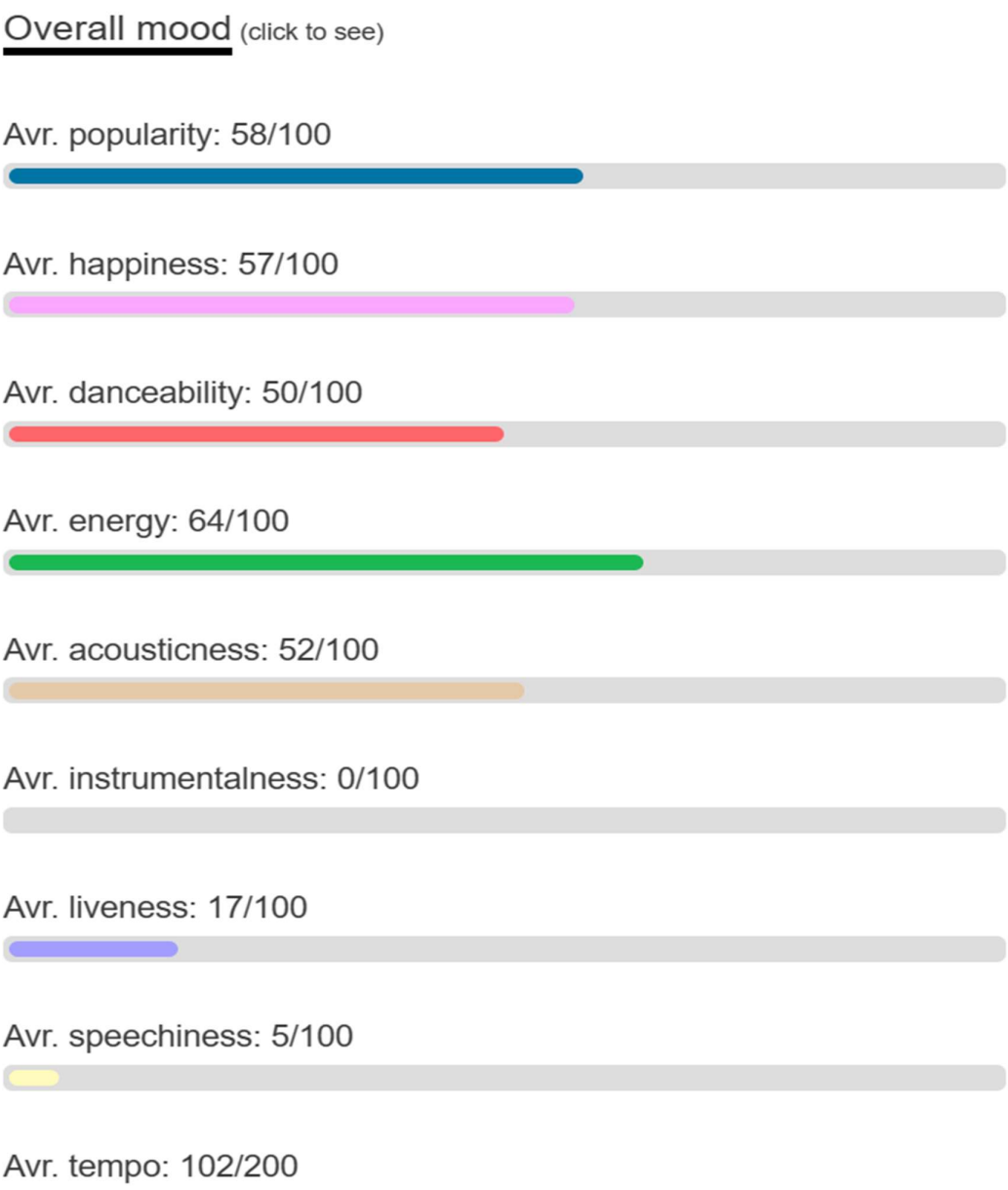


Interpretation

The investigation of the relationships between the various musical characteristics reveals that there are significant relationships between ENERGY and HAPPINESS as well as between VALANCE and HAPPINESS, i.e., songs with higher valance and loudness tend to have happier melodies. The person numbered 2 prefers to listen to boisterous, upbeat, and happy songs.

Individual 3

	Popularity	*BPM*	*)anceabilit*	*Energy*	*\coustices*	*Happiness*	*Liveness*	*Loudness*	*Valence*	*RND*
Popularity	1									
BPM	-0.14433	1								
Danceabili	0.583279	0.098958	1							
Energy	0.2966	-0.24794	0.448255	1						
Acousticne	-0.16001	0.024145	-0.52072	-0.59535	1					
Happiness	0.401917	0.098223	0.58063	0.493327	-0.41438	1				
Liveness	-0.65841	0.292197	-0.53282	0.044917	-0.25666	-0.15517	1			
Loudness	-0.19982	-0.59362	-0.35661	0.321487	-0.21342	-0.39326	0.168915	1		
Valence	0.401917	0.098223	0.58063	0.493327	-0.41438	0.42854	-0.15517	-0.39326	1	
RND	0.031337	0.448171	0.103931	-0.30306	-0.2348	0.314098	0.302757	-0.65399	0.314098	1



Interpretation

The investigation of the relationships between the various musical characteristics reveals that there are significant relationships between POPULARITY and DANCEABILITY as well as between HAPPINESS and DANCEABILITY, i.e., songs with higher Popularity and Happiness tend to have Danceable beats. The person numbered 3 prefers to listen to upbeat, cheerful music with high danceable and energy.

Individual 4

	Popularity	BPM	Danceability	Energy	Acousticnes	Happiness	Liveness	Loudness	Valence	RND
Popularity	1									
BPM	-0.69271	1								
Danceabili	-0.41338	0.228646	1							
Energy	0.110243	-0.37526	0.357861	1						
Acousticne	-0.02811	0.161347	0.080883	0.097815	1					
Happiness	0.089857	-0.45644	0.517928	0.4106	-0.04481	1				
Liveness	0.220386	-0.40862	-0.46166	0.337278	-0.01789	-0.22546	1			
Loudness	0.677016	-0.56142	-0.2487	0.056005	0.273238	0.512621	-0.01907	1		
Valence	0.089857	-0.45644	0.517928	0.4106	-0.04481	1	-0.22546	0.512621	1	
RND	0.352505	-0.6523	0.247109	0.531816	-0.33124	0.571524	0.179012	0.269659	0.571524	1

Overall mood (click to see)

Avr. popularity: 56/100

Avr. happiness: 50/100

Avr. danceability: 60/100

Avr. energy: 60/100

Avr. acousticness: 41/100

Avr. instrumentalness: 2/100

Avr. liveness: 12/100

Avr. speechiness: 6/100

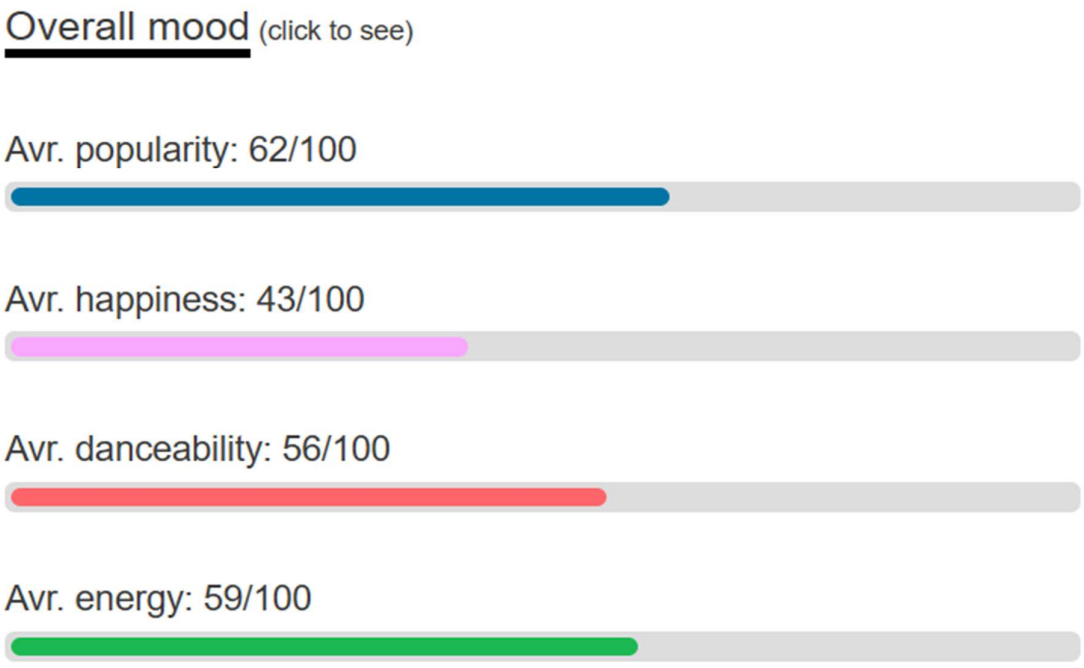
Avr. tempo: 120/200

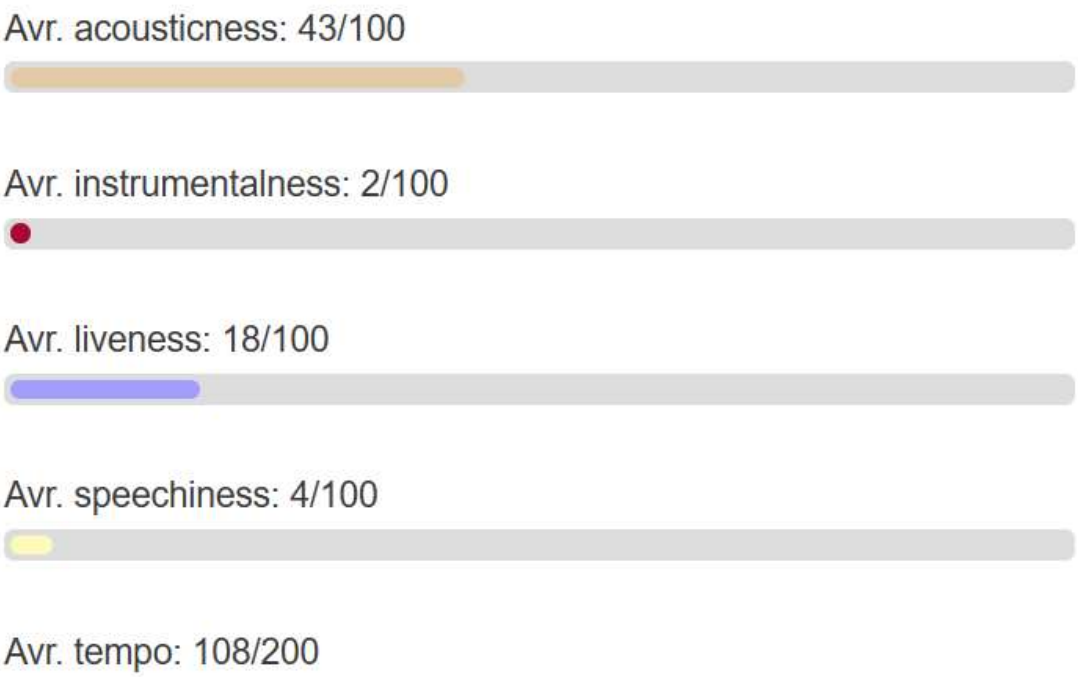
Interpretation

The investigation of the relationships between the various musical characteristics reveals that there is a strong positive correlation between LOUD and POPULARITY, indicating that a song will be more energetic the more popular it is. RND, VALENCE and HAPPINESS also have a strong positive correlation, meaning that music is more danceable the happier and more lively it is. Last but not least, a substantial the valence of the song rises, so will its loudness. The person numbered 4 prefers to listen to energetic, boisterous music that is danceable.

Individual 5

	Popularity	*BPM*	*Danceability*	*Energy*	*Acousticnes*	*Happiness*	*Liveness*	*Loudness*	*Valence*	*RND*
Popularity	1									
BPM	0.555444	1								
Danceabili	0.262812	0.088909	1							
Energy	0.267403	0.106721	0.513509	1						
Acousticne	-0.12599	0.138525	-0.55447	-0.70476	1					
Happiness	0.480639	0.265695	0.575795	0.611478	-0.12715	1				
Liveness	0.314627	0.609043	0.597291	0.305635	-0.13342	0.357189	1			
Loudness	0.359283	-0.16999	0.725724	0.607694	-0.80316	0.352325	0.101185	1		
Valence	0.400569	0.118511	0.52243	0.715708	-0.21957	0.969569	0.287878	0.368845	1	
RND	-0.39896	-0.18297	-0.05574	0.204835	0.044042	0.204532	-0.13218	-0.33333	0.296153	1





Interpretation

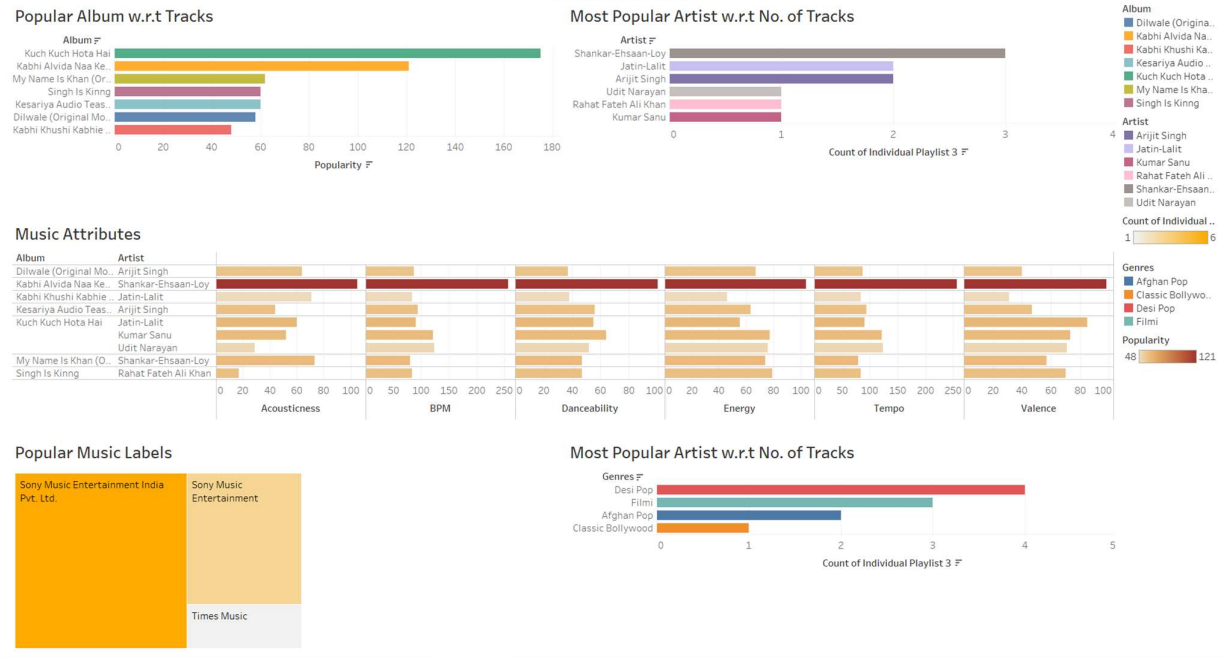
The investigation of the relationships between the various musical characteristics reveals Individual 3 shows a strong positive correlation between LIVENESS and BPM, LOUDNESS and DANCEABIITY, and VALANCE and ENERGY. That means if the loudness of the song increases the energy of the song also increases and thus the beats per minute of the song will also subsequently increases. The person numbered 5 prefer to listen loud, energetic, high BPM and danceable songs.

Tableau Dashboards

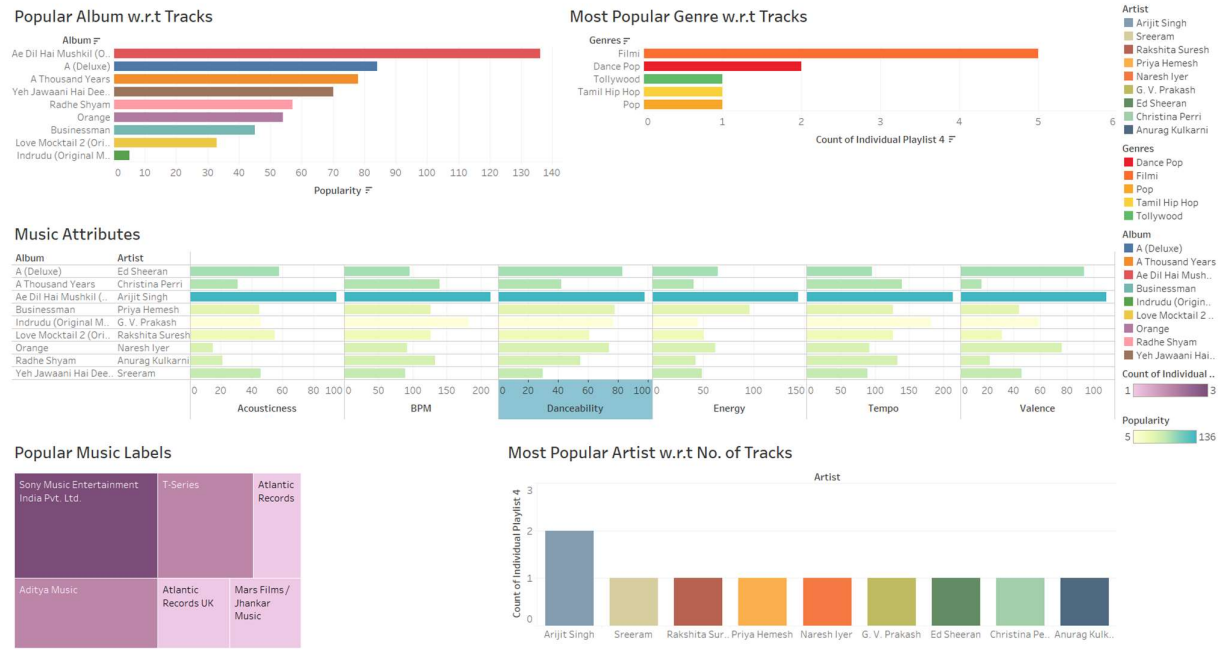
Individual 1 Music Dashboard

Individual 2 Music Dashboard:

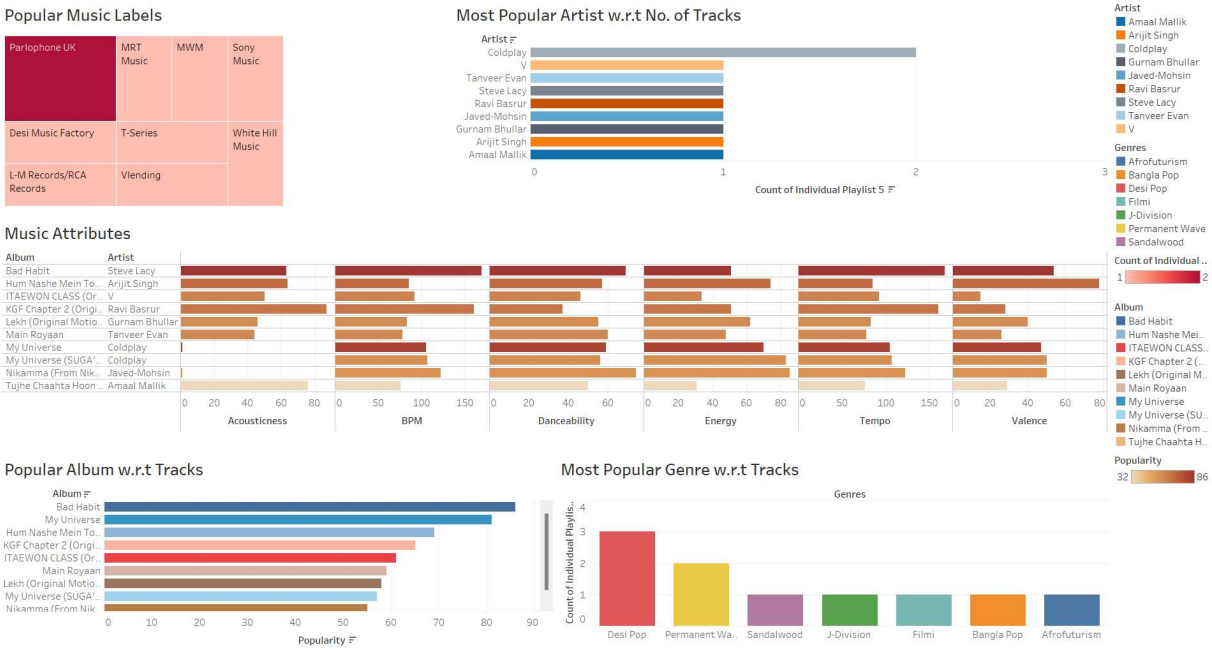
Individual 3 Music Dashboard:



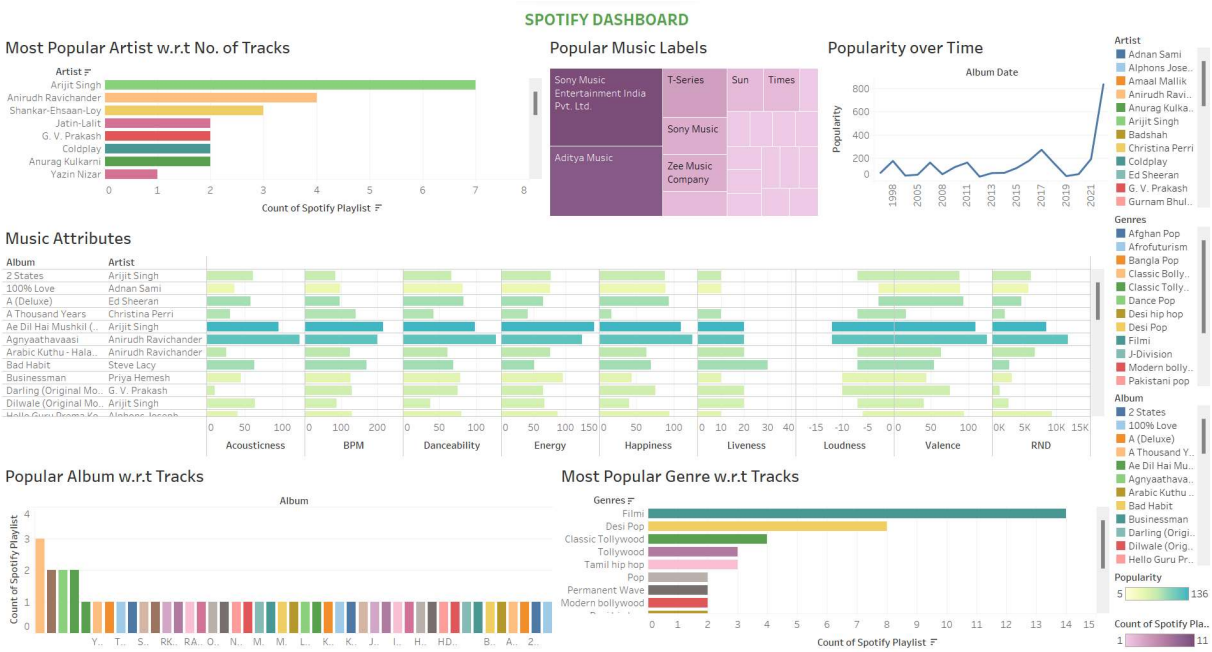
Individual 4 Music Dashboard:



Individual 5 Music Dashboard:



Combined Music Dashboard of all individuals:



Dashboards link:

Dashboard 1:
https://public.tableau.com/app/profile/k.prashanth.kumar/viz/IndividualPlaylist1/Dashboard1

Dashboard 2:
https://public.tableau.com/app/profile/k.prashanth.kumar/viz/IndividualPlaylist2/Dashboard1

Dashboard 3:
https://public.tableau.com/app/profile/k.prashanth.kumar/viz/IndividualPlaylist3/Dashboard1

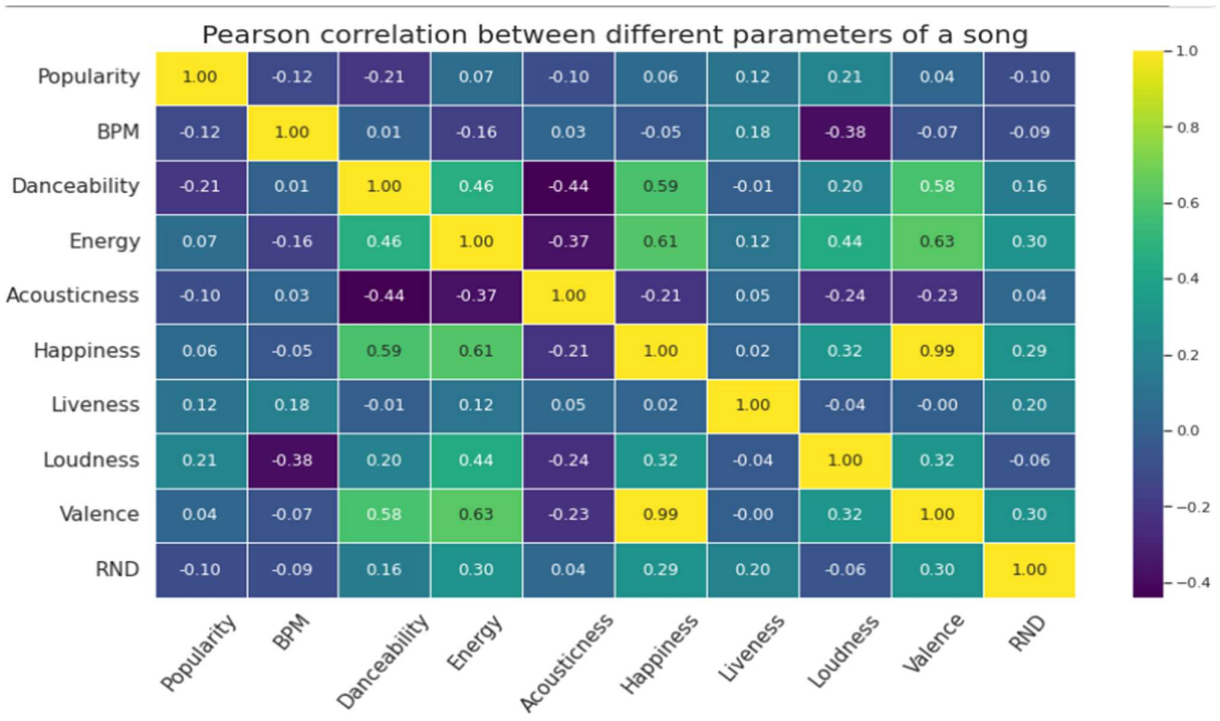
Dashboard 4:
https://public.tableau.com/app/profile/k.prashanth.kumar/viz/IndividualPlaylist4/Dashboard1

Dashboard 5:
https://public.tableau.com/app/profile/k.prashanth.kumar/viz/IndividualPlaylist5/Dashboard1

Combined Dashboard:
https://public.tableau.com/app/profile/k.prashanth.kumar/viz/SPOTIFYDASHBOARD/Dashboard1

Key Findings:

Findings on the Overall Data:-



1)As there is +ve correlation between danceability and popularity
2)As there is +ve correlation between danceability and loudness
3) As there is +ve correlation between danceability and Energy
4) As there is +ve correlation between valence and energy
5) As there is +ve correlation between valence and danceability
6) As there is +ve correlation between energy and loudness

Findings on the Individual Data:-

Individual 1

- Among the given data set, the most popular artist with maximum number of tracks is Anirudh Ravichander. Out of 10 songs in the playlist, 2 songs are of Anirudh. Hence, this shows that the individual like the song composed by Anirudh Ravichander.
- The most popular song with maximum number of popularity is Pasoori composed by Shae Gill.
- The individual loves to hear Indian composed songs by genres of Tamil hip hop, Modern Bollywood and Filmi.
- The increasing stream vs year graph over time in the dashboard shows that the individual love to listen most recent songs in comparison to old songs

Individual 2

- Among the given data set, the most popular music label with maximum number of tracks from Aditya Music. Out of 10 songs in the playlist, 7 songs are of Aditya Music Label. Hence, this shows that the individual like the song released by Aditya Music.
- The most popular song with maximum number of popularity is Pillaa Raa composed by Anurag Kulkarni.
- The individual loves to hear Indian composed songs by genres of Classic Tollywood and Filmi.
- The increasing stream vs year graph over time in the dashboard shows that the individual love to listen most recent songs in comparison to old songs

Individual 3

- Among the given data set, the most popular artist with maximum number of tracks is Shankar-Ehsaan-Loy. Out of 10 songs in the playlist, 3 songs are of

Shankar-Ehsaan-Loy. Hence, this shows that the individual like the song composed by Shankar-Ehsaan-Loy.

- The most popular song with maximum number of popularity is Mitwa composed by Shankar-Ehsaan-Loy.
- The individual loves to hear Indian composed songs by genres of Desi Pop and Filmi.
- The increasing stream vs year graph over time in the dashboard shows that the individual love to listen most recent songs in comparison to old songs.

Individual 4

- Among the given data set, the most popular artist with maximum number of tracks is Arijit Singh. Out of 10 songs in the playlist, 2 songs are of Arijit Singh. Hence, this shows that the individual like the song composed by Arijit Singh.
- The most popular song with maximum number of popularity is Shape of You composed by Ed Sheeran.
- The individual loves to hear Indian composed songs by genres of Dance Pop and Filmi.
- The increasing stream vs year graph over time in the dashboard shows that the individual love to listen most recent songs in comparison to old songs

Individual 5

- Among the given data set, the most popular artist with maximum number of tracks is Coldplay. Out of 10 songs in the playlist, 2 songs are of Coldplay. Hence, this shows that the individual like the song composed by Coldplay .
- The most popular song with maximum number of popularity is Bad Habit composed by Steve Lacy.
- The individual loves to hear Indian composed songs by genres of Desi Pop and Permanent Wave.
- The increasing stream vs year graph over time in the dashboard shows that the individual love to listen most recent songs in comparison to old songs

Final Conclusion

The person numbered 1 enjoys listening to upbeat and boisterous music.

Suggested song based on above interpretation are:

- Tujhe Kitna Chahne Lage (From "Kabir Singh")
- Mastaaru Mastaaru (Sir)

The person numbered 2 prefers to listen to boisterous, upbeat, and happy songs.

Suggested song based on above interpretation are:

- Du Du (Dhamaka 2022)
- Sara Sari (Bheeshma)

The person numbered 3 prefers to listen to upbeat, cheerful music with high danceable and energy.

Suggested song based on above interpretation are:

- Shuru Se Shuru Song (Modern Love)
- Kaise Hua (From "Kabir Singh")

The person numbered 4 prefers to listen to energetic, boisterous music that is danceable.

Suggested song based on above interpretation are:

- Guruvaram(Kirrak Party)
- Barcelona (Ed Sheeran)

The person numbered 5 prefer to listen loud, energetic, high BPM and danceable songs.

Suggested song based on above interpretation are:

- Music of the Spheres (by coldplay)
- Baarish Aayi Hai (LoFi Chill)