The following features were used for clustering:

Acousticness
Danceability
Energy
Instrumentalness
Liveness
Speechiness
Valence

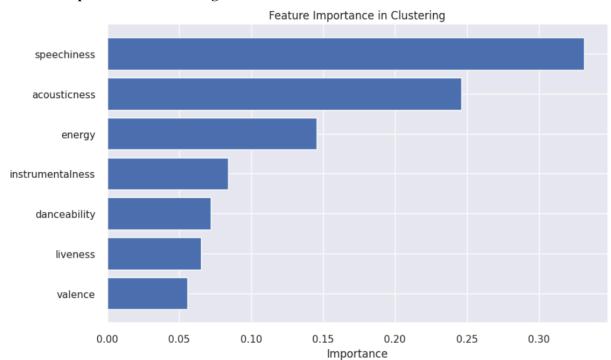
View the following link for a data dictionary: Web API Reference | Spotify for Developers

The data can be accessed here: An-Introduction-to-Top-Spotify-Songs-2023 (kaggle.com)

Hierarchical Clustering

Clustering using all features

Features' Importance in Clustering



Clusters' Interpretation using all features

Cluster 1

General Interpretation:

This cluster features songs that are popular, contemporary, and often have a vibrant, upbeat feel. These tracks generally exhibit a range of energy levels but are frequently highlighted by strong mainstream appeal and high streaming counts. They blend various modern genres and are ideal for dynamic settings.

Business Use Case:

Mainstream Hits Playlist Curation:

- Ideal for creating an engaging atmosphere in high-traffic areas like retail stores, malls, and entertainment venues.
- Useful for streaming platforms and radio stations to attract a broad audience with popular and trending music.
- Enhances customer engagement with familiar, high-appeal tracks.

Examples of Songs:

- 1. "Cruel Summer" Taylor Swift
- 2. "Sprinter" Dave, Central Cee
- 3. "La Bebe Remix" Peso Pluma, Yng Lvcas
- 4. "Classy 101" Feid, Young Miko
- 5. "Popular (with Playboi Carti & Madonna) The Idol Vol. 1 (Music from the HBO Original Series)" The Weeknd, Madonna, Playboi Carti

Cluster 2

General Interpretation:

This cluster encompasses songs that are more reflective and emotionally driven. The tracks often have a mellow or melancholic tone, with a focus on acoustic and introspective elements. They evoke a deeper emotional response and are often associated with personal and contemplative listening experiences.

Business Use Case:

Reflective and Acoustic Playlist Curation:

- Ideal for creating a calm and serene atmosphere in spaces like coffee shops, bookstores, and spas.
- Streaming services can use these tracks for relaxation and introspective listening playlists.
- Suitable for settings that benefit from a soothing and reflective musical backdrop.

Examples of Songs:

- 1. "Daylight" David Kushner
- 2. "What Was I Made For? [From The Motion Picture Barbie]" Billie Eilish
- 3. "Sunflower Spider-Man: Into the Spider-Verse" Post Malone, Swae Lee
- 4. "Another Love" Tom Odell
- 5. "La Bachata" Manuel Turizo

Cluster 3

General Interpretation:

This cluster is characterized by high-energy, rhythmically engaging tracks that are well-suited for creating an upbeat and lively atmosphere. The songs often feature dynamic beats and contemporary styles, making them ideal for settings where an energetic and motivating vibe is desired.

Business Use Case:

Energetic and Rhythmic Playlist Curation:

- Perfect for fitness centers, high-energy events, and nightlife venues where an energetic ambiance is needed.
- Streaming platforms can create workout playlists, party mixes, and other high-energy content.
- Enhances activity and engagement in environments that benefit from a stimulating musical environment.

Examples of Songs:

- 1. "Seven (feat. Latto) (Explicit Ver.)" Latto, Jung Kook
- 2. "LALA" Myke Towers
- 3. "vampire" Olivia Rodrigo
- 4. "WHERE SHE GOES" Bad Bunny
- 5. "Ella Baila Sola" Eslabon Armado, Peso Pluma

Overall Summary:

- Cluster 1: Features mainstream, contemporary hits ideal for dynamic and engaging settings.
- Cluster 2: Includes reflective and emotional tracks, perfect for creating a calm and introspective atmosphere.
- Cluster 3: Comprises high-energy and rhythmic tracks, suited for lively, energetic environments.

Clusters' Interpretation using Top 2 features (Speechiness and Acousticness)

Cluster 1

General Interpretation:

This cluster features songs that are vibrant, high-energy, and often have catchy, upbeat rhythms. These tracks are typically popular in contemporary music charts and are great for creating a lively and engaging atmosphere.

- **Business Use Case: **
- **Upbeat and Energetic Playlist Curation:**
- Ideal for retail stores, gyms, and events where a dynamic and energetic ambiance is desired.
- Streaming platforms can use these tracks for workout playlists, party mixes, and energizing background music.
- Enhances customer engagement and activity levels.
- **Examples of Songs:**
- 1. "Cruel Summer" Taylor Swift
- 2. "Sprinter" Dave, Central Cee
- 3. "La Bebe Remix" Peso Pluma, Yng Lvcas
- 4. "Classy 101" Feid, Young Miko

5. "Popular (with Playboi Carti & Madonna) - The Idol Vol. 1 (Music from the HBO Original Series)" - The Weeknd, Madonna, Playboi Carti

Cluster 2

General Interpretation:

This cluster includes songs that are emotional, contemplative, and often carry a relaxed or melancholic vibe. These tracks tend to be slower and evoke deep emotional responses.

- **Business Use Case:**
- **Emotional Ballads and Chill Playlist Curation:**
- Perfect for creating a calming and reflective atmosphere in cafes, bookstores, and spa centers.
- Streaming platforms can curate playlists for unwinding, studying, or reflective listening.
- Suitable for environments that benefit from a relaxed and introspective mood.
- **Examples of Songs:**
- 1. "Daylight" David Kushner
- 2. "What Was I Made For? [From The Motion Picture Barbie]" Billie Eilish
- 3. "Sunflower Spider-Man: Into the Spider-Verse" Post Malone, Swae Lee
- 4. "Another Love" Tom Odell
- 5. "La Bachata" Manuel Turizo

Cluster 3

General Interpretation:

This cluster is characterized by high-energy, rhythmic, and engaging tracks. These songs are ideal for creating an energetic and dynamic atmosphere, often associated with modern, trendy vibes.

- **Business Use Case:**
- **High-Energy Party and Workout Playlists:**
- Perfect for fitness centers, workout sessions, and party environments.
- Creates a motivating and energetic ambiance for customers.
- Playlists for energizing activities and high-energy events.
- **Examples of Songs:**
- 1. "Seven (feat. Latto) (Explicit Ver.)" Latto, Jung Kook
- 2. "LALA" Myke Towers
- 3. "vampire" Olivia Rodrigo
- 4. "WHERE SHE GOES" Bad Bunny
- 5. "Ella Baila Sola" Eslabon Armado, Peso Pluma

Overall Summary:

- **Cluster 1:** Vibrant and high-energy, perfect for dynamic and engaging environments.
- **Cluster 2:** Emotional and contemplative, suitable for relaxation and reflection.
- **Cluster 3:** High-energy and rhythmic, ideal for fitness, workouts, and parties.

Clusters' Musical Features Statistics using Top 2 features (Liveness and Valence)

++			+	+
	cluster	index	speechiness	acousticness
0	3	count	618	618
1	3	mean	-0.415332	-0.405219
2	3	std	0.29503	0.581925
3	3	min	-0.820693	-1.04138
4	3	25%	-0.618829	-0.887435
5	3	50%	-0.517897	-0.618022
6	3	75%	-0.215102	0.0362663
7	3	max	0.592352	1.07543

+	+-			+	+
į	į	cluster	index	speechiness	acousticness
	0	1	count	186	186
	1	1	mean	1.79322	-0.069264
	2	1	std	0.887227	0.881999
	3	1	min	0.390488	-1.04138
	4	1	25%	1.09701	-0.733484
	5	1	50%	1.65214	-0.348609
	6	1	75%	2.38389	0.421142
	7	1	max	5.43708	2.30703

	 	cluster	index	speechiness	acousticness
Ϊ	0	2	count	149	149
Ì	1	2	mean	-0.515865	1.76717
Ì	2	2	std	0.250679	0.468348
	3	2	min	-0.820693	0.92148
	4	2	25%	-0.719761	1.34484
	5	2	50%	-0.618829	1.76821
	6	2	75%	-0.416966	2.15308
	7	2	max	0.592352	2.69191
4	+			++	+

Cluster 1 (186 songs):

- High speechiness (1.793 mean) suggests these tracks have a significant amount of spoken words or rap elements.
- Slightly negative acousticness (-0.069 mean) indicates these tracks are somewhat more electronic or produced rather than acoustic.
- This cluster likely represents hip-hop or rap tracks, possibly appealing to audiences who enjoy vocal-heavy music with strong lyrical content. These tracks could be popular in urban settings or youth-focused marketing campaigns.

Cluster 2 (149 songs):

- Low speechiness (-0.516 mean) suggests these tracks have minimal spoken words, likely instrumental or with sparse vocals.
- Very high acousticness (1.767 mean) indicates these tracks are predominantly acoustic, possibly featuring organic instruments.
- This cluster might represent folk or acoustic tracks, appealing to listeners seeking soothing, natural sounds. These could be valuable for use in coffee shops, relaxation playlists, or nature-related media.

Cluster 3 (618 songs):

- Moderate speechiness (-0.415 mean) indicates a balanced mix of spoken words and singing.
- Low acousticness (-0.405 mean) suggests these tracks are somewhat produced with a mix of electronic and organic elements.
- This cluster likely represents mainstream pop tracks, which are versatile and widely appealing. These tracks could be great for commercial use, radio play, and public spaces where a broad audience is present.

Business Implications:

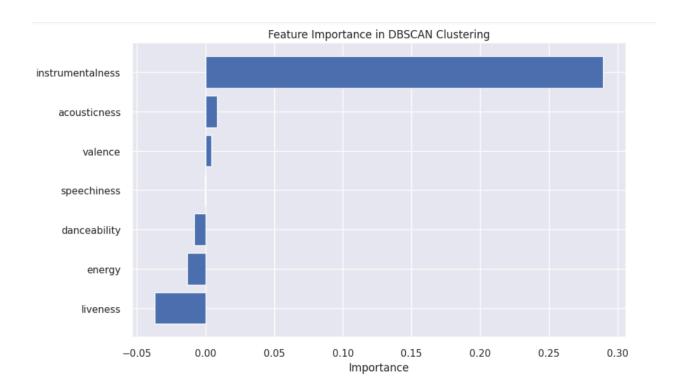
- 1. *Diverse Portfolio: The clusters show a range of musical styles, allowing for a balanced catalog that can cater to various listener moods and preferences.
- 2. Targeted Marketing: Each cluster can be marketed differently. Cluster 1 for urban or youth markets, Cluster 2 for serene or nature-themed environments, and Cluster 3 for mainstream, broad audience appeal.
- 3. **Playlist and Radio Programming**: Understanding these clusters can help in creating more effective playlists or radio stations, potentially increasing listener engagement and retention.
- 4. **Licensing Opportunities**: Different clusters may be more suitable for various licensing scenarios (e.g., Cluster 1 for urban settings, Cluster 2 for relaxation or nature-related media, Cluster 3 for general commercial use).

DBSCAN

The DBSCAN clustering is still a work in progress and needs more tuning to get interpretable results (see code for details) because most data points are labeled as noise by the algorithm. It is also strange that there is more than one cluster before tuning the hyperparameters but there is only one cluster without tuning. Therefore, we need to reevaluate the necessity of tuning.

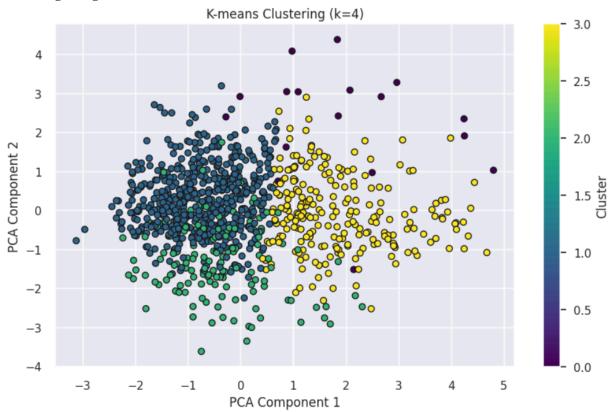
Clustering using all features

Features' Importance in Clustering

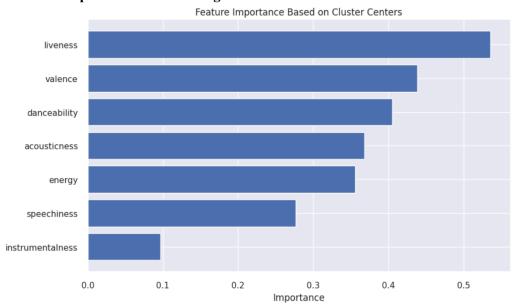


Kmeans

Clustering using all features



Features' Importance in Clustering



Clusters' Interpretation using all features

Cluster 0

General Interpretation:

This cluster features a variety of tracks from different genres and styles, including pop, alternative, and electronic music. The songs in this cluster are known for their unique and diverse sound profiles, appealing to listeners who enjoy a mix of modern and eclectic musical influences.

- **Business Use Case:**
- **Eclectic Playlist Curation:**
- Suitable for environments like art galleries, trendy cafes, and boutique stores where a distinctive and diverse atmosphere is desired.
- Streaming platforms can use these tracks to create playlists for listeners who appreciate a variety of genres and innovative sounds.
- Enhances the ambiance of spaces looking to convey a sense of modernity and eclecticism.
- **Examples of Songs:**
- 1. "WHERE SHE GOES" Bad Bunny
- 2. "Makeba" Jain
- 3. "Apocalypse" Cigarettes After Sex
- 4. "Link Up (Metro Boomin & Don Toliver, Wizkid feat.)" WizKid, Toian, Metro Boomin, Don Toliver, Beam
- 5. "METAMORPHOSIS" INTERWORLD

Cluster 1

General Interpretation:

This cluster is characterized by high-energy, contemporary pop and hip-hop tracks that are popular in modern music charts. The songs are known for their catchy hooks and vibrant rhythms, making them appealing for various energetic and social settings.

- **Business Use Case:**
- **Upbeat and Energetic Playlist Curation:**
- Ideal for retail environments, gyms, and events where an energetic and dynamic atmosphere is desired.
- Streaming platforms can use these tracks for workout playlists, party mixes, and energizing background music.
- Enhances customer engagement and activity levels with its lively and upbeat sound.
- **Examples of Songs:**
- 1. "Seven (feat. Latto) (Explicit Ver.)" Latto, Jung Kook
- 2. "LALA" Myke Towers
- 3. "Cruel Summer" Taylor Swift
- 4. "Ella Baila Sola" Eslabon Armado, Peso Pluma
- 5. "Columbia" Quevedo

Cluster 2

General Interpretation:

This cluster includes tracks that are contemporary and popular in the hip-hop and electronic genres, often characterized by their rhythmic beats and engaging sounds. The songs are well-suited for high-energy and trendy environments.

- **Business Use Case:**
- **High-Energy Party and Workout Playlists:**
- Perfect for fitness centers, high-energy events, and social gatherings where a lively and engaging atmosphere is desired.
- Streaming platforms can use these tracks for workout playlists, party mixes, and energetic background music.
- Creates a vibrant and exciting environment for listeners who enjoy modern, high-energy music.
- **Examples of Songs:**
- 1. "Sprinter" Dave, Central Cee
- 2. "La Bebe Remix" Peso Pluma, Yng Lvcas
- 3. "TQG" Karol G, Shakira
- 4. "Barbie World (with Aqua) [From Barbie The Album]" Nicki Minaj, Aqua, Ice Spice
- 5. "Starboy" The Weeknd, Daft Punk

Cluster 3

General Interpretation:

This cluster features tracks that are emotionally charged and introspective, often reflecting themes of melancholy or deep reflection. The songs are known for their emotional depth and are well-suited for creating a thoughtful and reflective atmosphere.

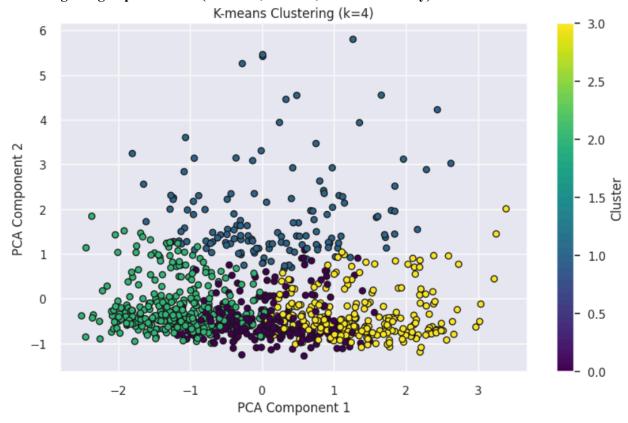
- **Business Use Case:**
- **Emotional Ballads and Chill Playlist Curation:**
- Ideal for creating a calming and reflective atmosphere in spaces like cafes, bookstores, and relaxation areas
- Streaming platforms can use these tracks for playlists focused on relaxation, studying, or emotional reflection.
- Enhances environments that benefit from a soothing and introspective mood.
- **Examples of Songs:**
- 1. "vampire" Olivia Rodrigo
- 2. "Daylight" David Kushner
- 3. "What Was I Made For? [From The Motion Picture Barbie]" Billie Eilish
- 4. "I Wanna Be Yours" Arctic Monkeys
- 5. "Last Night" Morgan Wallen

Overall Summary:

- **Cluster 0:** Eclectic and diverse, ideal for creative and modern spaces.
- **Cluster 1:** Upbeat and energetic, perfect for lively and dynamic settings.

- **Cluster 2:** High-energy and rhythmic, suitable for party and workout environments.
- **Cluster 3:** Emotional and reflective, ideal for calming and introspective spaces.

Clustering using Top 3 features (Liveness, Valence, and danceability)



Clusters' Interpretation using Top 3 features (Liveness, Valence, and danceability)

I apologize for the oversight. Let's use the correct tables you provided and revise the cluster interpretations accordingly:

Cluster 0

General Interpretation:

This cluster is characterized by a mix of contemporary and popular tracks, often featuring elements from genres like reggaeton, trap, and modern R&B. The songs are typically upbeat and energetic, with a mix of mainstream appeal and unique sound characteristics.

^{**}Business Use Case:**

^{**}Eclectic Playlist Curation:**

^{- **}Retail Environments & Trendy Spaces: ** Ideal for creating an upbeat and contemporary atmosphere in settings such as boutiques, cafes, and urban lounges.

- **Streaming Platforms: ** Useful for creating playlists that feature a diverse range of modern tracks with a high level of engagement.
- **Social Media Content:** Perfect for background music in content that aims to attract a younger, trend-savvy audience.
- **Examples of Songs:**
- 1. "WHERE SHE GOES" Bad Bunny
- 2. "fukumean" Gunna
- 3. "Kill Bill" SZA
- 4. "Mastermind" Taylor Swift
- 5. "Circo Loco" Drake, 21 Savage

Cluster 1

General Interpretation:

This cluster features high-energy and contemporary pop and hip-hop tracks. The songs are marked by their catchy rhythms and mainstream appeal, making them suitable for vibrant and energetic environments.

- **Business Use Case:**
- **Upbeat and Energetic Playlist Curation:**
- **Fitness Centers, Retail Stores & Events:** Great for spaces that need an energetic and lively atmosphere to boost engagement and activity.
- **Streaming Platforms: ** Ideal for playlists focused on workouts, parties, and energetic social gatherings.
- **Public Spaces: ** Enhances environments where a dynamic and vibrant mood is desired.
- **Examples of Songs:**
- 1. "un x100to" Bad Bunny, Grupo Frontera
- 2. "As It Was" Harry Styles
- 3. "Cupid Twin Ver." Fifty Fifty
- 4. "Like Crazy" Jimin
- 5. "LADY GAGA" Gabito Ballesteros, Junior H, Peso Pluma

Cluster 2

General Interpretation:

This cluster includes tracks that are rhythmic and trendy, often from the hip-hop and reggaeton genres. The songs are known for their engaging beats and contemporary sound, making them suitable for energetic and social settings.

- **Business Use Case:**
- **High-Energy Party and Workout Playlists:**
- **Fitness Centers & Social Events:** Ideal for creating a high-energy environment that encourages activity and social interaction.

- **Streaming Platforms: ** Useful for playlists designed for parties, workouts, and other high-energy activities.
- **Nightclubs & Bars:** Perfect for enhancing the atmosphere in lively nightlife venues.

Examples of Songs:

- 1. "Seven (feat. Latto) (Explicit Ver.)" Latto, Jung Kook
- 2. "LALA" Myke Towers
- 3. "Sprinter" Dave, Central Cee
- 4. "Ella Baila Sola" Eslabon Armado, Peso Pluma
- 5. "La Bebe Remix" Peso Pluma, Yng Lvcas

Cluster 3

General Interpretation:

This cluster features tracks that are emotionally charged and introspective, often reflecting themes of personal reflection or melancholy. The songs are known for their emotional depth and are well-suited for creating a reflective atmosphere.

Business Use Case:

- **Emotional Ballads and Chill Playlist Curation:**
- **Cafes, Bookstores & Relaxation Areas:** Ideal for spaces where a calming and introspective atmosphere is desired.
- **Streaming Platforms: ** Suitable for playlists focusing on relaxation, studying, or emotional reflection.
- **Personal Spaces: ** Enhances environments where a soothing and reflective mood is beneficial.

Examples of Songs:

- 1. "vampire" Olivia Rodrigo
- 2. "Daylight" David Kushner
- 3. "What Was I Made For? [From The Motion Picture Barbie]" Billie Eilish
- 4. "I Wanna Be Yours" Arctic Monkeys
- 5. "The Great War" Taylor Swift

Overall Summary:

- **Cluster 0:** Eclectic and diverse, perfect for modern and trendy spaces.
- **Cluster 1:** Upbeat and energetic, ideal for lively and dynamic environments.
- **Cluster 2:** High-energy and rhythmic, suitable for party and workout settings.
- **Cluster 3:** Emotional and reflective, great for calming and introspective spaces.

Clusters' Musical Features Statistics using Top 3 features (Liveness, Valence, and danceability)

0		cluster		danceability	liveness	valence
/ 2	1 2 3 4 5	2 2 2 2 2 2 2 2	mean std min 25% 50%	324 0.622407 0.655087 -1.36563 0.207238 0.685938	324 -0.335131 0.54788 -1.11011 -0.672285 -0.526342	324 0.997572 0.50105 0.152066 0.56752 1.00428

4			L	4		L	+
	İ	cluster	index	danceability	liveness	valence	į
	0	3	count	247	247	247	i
	1	3	mean	-1.21779	-0.290294	-0.749313	I
	2	3	std	0.618146	0.523158	0.694928	ĺ
	3	3	min	-3.00689	-1.11011	-2.02108	
	4	3	25%	-1.57079	-0.599314	-1.2967	I
	5	3	50%	-1.09209	-0.453371	-0.827979	Ĺ
ĺ	6	3	75%	-0.750162	-0.161486	-0.23143	İ
	7	3	max	-0.408233	2.24656	1.04689	ĺ
4			+	+	+	+	+

	cluster	index	danceability	liveness	valence
0	0	count	243	243	243
1 1	0	mean	0.498229	-0.330852	-0.669636
2	0	std	0.552852	0.491636	0.576331
3	0	min	-0.339848	-1.11011	-2.02108
4	0	25%	0.00208099	-0.672285	-1.14756
5	0	50%	0.412395	-0.526342	-0.572315
6	0	75%	0.891096	-0.161486	-0.188819
7	0	max	1.91688	1.44388	0.194677
++		+	+	+	++

	+	+		+			μ.
		cluster	•	danceability		valence	
	0	1	count	139	139	139	
	1 2]	mean std	-0.157814 0.811265	1.87541 1.06843	0.176897 0.844005	
	3	1	min	-2.32303	0.641198	-1.89325	
	4	1	25%	-0.681776	1.152	-0.465789	
	5	1	50%	-0.203076	1.44388	0.194677	
	6	1	75%	0.412395	2.21008	0.748615	
	7	1	max	1.8485	5.74918	1.8991	
-	+	+		+	+	+	F

Cluster 0 (243 songs):

- **Danceability:** Moderate (mean: 0.498) suggests these tracks have a balanced rhythmic quality, making them versatile for various environments.
- **Liveness:** Slightly negative (mean: -0.331) indicates these tracks are more polished and studio-produced rather than featuring live recordings.
- **Valence: ** Low (mean: -0.670) shows that these tracks generally have a more neutral to slightly negative mood.

General Interpretation:

Cluster 0 likely includes a range of tracks that are neither overly energetic nor too mellow, making them suitable for a variety of settings. The combination of moderate danceability and low valence suggests these songs are versatile but might lean towards a more subdued atmosphere.

Business Use Case:

- **Versatile Background Music:**
- Suitable for commercial spaces like shopping malls, office environments, or general public areas where a balanced, non-intrusive musical atmosphere is desired.
- Ideal for streaming platforms and radio stations aiming to provide a mix of engaging yet background-friendly music.
- Enhances the customer experience by offering a diverse selection of tracks that can fit a range of moods and activities.

Cluster 1 (139 songs):

- **Danceability:** Low (mean: -0.158) suggests these tracks might be less rhythmic or suited for dancing.
- **Liveness: ** High (mean: 1.875) indicates a significant presence of live performance elements or recordings.
- **Valence:** Low (mean: 0.177) shows that these tracks generally have a more neutral or slightly positive mood.

General Interpretation:

Cluster 1 features tracks with strong live performance characteristics and less emphasis on rhythm, which might be more suited to live music settings or performances. The high liveness suggests these tracks are likely recorded with a significant live element.

Business Use Case:

- **Live Performance and Engaging Music:**
- Ideal for venues, events, or settings where a live performance atmosphere is desirable, such as concerts or live shows.
- Suitable for streaming services and radio stations that focus on live recordings or performance highlights.
- Enhances environments that benefit from a lively, performance-oriented musical backdrop.

Cluster 2 (324 songs):

- **Danceability:** High (mean: 0.622) indicates these tracks are very rhythmic and likely encourage movement.
- **Liveness:** Slightly negative (mean: -0.335) suggests a more produced sound with less emphasis on live recording.
- **Valence: ** High (mean: 0.998) shows these tracks generally have a very positive and uplifting mood.

General Interpretation:

Cluster 2 is characterized by its energetic and uplifting nature, with tracks that have high danceability and a positive mood. This cluster likely represents high-energy music suitable for engaging and lively settings.

Business Use Case:

- **Upbeat and Energetic Music:**
- Ideal for high-energy environments such as gyms, parties, or retail spaces where an engaging and dynamic atmosphere is beneficial.
- Useful for streaming platforms and radio stations to create playlists for workouts, parties, or social events.
- Enhances customer engagement with vibrant, positive music that energizes and motivates.

Cluster 3 (247 songs):

- **Danceability:** Low (mean: -1.218) suggests these tracks are less rhythmic and less suitable for dancing.
- **Liveness: ** Slightly positive (mean: -0.290) indicates a mix of live and studio elements, but leaning towards a more polished production.
- **Valence:** Low (mean: -0.749) shows these tracks generally have a more melancholic or introspective mood.

General Interpretation:

Cluster 3 features tracks that are more introspective and less rhythmically driven, with a melancholic mood. These tracks are likely suited for reflective or calm environments.

Business Use Case:

- **Reflective and Mellow Music:**
- Perfect for settings requiring a calm and introspective atmosphere, such as bookstores, cafes, or relaxation areas.
- Useful for streaming services to curate playlists for studying, relaxation, or contemplative moments.
- Enhances environments that benefit from a serene, reflective musical backdrop.

Overall Summary:

- **Cluster 0:** Versatile and balanced, ideal for general commercial use and diverse settings.
- **Cluster 1:** Live and engaging, suitable for performance-focused environments.
- **Cluster 2:** Upbeat and positive, perfect for high-energy activities and lively settings.
- **Cluster 3:** Reflective and mellow, best for calm and introspective atmospheres.

Business Implications:

- 1. **Diverse Portfolio:** The clusters reflect a range of musical styles, enabling a balanced catalog that can cater to various listener needs and environments.
- 2. **Targeted Marketing:** Each cluster can be marketed to specific contexts—Cluster 0 for general background use, Cluster 1 for live settings, Cluster 2 for energetic activities, and Cluster 3 for calm environments.

- 3. **Playlist and Programming:** Understanding these clusters aids in creating effective playlists and radio programming, enhancing listener engagement and satisfaction.
- 4. **Licensing Opportunities:** Different clusters can be targeted for various licensing scenarios, such as Cluster 0 for general use, Cluster 1 for live performances, Cluster 2 for high-energy content, and Cluster 3 for relaxation and introspection.