

Analyzing the data of rapper: Pitbull's songs from 2004 to 2024*

Analyzing Pitbull's Music: Trends in Valence, Energy, and Danceability from 2004 to 2024

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This paper explores trends in the valence, energy, and danceability of Pitbull's songs from 2004 to 2024. The analysis examines how the emotional tone (valence) has changed over time, its relationship with energy, and how energy influences danceability. Using data from Spotify, the study identifies key patterns in Pitbull's music, including shifts in mood and energy over time, as well as the optimal energy levels for danceability.

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1 Introduction

The R programming language (R Core Team 2023) and tidyverse (Wickham et al. 2019) were used to clean data, generate tables and create graphs, package knitr (Xie 2023) and (Zhu 2024)

*Code and data are available at: <https://github.com/NevaeH-9/vincentspotify>

is used for adding caption to table. The data were gathered and downloaded form spotify by using package spotifyr (Thompson et al. 2022) and devtools (Wickham et al. 2022).

2 Data

The data used in this study was obtained using the Spotify Web API (Spotify, n.d.) through the spotifyr package in R (Thompson et al. 2022), all of the songs from 2004 to 2024 and “album_release_date”, “danceability”, “valence” and “energy” are chosen to analyze. This table Table 1 shows the first several rows of the data we use.

Table 1: 2004 - 2024 Data of Pitbull’s Songs

Album Release Date	Danceability	Valence	Energy
2024-02-16	0.798	0.696	0.956
2024-02-16	0.842	0.911	0.857
2024-02-16	0.869	0.935	0.832

3 Result

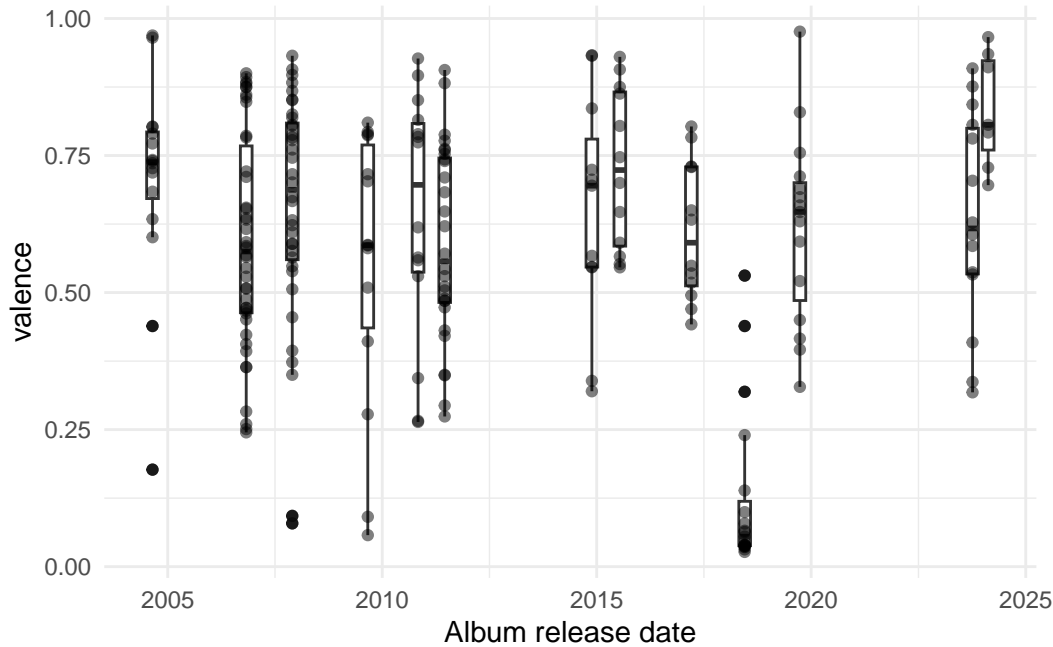


Figure 1: Trend in Valence of Pitbull’s songs Over Time

Box plot shows the trend in the musical positivity (valence) of Pitbull's songs from 2004 to 2024, positive in general but become extremely neagitive around 2018, showing fluctuations in emotional tone across albums and highlighting shifts toward more upbeat or moody compositions.

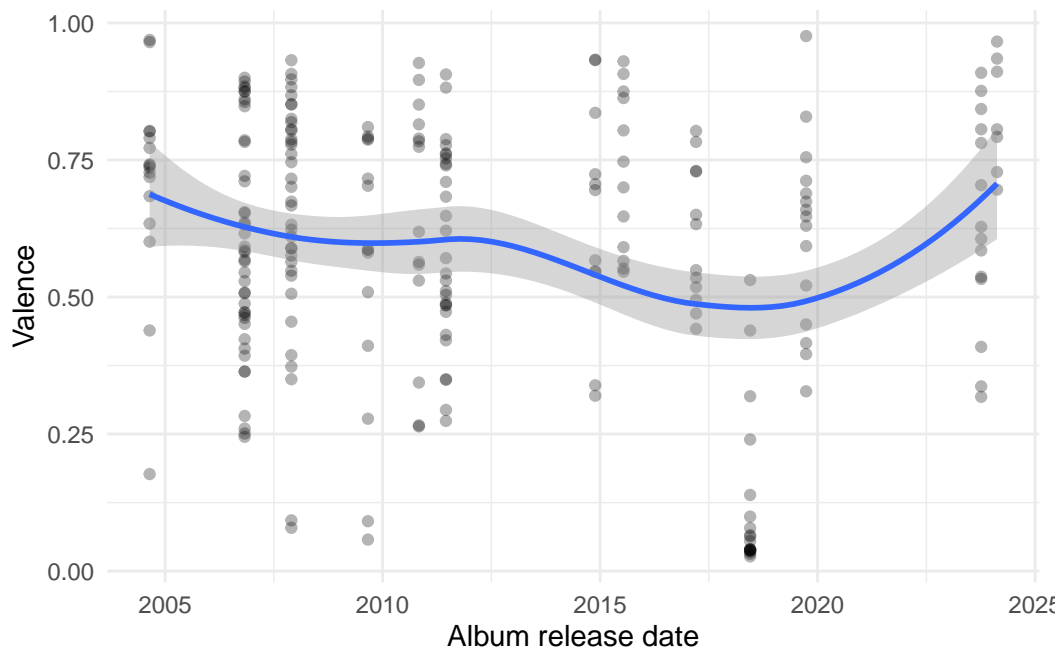


Figure 2: Trend in Valence of Pitbull's songs Over Time

scatter plot of album released and valence, showing a decrease from 2020 to 2018, and an increase after 2018.

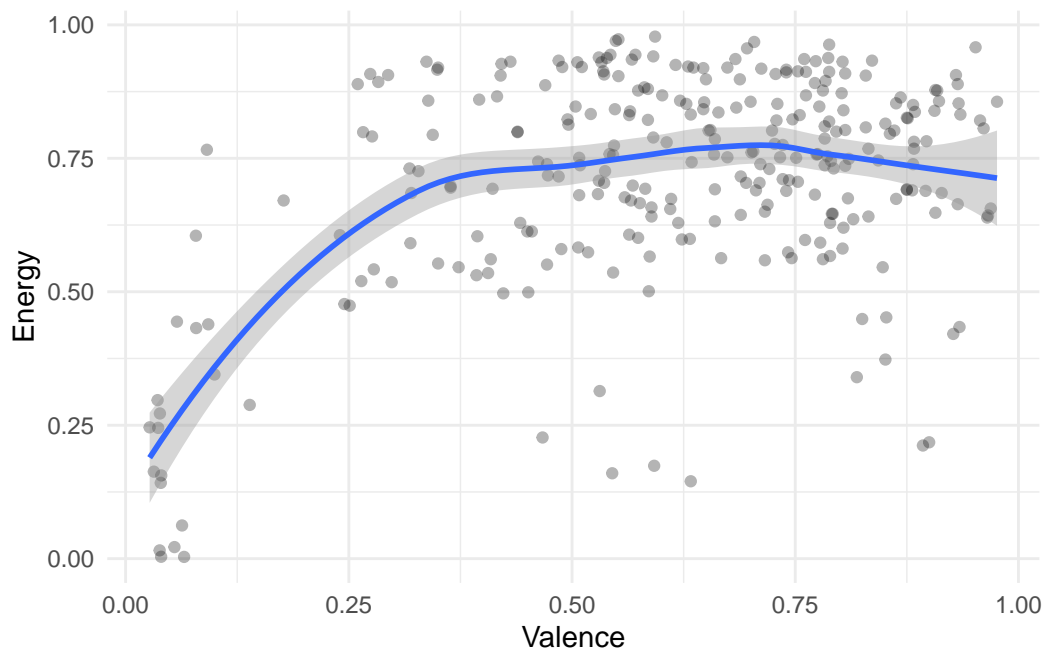


Figure 3: Relationship between valence and energy

Scatter plot showing the relationship between energy and valence in Pitbull's songs. The fit line indicates that songs with moderate positivity are associated with higher energy levels, showing a positive correlation when $\text{Valence} < 0.5$, while extremes in valence tend to have lower energy.

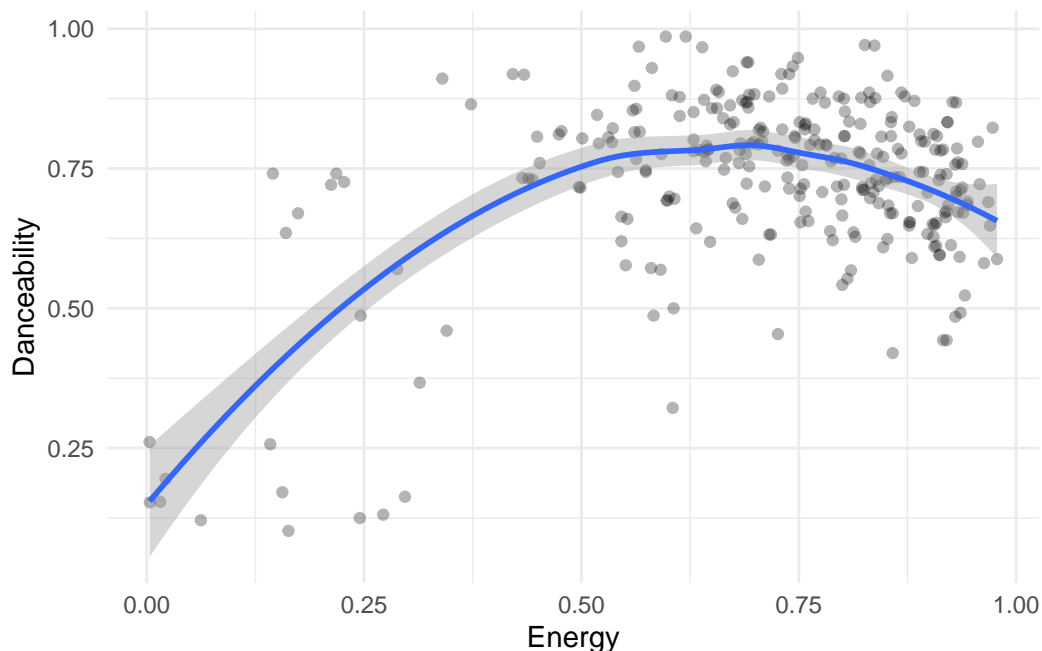


Figure 4: Relationship between energy and danceability

Scatter plot showing how danceability changes with energy in Pitbull's songs. The fit line highlights that moderately high energy levels maximize danceability (when valence < 0.5), with a decline in danceability for extremely high-energy tracks.

4 Discussion

From the graph Figure 1, we can see that In the early years (pre-2010), there is a wide range of valence values, with some songs having very high positivity (close to 1) and others showing lower values, suggesting a mix of upbeat and moody tracks. As time progresses (between 2010 and 2020), the valence remains fairly consistent, though the range in some albums narrows, indicating a tendency toward maintaining a certain upbeat style. Around 2020, there seems to be a drop in valence for a few songs, as seen by some outliers with lower valence scores. This could suggest Pitbull released some less positive songs during this period, though most of his music remained relatively upbeat.

When we fit a smoothed line to the graph as shown in Figure 2, the trend is more obvious, suggests that Pitbull's music started off with a relatively high valence (around 0.75) in the early 2000s, and then gradually declined, reaching a low point around 2018, where the valence dipped below 0.5. After that valence increases again, climbing back toward 0.75 until recent years.

Other two graphs that visualize relationships between valence, energy, and danceability of Pitbull's songs Figure 3 and Figure 4 have similar patterns. Both of them shows there is a strong positive correlation between two variables when one variable is smaller than 0.5. Figure 3 shows that positive songs tend to have higher energy, but beyond a certain point (around 0.75), increasing valence doesn't necessarily result in more energetic. Figure 4 demonstrates that moderately high energy songs (with energy range from 0.5 to 0.8) are the most danceable, but extremely high energy might reduce danceability.

References

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