Analyzing The Impact Of Telugu Music Features On The Economic Success Of The Tollywood Film Industry

Word Count: 5182

Introduction

The rapid expansion of technology in the 21st century has transformed the way films and series are traditionally perceived. With rising globalization, international film industries have garnered greater recognition, in particular being the Indian film industry, which has been met with significant growth in GDP since 2000 (Fetscherin, 2010). While the Indian film industry, famously and mistakenly dubbed as Bollywood, is notable for its high revenues, India comprises over 1600 dialects and 30 languages, such that the films differ from region to region (KPMG International, 2017). Despite the large economic success this particular industry receives, many other languages, especially in Southern India, are rooted in successful levels of film production activity, benefiting from strong economic revenues as well (Dastidar & Elliott, 2019). This research aims to delve into the connection between Telugu, one of the aforementioned 30 languages, and its subsequent film industry, otherwise known as Tollywood.

The development and structure of Telugu cinema is vastly complex, characterized by traditional depictions of culture and belief, alongside nationalism and degrees of problems cultivated from society (Balabantaray, 2020). One key component that is found in Telugu films is the inclusion of music which accounts for nearly 80% of India's music revenue emphasizing the crucial role of the Indian film industry in the economy (Hu, 2017) making it important to acknowledge the features of successful songs that allow for a movie to be financially profitable.

This study aims to examine the music produced by the various films in the Tollywood industry and determine the defining characteristics of popular songs that accumulate large film revenues. Music with similar qualities will be compared to the economic revenues of the films

they derive from, which will be collected from existing databases, and graphically analyzed for features and similarities in songs with higher outputs than others. By studying different popular Telugu songs and the variety of formats and types that they fit into, this quantitative analysis becomes important to creating music that will appeal to audiences thus increasing song and film industry revenues.

Literature Review

Regional Markets

The Telugu film music industry, otherwise known as Tollywood, was selected for analysis as it possesses a variety of attributes relatively attractive as a source of study. Tollywood music is composed of a large variety of musical styles. According to Peter Manuel[1] (1988), Tollywood contains elements from Western music such as disco, rock, pop, and classical. In addition, remixes, hybrids, and blends between these styles and instruments have introduced more variation, meaning the analysis of the Tollywood industry offers insight into other musical genres and industries as well. India is currently the world's largest producer of films, and by extension film music, producing over 1724 films in 2013 compared to 738 films produced in the United States (Luis, 2016). A primary reason for the large industrial growth is cited to India's Pan-India film movement, where the focus of Tollywood as merely a regional market has shifted to other parts of the country attracting more audiences of all languages and states. Another factor is the modern Indian diaspora and subsequent growth of the South Asian population. In 2018,

[1] Peter Manuel is a researcher in ethnomusicology, specializing in the music of India, the Caribbean, and Spain, at the University of John Jay.

according to India's Ministry of External Affairs (2018), there were approximately 32,100, 340 overseas Indians, 13,459,195 non-resident Indians, and 18,683,645 persons of Indian origin. Thus, this allows for the influence of various international film markets to globalize, especially the South Indian film industry, with the shift to modernity having rapidly transformed musical styles, elevating film popularity. In 2012, Indian cinema box office[2] revenues were $1.6 billion in the services[3] sector accounting for more than 50% of the Indian economy (McCarthy, 2014).

Structure of Music Industry and Globalization of Indian Film

Tollywood is rigidly structured as it is organized into production companies, independent distributors, private financiers, and stand-alone cinema operators. This persistence of Tollywood's detailed format can be understood through the prevalence of the large social network structure between producers and music directors. A system involving the combination of genre elements along with song-and-dance sequences are rooted in this specific relationship within a small community of key people—most of whom have familial connections extended throughout the industry (Lorenzen & Täube, 2008). This nepotistic setup means that a predominant number of artists are affiliated with a label that has developed and promoted them. Thus, the promotion is deeply rooted in the appearance of star performers in films, creating interest among fans, boosting viewership, and generating extreme film and music publicity, contributing to reasons why a film may be unsuccessful while its respective music can become critically acclaimed (Basuroy et al., 1994; Moon et al., 2010). However, the rising international competition has alleviated local demand for films and music in the Telugu market (Dastidar &

[2] Box Office refers to the commercial success of a film based on audience ticket transactions.
[3] The services sector includes cinema.

Elliott, 2019). Subhra Rajat Balabantaray[4] (2020), states that the increasing globalization and westernization of the Indian film industry has shifted the styles of music to incorporate more western-specific works such as electronic music technology. The argument mainly surrounds how the changing youth audience has created a shift in the structure of music styles that engage and appeal to modernity. Similar to Balabantaray's perspective, Carlos Nardi[5] (2011), places emphasis on changes in the way western technology is used in music as an attractive source possibly leading to shifting music opinions. He argues that music aesthetics are defined by sound, and thus music production technology allows producers to influence the large music market and gain advantage financially. As globalization has increased, music technology has become more accessible allowing the investigation of Tollywood to lead to additional discoveries about the influence of the western world in South India. The prominent transformation from ancient music forms to modernized Indian pop and western hip hop styles, emphasizes the impact of diminishing local audiences in favor of the growing Westernized music (Hasan & Nika, 2014). However Ashish Rajadhyaksha[6] (2010) argues that the Indian film industry, while becoming modernized, is slowly resisting industrialization and maintaining its cultural insiderism within film viewership as certain aspects of Tollywood's film and music industry limit the rates at which this advancement can occur.

Identifying Drive

[4] Balabantaray is a researcher at the Department of Economics and International Business at the University of Petroleum and Energy Studies.

[5] Carlos Nardi is a Research Associate at Rhodes University who teaches music production, DJing, methodology and arts marketing at CDM – Centro Didattico MusicaTeatroDanza, with a PhD in Musicology from the University of Trento.

[6] Ashih Rajadhyaksha is a popular Indian film scholar and cultural theorist.

With Tollywood's current reputation, various academic sources have sought to investigate the driving causes behind its appeal, both internationally and nationwide. Alison Arnold's[7] (1988) case study explored the mass-market musical eclecticism[8] of popular film songs in India as it contributes to the growing global role of Indian music in non-Western nations. Arnold discusses how the growing popularity of Indian film music is due to the rapid emergence of foreign musical styles replacing the traditional aspects of the music. In a study analyzing the main causes of a motion picture's popularity, positive consumer judgment related to high box office revenue and critical acclaim (Prag & Casavant, 1994). Most often, if a film has a positive performance both in reviews and economic outputs, the music is seen to be denoted as a success as well (Beaster-Jones, 2015). Thus, Prag and Casavant's study intimately connects to Arnold's work, emphasizing the facet of consumer review as being an important aspect of film and song success as the Indian film industry has grown to encourage musical modernization. Other factors include production cost, the presence of star performers, and marketing. Prag and Casavant weighed these factors evenly, while Arnold focused on consumer rating as the most significant contributor towards acclaimed recognition and success. As such, this study intends to focus on the musical aspect of Indian cinema (Tollywood), through a quantitative analysis rather than a qualitative approach, connecting it to the identification of the features that lead to high consumer reviews and subsequent economic success.

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[7] Alison Arnold is a Lecturer and Assistant teaching Professor in the Music Department and Arts Studies program at North Carolina State University.

[8] Eclecticism is the conscious use of styles that vary from a composer's own nature. It refers to a composer utilizing other models and styles of music instead of their own. This term also describes the music of composers who combine multiple styles.

Research Gap

However, the question still remains as to what specific audio features of Telugu music contribute to high success rates and the generation of large economic revenues. While music has been denoted to be a factor of a film's financial success, its features and components are loosely investigated (Balabantaray, 2020). Additionally, while there is film and revenue analysis by itself, not many studies have been conducted in which the film songs are being connected to accumulation of revenue for a movie, which is a primary goal of this research. There is another gap within what languages are being studied in film analysis, with Telugu not being a large part of the subject as there are other studies aimed towards analyzing connections between music and widespread, popular languages such as English, French, Spanish, and even Hindi.

As such, this research intends to find a numerical correlation between the musical qualities of songs and their success. Inspiration for this choice of methodology was drawn largely from a data visualization study titled "Song Hit Prediction: Predicting Billboard Hits Using Spotify Data" performed by Kai Middlebrook and Kian Sheik (2019). Within this study, they aim to predict which songs will achieve high success rates on the Billboard charts. The research is introduced by alluding to Hit Song Science[9] (HSS) where Middlebrook and Sheik attempted to solve this problem by constructing a dataset with approximately 1.8 million hit and non-hit songs between 1985 and 2018, extracting their respective audio features utilizing Spotify's Web Application Programming Interface (API), a music analysis tool. Essentially, a set

[9] Hit Song Science aims to predict success rates of songs before they are released into the market, dictating that the popularity of a song can be examined through an analysis of its audio features.

of characteristics and revenue features of the Telugu film industry establish it as a suitable subject for this research, which intends to utilize a quantitative method. To connect the prior research and to fill a gap, this study aims to answer the following question: To What Extent Do The Features Of Telugu Music Impact The Economic Success Of The Tollywood Film Industry In Terms Of Box Office Collections, Streams, And Views?

Methodology

Rationale

A quantitative correlational analysis was used to evaluate the extent of the relationship between particular audio features of Telugu music and its film's respective variable measures of economic success. This is important as the quantitative method captured details that would not have been revealed had a qualitative method been utilized to effectively formulate results (Salakka et.al., 2021). As discussed in the literature review, some past researchers have conducted interviews and others have explored experimental design concerning the music of the Telugu Film Industry, but not in a quantitative approach as utilized in this study (Durisala, 2009). Additionally, while the pre-existing research has demonstrated evidence of researchers performing a correlational method through use of the Spotify API, it was important to note that such studies were conducted with American music (Middlebrook & Sheik, 2019; Simonton, 2007).

While having identified music as a critical financial feature, past studies have not delved into the specific aspects of the music that garnered large financial success (Moon et al., 2010; Balabantaray, 2020). Thus, a precedent was established for music and its subsequent importance

as a measure of a film's economic success, such designating the quantitative correlational analysis design to be essential as it introduced audio analysis not only for an underexplored industry but offered another perspective away from previously conducted qualitative analyses.

This method was chosen over the next most viable option, a qualitative content analysis, which focused on examining audience reviews regarding Telugu music albums from films in order to identify the most discussed aural aspect of the tracks. A qualitative content analysis would have been cumbersome, largely because it would have required an exhaustive discussion of how variables measuring economic success were reflected in the multiple descriptions established by the audience reviews. Additionally, it would have been extremely difficult to summarize as most audience reviews are in the format of live interviews with the presence of a thin but obstructive language barrier between the researcher and source. Furthermore, audience reviews of Telugu movies are primarily dedicated to the analysis of the film more so than the music, thus a minimal amount of music related reviews would have been collected that would have culminated into inaccurate results.

A factor analysis was rejected by the researcher as well, as this type of analysis explores relationships between variables that already have a pre-established correlation. As no previous establishment between audio analysis features and economic measures has been determined, a factor analysis would not be a feasible mode of methodology. Therefore, a quantitative correlational analysis allowed for a simpler comparison that would not have been possible under a comparative content, factor, and qualitative analysis.

Sample

The sample began by taking all songs that were nominated for awards in major music related categories from the following organizations: Filmfare Awards South and South Indian International Movie Awards (SIIMA).[10][11]At least one of these organizations had to recognize the song's achievement in one or more of the following three categories: best male playback singer, best female playback singer, and best lyricist. These two organizations were selected as the Tollywood Film Industry has few film and music award ceremonies, with both Filmfare and SIIMA being the most well known and major shows that provided recognition for artistic and cinematical technical excellence in the industry. In order to save computational time, not all awards ceremonies could be considered. In addition, both organizations had at least one award category dedicated to film music, which placed that category on the same level of other major categories that recognized cinematic achievement.

This selection process emphasized that it may be possible to assess the contribution of film music with the same reliability as the other film components. This is important as it demonstrates the film songs as having attained a moderate level of success which enabled this to be a key assumption of the study. By extension, the films are considered to be economic successes. This is essential to the study as the researcher aimed to analyze the features of successful songs that contribute to the economic success of the respective films. As over hundreds of songs are produced in the Tollywood film industry every year (Rajadhyaksha, 2003), it was not feasible for all songs to be analyzed. Thus songs were thus tabulated from 2015 to

[10] The Filmfare Awards South and South Indian International Movie Awards honors the artistic and technical excellence within South Indian films, encompassing the four main languages of Telugu, Tamil, Kannada, and Malayalam.
[11] The nomination lists were collected from each award show's respective online database and official websites.

2019. Only the first occurrence of the song was included in the sample, removing 27 duplicates from the study. This has amounted to 104 songs for the course of the five year period.

Measures

Information about each song's audio features were gathered through use of Spotify Application Programming Interface (API). This interface was used as it is a leading music streaming service platform, thus having contained a favorable amount of data to be useful towards the purposes of the study. The definition of audio features[12] is given in Table 1 to encompass a range of quantitative metrics that provide information on specific aspects of the music.

Table 1: *Spotify API Audio Analysis Features*

Audio Feature	Description	Range of Value
Acousticness	Measure from 0.0 to 1.0 of whether or not a track is acoustic (lack of electronic means present in the music)	0.0 - 1.0
Danceability	Measure of how suitable a track is for dancing based on tempo, rhythm, beats, and regularity. A value of 0.0 is least danceable and 1.0 is most danceable.	0.0 - 1.0
Energy	Measure of intensity and activity from 0.0 to 1.0 based on dynamic range, perceived loudness, timbre, onset rate,	0.0 - 1.0

[12] The information about the quantitative metrics were directly taken from the official Spotify developer website.

	and general entropy. Energetic tracks typically feel fast, loud, and noisy.	
Instrumentalness	Measure of whether a track contains no vocals. The closer the value is to 1.0, the greater indication that the track has no vocals.	0.0 - 1.0
Key	The key the track is in. Integers are mapped to pitches following the Pitch Class Notation. If no key was able to be detected, a value of -1 is returned.	-1 - 11
Liveness	Measure of whether an audience is present in the track.	0.0 - 1.0
Loudness	Measures the overall loudness of the track in decibels(dB).	-60 - 0
Mode	Indicates the major or minor of the track. Major is indicated by 1 and minor is indicated by 0.	0 - 1
Speechiness	Measures the presence of spoken words in a track.	0.0 - 1.0
Tempo	Measures the overall estimated tempo of a track in beats per minute (BPM). Tempo in musical terms is the speed or pace of the given track.	0 - 250
Valence	Measures the musical positiveness of a track. Higher valence means the	0.0 - 1.0

	song is more positive (happy, cheerful) and lower valence means the song is more negative (sad, angry).	
Duration	The duration of the track in milliseconds.	No range

Note: Range of value is from low to high.

A few metrics can be eliminated from this study such as liveness and instrumentalness as the dataset does not carry attributes in these two categories. From there, a program (Appendix A) was written to input each song into the Spotify API with values then recorded in a spreadsheet.

Indicators of economic success were then declared into the following variables: music video views (lyrical and full video), number of Spotify streams, and film box office collections. These values were collected from electronic sources (YouTube, Spotify, and local Telugu news sources) and then recorded for each song into a spreadsheet. These variables were collected as they are the main financial contributors towards a film's total revenue (Kim, 2012). They were used to quantitatively measure the economic success of the films by examining the popularity of the songs, through video views and streams, in addition to the box office revenue of the films the songs were derived from. All data was stored in a singular spreadsheet.

After the data was recorded, each quantitative metric generated from the Spotify API was graphed against the aforementioned measures of success on a scatter plot. Microsoft Excel's spreadsheet software was used to determine trend lines that fit for each graph. The coefficient of determination (r^2) was then analyzed for each parabolic trend line to deduce common

sequences that were present in the data. The researcher predicted there to be direct relationships between all features and measures of economic success due to the expansion of western music in the Indian realm which previous research has established to carry positive relationships between most features.

Results and Discussion

The Spotify API limited the number of songs analyzed to 82 as 22 of the original 104 either had irretrievable measures of box office success or were unable to be located on the database. Even so, as the quantity of data is too large to reasonably display within this section, the data will be included at the end of this paper. Appendix B contains information about the song's Box office Collections in both Indian Rupees (INR) and US Dollars (USD). Appendix C contains data on the number of Spotify streams. Appendix D contains the data on the number of music video views. Appendix E details the results of the API analysis. Lastly, Appendix F provides the list of songs that were excluded either due to an irretrievable measure of economic success or lack of availability on the Spotify database.

Mode and Key

The results of the mode and key are the first presented as their values were whole number ranges. Table 2 and Table 3 depict the average success of the songs within each mode and key respectively.

Table 2: *Average Success Based On Mode*

Mode	Average Box Office Collections ($ in Millions)	Average Number of Spotify Streams (Millions)	Average Number of YouTube Video Views (Millions)
Major (1)	48.5	2.45	63.76
Minor (0)	32.5	1.92	49.39

Table 3: *Average Success Based On Key*

Key	Average Box Office Collections ($ in Millions)	Average Number of Spotify Streams (Millions)	Average Number of YouTube Video Views (Millions)
C (0)	30.26	1.50	61.0
C♯/D ♭ (1)	9.08	1.02	37.62
D (2)	45.6	2.47	61.56
D♯/E ♭ (3)	20.24	1.94	35.48
E (4)	15.4	2.74	63.0
F (5)	83.41	.584	33.2
F♯/G ♭ (6)	7.0	1.09	12.82
G (7)	95.6	1.48	77.56
G♯/A ♭ (8)	10.03	1.40	55.88
A (9)	35.66	2.11	45.0
A♯/B ♭ (10)	21.31	1.84	46.84
B (11)	11.85	4.94	64.65
Average	**31.7**	**2.2**	**54.0**

Songs written in major keys displayed greater overall success than songs written in minor keys, with 16 million more dollars collected at the box office, .53 million more Spotify streams, and 14.37 million more YouTube video views on average. Most of the keys maintained a moderate level of success in all three variables with a few notable exceptions. Keys F and G both had greater box office collections, by being 51.71 million dollars and 63.90 millions dollars respectively more than the total average. Key B, in particular, had similar success regarding the number of streams, averaging 2.74 more than the average. In addition, both B and G attained the highest number of views compared to the other keys, with 10.65 and 23.56 million more than the respective average. Key F♯/G♭, however, performed exceptionally poor in all three categories, with 24.7 million less dollars, 0.8 less streams, and 41.18 less views than the average. All other keys had differing results, with some performing either above or below average across all three categories. This may be attributed to the low values key F♯/G♭ had, lowering the overall average number of all three categories. As such, the differing musical keys reach various levels of economic success, thus describing which keys attain higher levels of financial popularity.

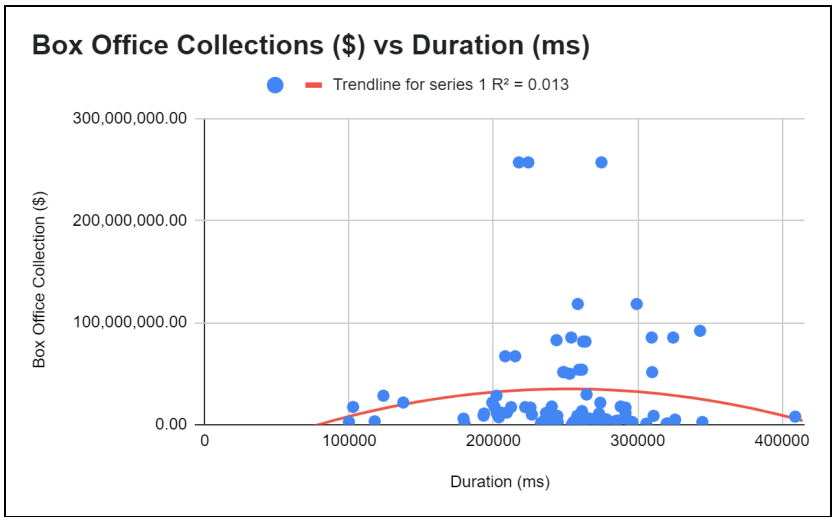
The rest of the data from the API was then utilized to generate the scatterplots shown below for each audio feature. The horizontal axis of each graph represents the audio metric while the vertical axis represents either the film's box office collections, the number of Spotify streams, or the total number of YouTube music video views. The box office collection data was originally given in the form of INR and was then converted to USD for universal understanding.

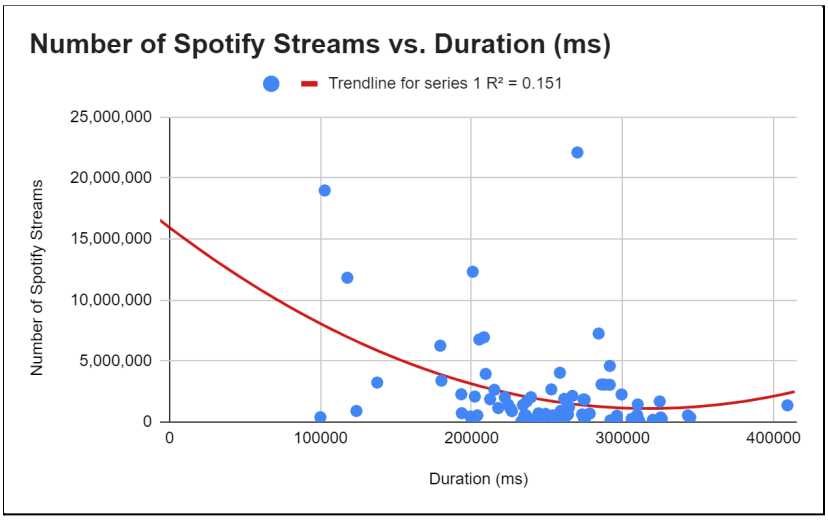
Microsoft Excel's spreadsheet software was used to plot data and create parabolic trend lines as the data is nonlinear, rendering a linear regression model to be ineffective. In addition,

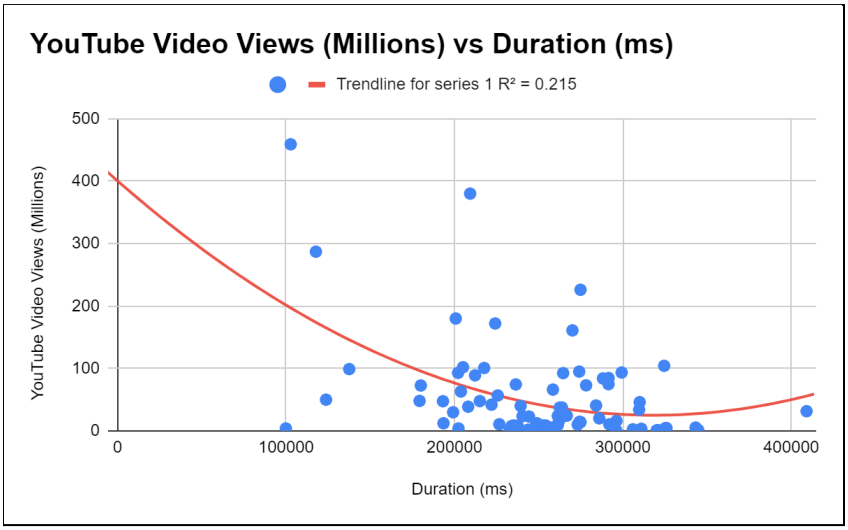
the coefficient of determination (r^2) value for each trendline was produced. The r^2 value is a statistical measure depicting how close the data fits the trendline. A preliminary examination of the dataset revealed that the correlation between each audio metric and its subsequent measure of economic success is low , meaning that the r^2 values are to be fairly small emphasizing that precise predictions cannot be made about the data values. It can be noted that a low coefficient of determination does not negate the importance of any variables and is not considered to be disadvantageous as vital conclusions can still be collected from this information.

Duration

Figure 1: *Duration Graphs*



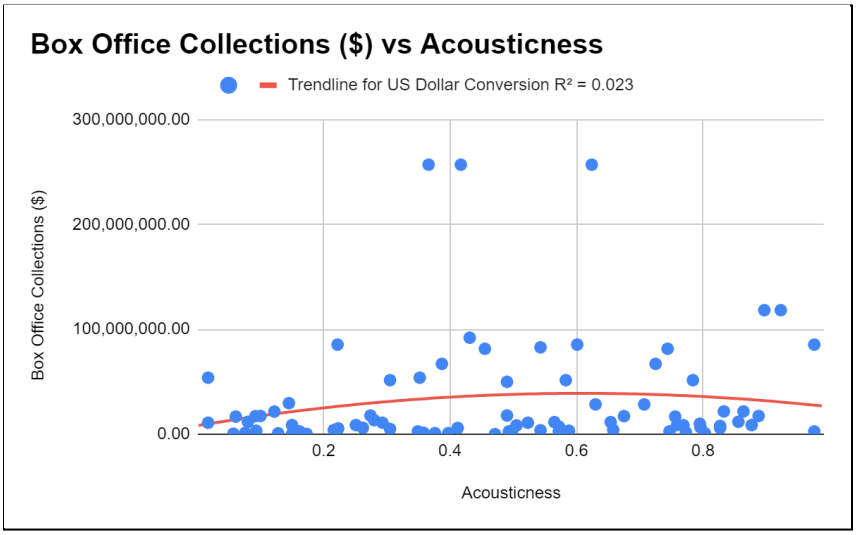


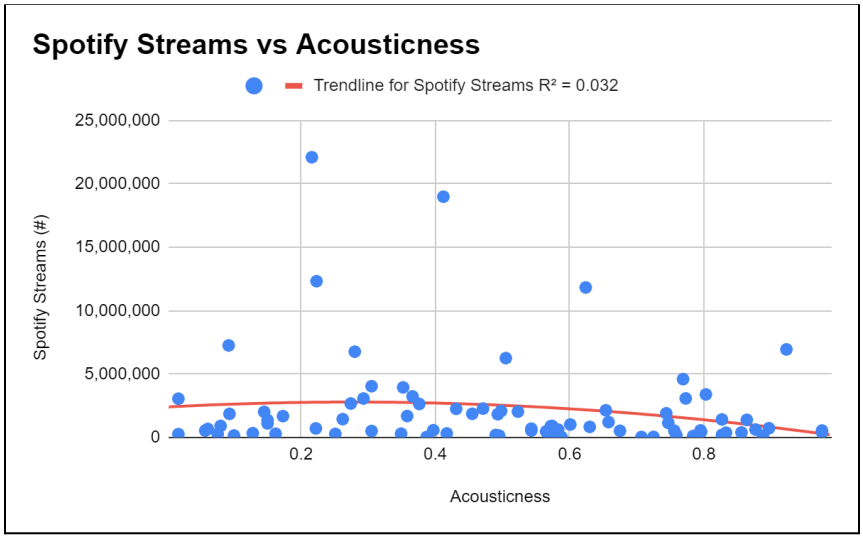


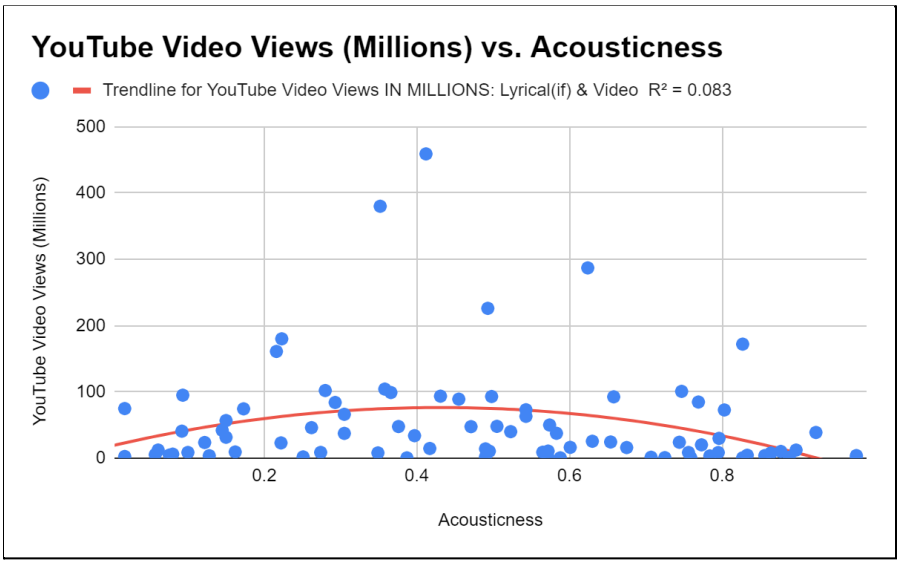
For the first graph as duration increases, eventually collections decline, as such, all graphs depict inversely proportional trend lines, meaning that as the duration of a song increases, its economic success exponentially decreases. This further demonstrates that songs with shorter lengths, approximately 230 seconds (3.83 minutes), are more likely to be favored by audiences.

Acousticness

Figure 2: *Acousticness Graphs*



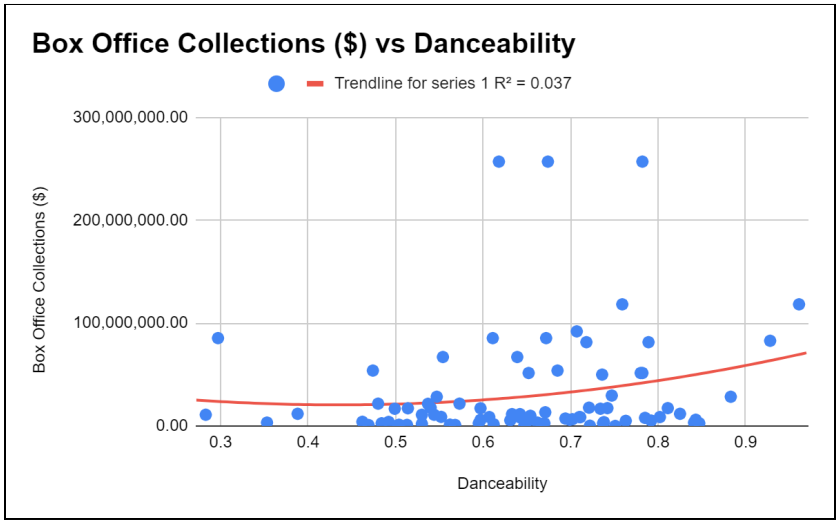


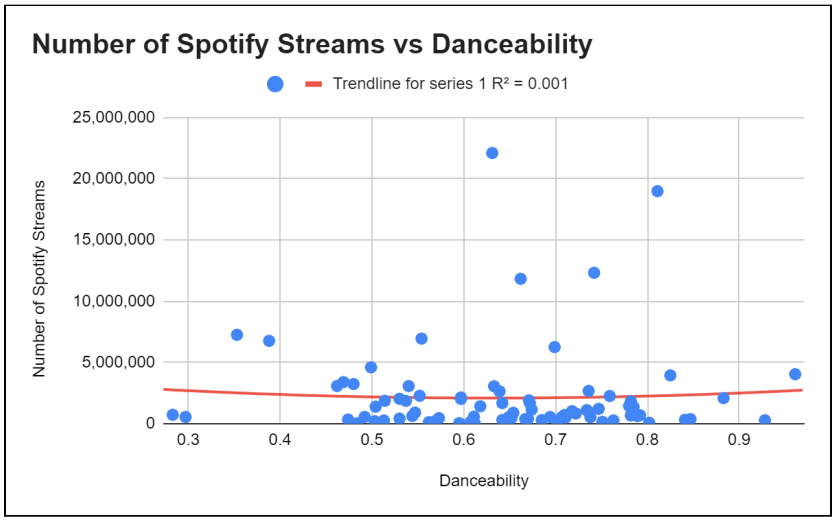


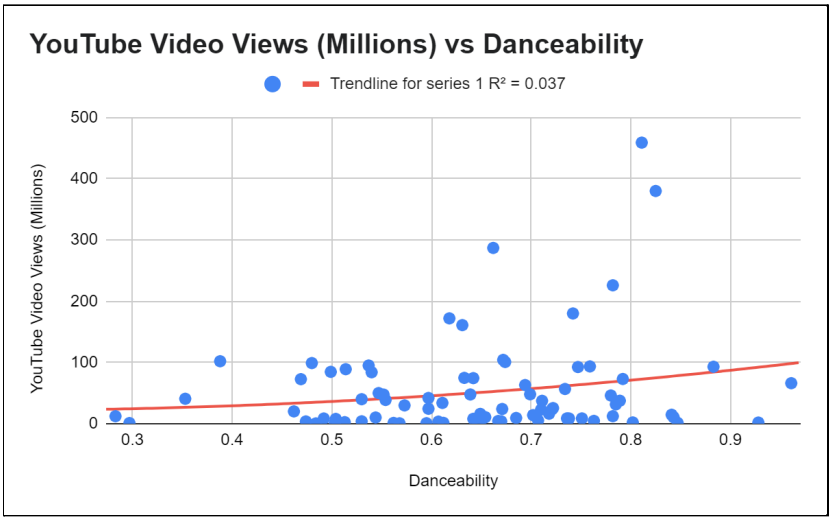
The graphs, generally, demonstrate that songs with lower levels of acousticness have better performance with all three categories consisting of inversely proportional trendlines in the latter half. This may be explained by the rise and increased accessibility of music production technology in Tollywood (Nardi, 2011), allowing for more electronic amplification to become incorporated within the music and increase financial success. Although the graphs depict few songs to be moderately successful, they generally do not attain the same levels of economic success compared to songs with more electronic counterparts. This is surprising as the Tollywood industry places value in traditional music practices (Rajadhyaksha, 2003), possibly demonstrating the increased effectiveness of western music practices on Telugu audiences and Tollywood's financial success. As such, lower levels of acousticness are generally more favorable towards better economic and popular performances.

Danceability

Figure 3: *Danceability Graphs*



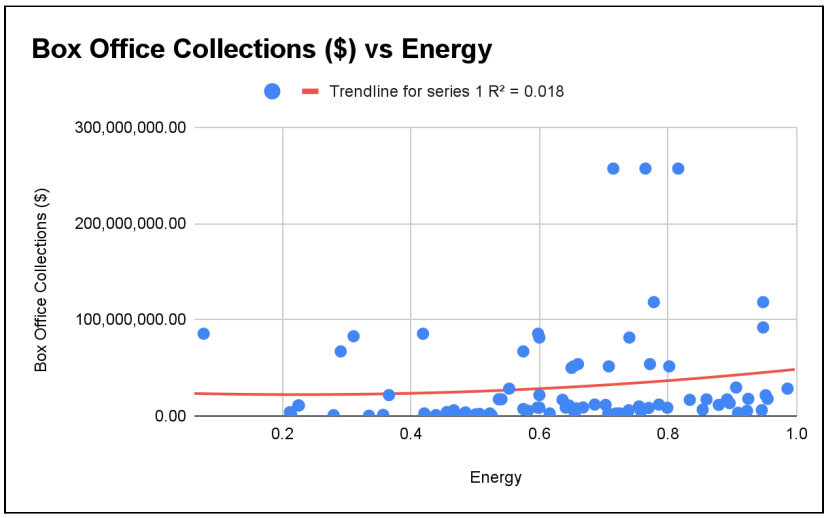


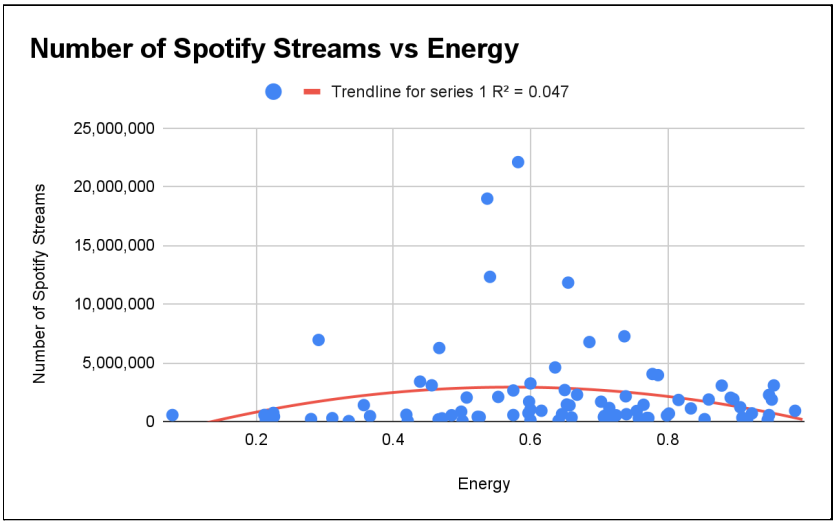


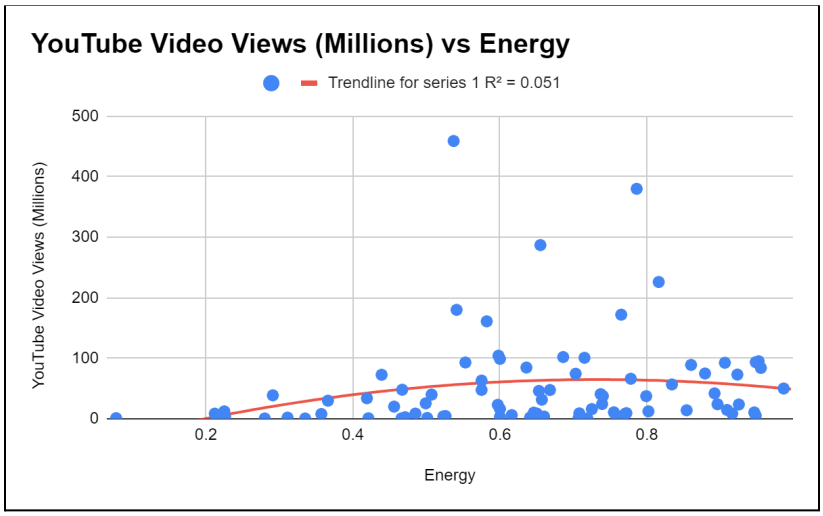
The graphs display upward sloping trend lines with only the graph of spotify streams plateauing at a value of 0.5. Thus, as the danceability value of songs increases, their respective measures of economic success increase as well. This pattern depicts the popularity of faster-paced and dance-based music, emphasizing the influence of electronic music technology that is rising within the Tollywood film and music industry. The graph depicting the number of streams is the only graph of the three with a fairly straight line which may be attributed to possible outliers as there was a smaller amount of data collected for streams in particular. It is also important to note that the graphs are consistent such that as danceability increases, all three measures of economic success increase in value, indicating that the difference in success between songs with values between 0.8 and 0.9 becomes minimal. As this metric also considers the relative consistency and strength of the rhythm and beats, Telugu music should attempt to achieve higher levels of danceability, placing emphasis on stable rhythm patterns and structured, powerful beats.

Energy

Figure 4: *Energy Graphs*



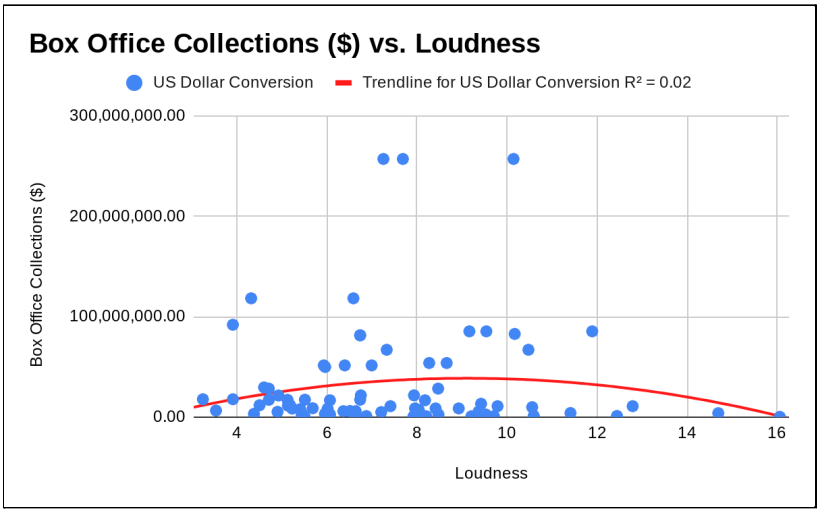


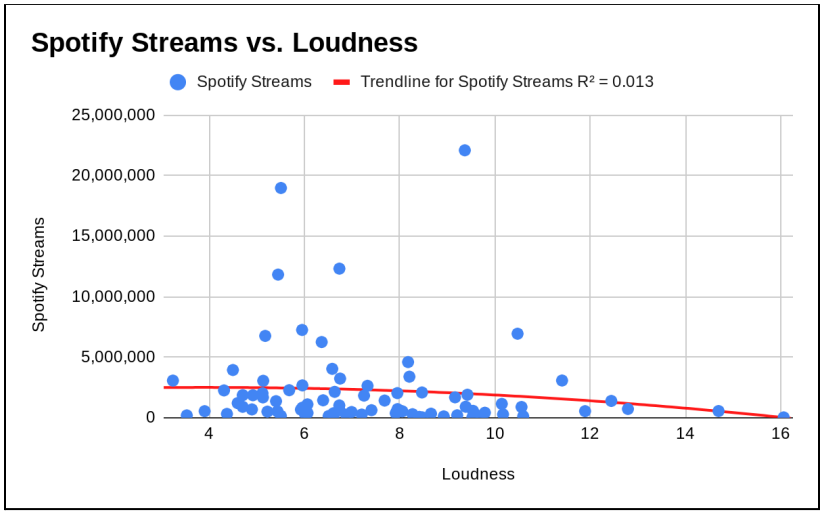


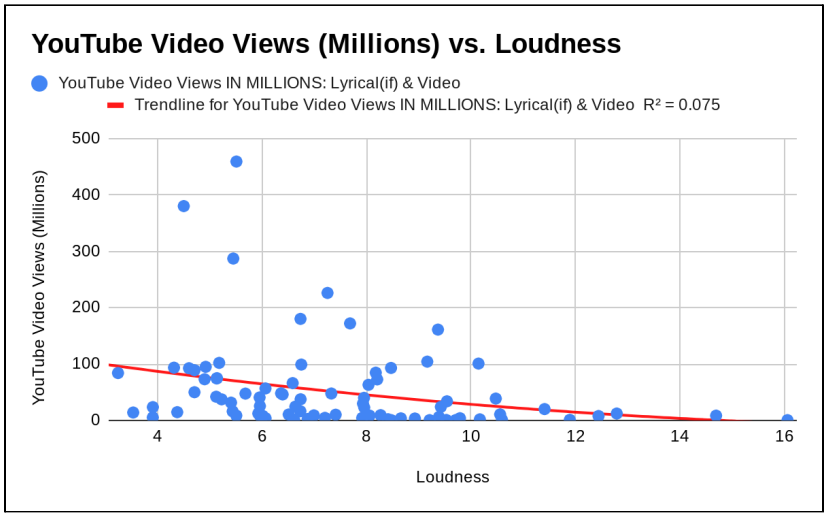
The graph depicting the number of Spotify streams likely presents contrasting results for previously mentioned reasons, such that the results taken from the other two graphs will be utilized due to greater reliability and consistency of the amount of data. While the graph for streams does demonstrate a relationship where songs with higher values of energy favor lower levels of stream success, this finding may be attributed to the aforementioned variation in the smaller dataset. However, in the other two graphs, the positive relationship within the trendlines are generally easier to observe, as they demonstrate a directly proportional relationship in which the higher the value of energy, the more collections and views the songs and films gain. Further, the relationship reveals an audience's greater likelihood to financially respond better to Telugu music with higher amounts of intensity and vigor.

Loudness

Figure 5: *Loudness Graphs*


Box Office Collections ($) vs. Loudness
US Dollar Conversion
Trendline for US Dollar Conversion R² = 0.02
300,000,000.00
200,000,000.00
100,000,000.00
0.00
Box Office Collections ($)
4
6
8
10
12
14
16
Loudness

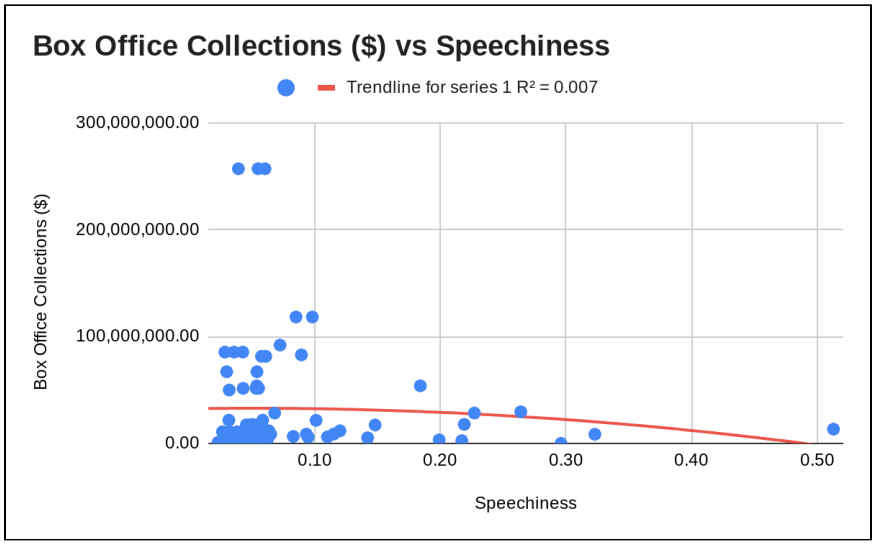

Spotify Streams vs. Loudness
Spotify Streams
Trendline for Spotify Streams R² = 0.013
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Spotify Streams
4
6
8
10
12
14
16
Loudness

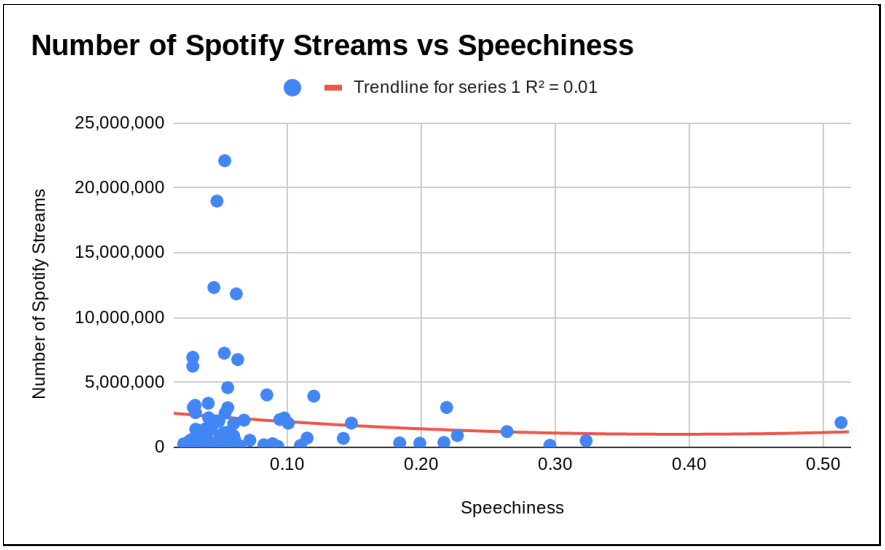


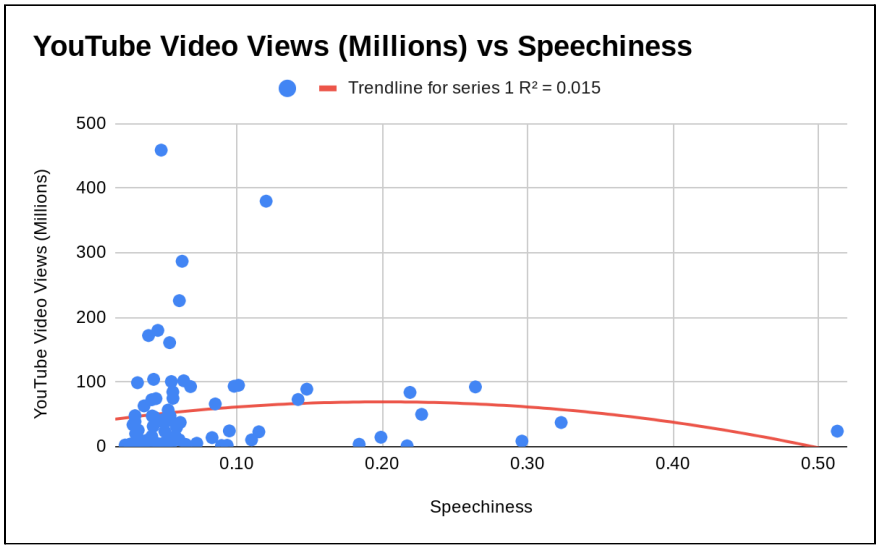
The absolute value was taken for each loudness value to be plotted on all graphs in order to eliminate negative values from the graphs to maintain consistency. Due to this data implementation, the smaller the value, the louder the song, meaning larger values of loudness indicate quieter music. For loudness, there exists a nearly linear inverse relationship for both graphs representing streams and views. In addition, as all three graphs represent inversely proportional relationships, this finding is correlated with the analysis from the energy graphs suggesting that audiences tend to favor songs with higher intensity, noise, activity, and pace.

Speechiness

Figure 6: Speechiness Graphs


Box Office Collections ($) vs Speechiness
Trendline for series 1 R² = 0.007
300,000,000.00
200,000,000.00
100,000,000.00
0.00
Box Office Collections ($)
0.10
0.20
0.30
0.40
0.50
Speechiness

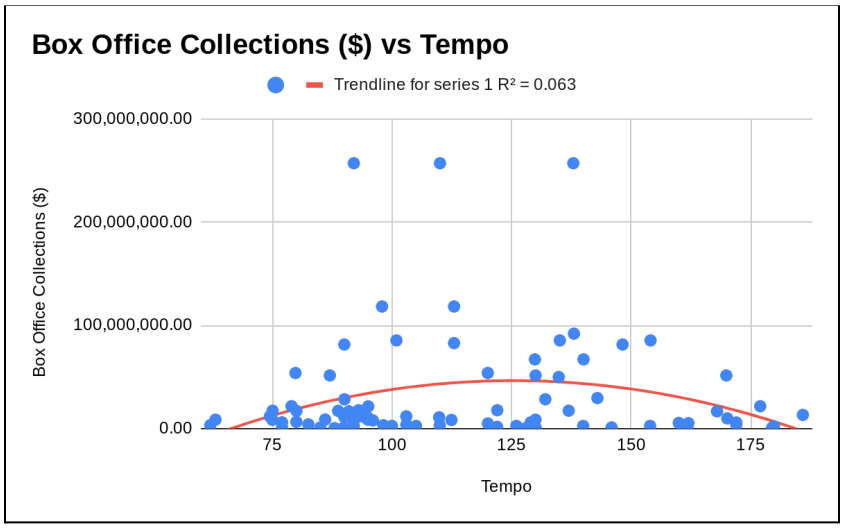

Number of Spotify Streams vs Speechiness
Trendline for series 1 R² = 0.01
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Number of Spotify Streams
0.10
0.20
0.30
0.40
0.50
Speechiness

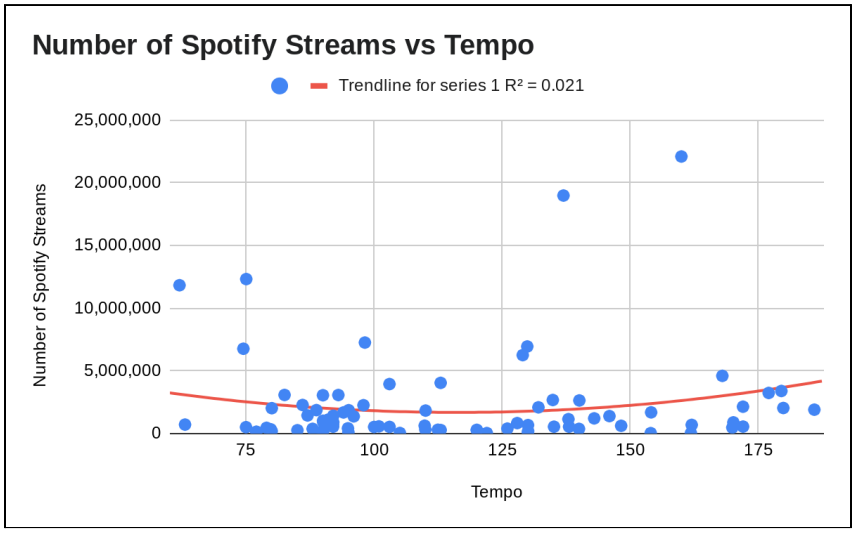


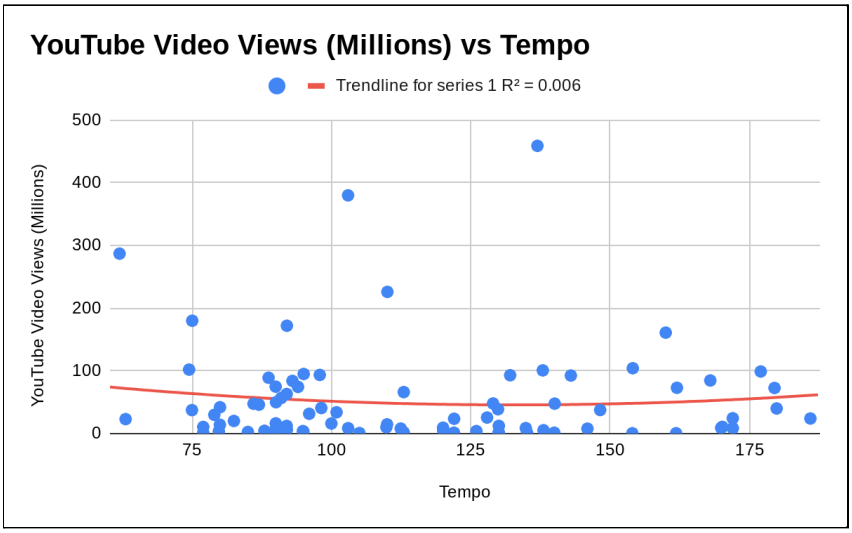
All graphs in this metric depict a similar inversely proportional relationship in which lower values of speechiness are attributed to a higher financial success. The data suggests that audiences gravitate towards music with less exclusively speech-like recording emphasizing the importance Telugu audiences may attribute to the music itself rather than the vocals. As such, this connects to the prominence of both the energy and loudness as previously analyzed, which are common aural features to be more heavily influential in a song's musical composition, supporting the notions of higher intensity and activity in the Tollywood industry.

Tempo

Figure 7: *Tempo Graphs*


Box Office Collections ($) vs Tempo
Trendline for series 1 R² = 0.063
300,000,000.00
200,000,000.00
100,000,000.00
0.00
Box Office Collections ($)
75
100
125
150
175
Tempo

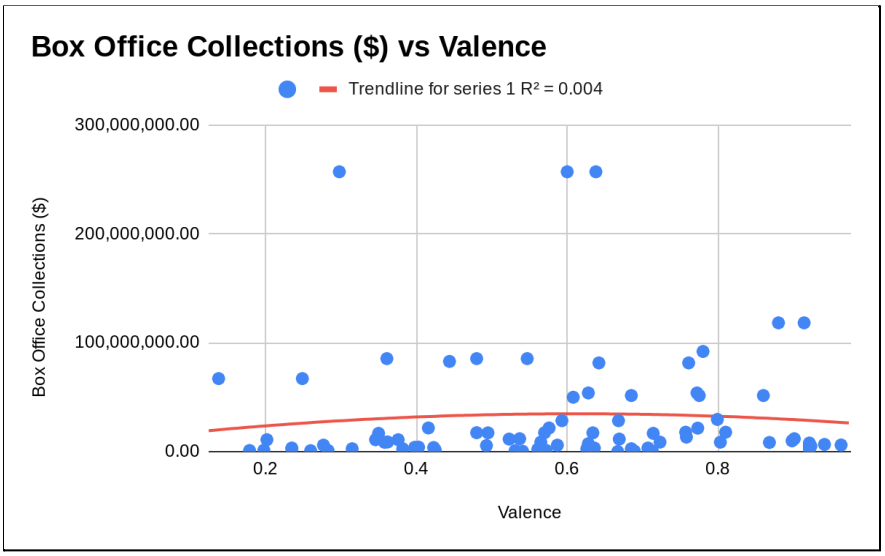

Number of Spotify Streams vs Tempo
Trendline for series 1 R² = 0.021
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Number of Spotify Streams
75
100
125
150
175
Tempo

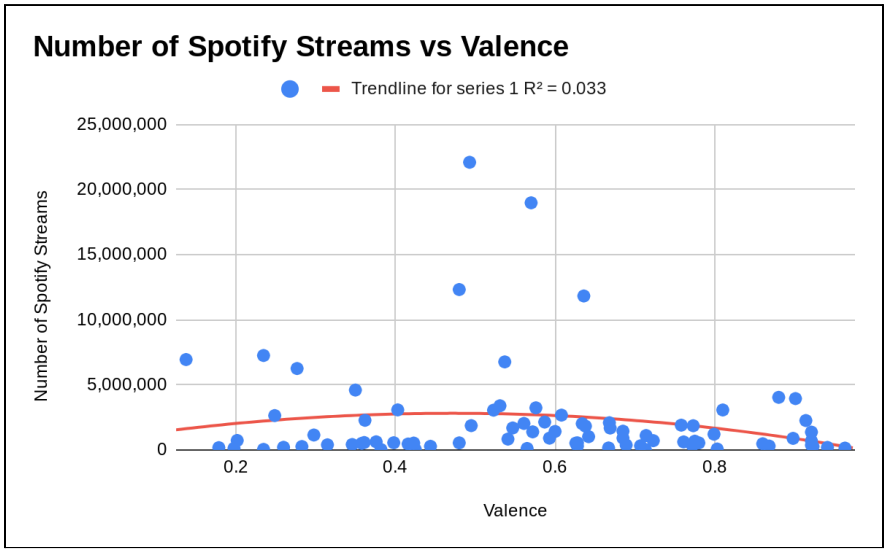


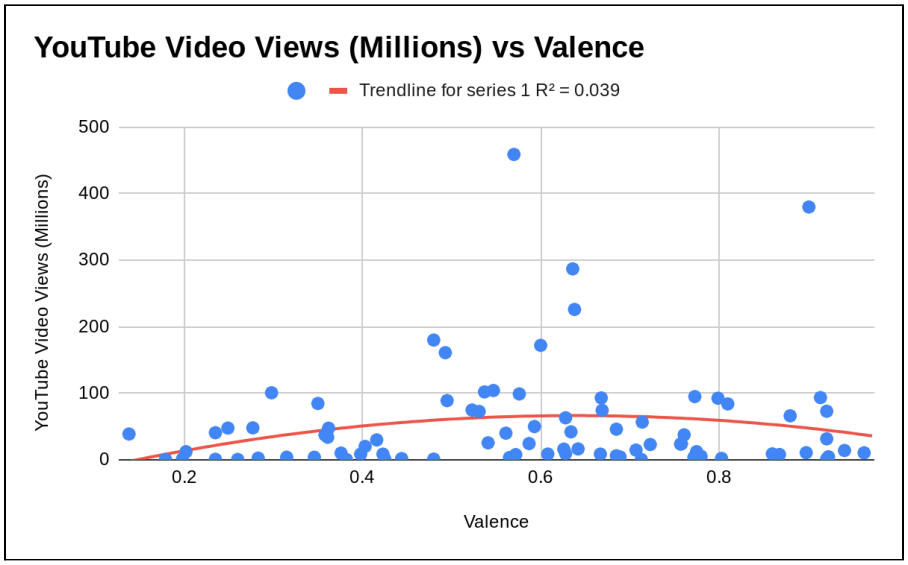
All of the graphs in the tempo section present inversely proportional relationships with both maximum and minimum values of 125 beats per minute. This not only effectively illustrates the appeal of songs with a moderate speed but emphasizes that the two extremes of high or low tempo do not perform as well as compared to songs with more intermediate levels of speed. Therefore, songs with a balance between slow and fast paced aspects of music suggest to be presumably more attractive to Telugu audiences, where a proportional amount of each would be optimal to attain the most favorable levels of financial performance.

Valence

Figure 8: *Valence Graphs*


Box Office Collections ($) vs Valence
Trendline for series 1 R² = 0.004
300,000,000.00
200,000,000.00
100,000,000.00
0.00
Box Office Collections ($)
0.2
0.4
0.6
0.8
Valence


Number of Spotify Streams vs Valence
Trendline for series 1 R² = 0.033
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
Number of Spotify Streams
0.2
0.4
0.6
0.8
Valence



The valence graphs display a similar trend as can be seen in tempo. The graphs determine a positive trend in which as the valence increases, the financial success in terms of collections, streams, and views increase as well. Additionally, the valence graphs were the only such audio metric that possessed all concave downwards and upward trending lines from all features analyzed. Even the Spotify streams graphs, which throughout the analysis faced exceptions and minimally reliable datasets, maintained an upward trending line as well, suggesting the underlying importance of more vibrant, upbeat, and cheerful music towards Telugu audiences for emerging financial success.

Further Discussion

Overall, successful Telugu music was characterized by higher values in danceability, energy, loudness, intensity, and positive valence with lower values in acousticness and spoken words. Additionally, the films were presumably found to reach higher prominence when the songs were written in major keys, excluding F♯/G♭, as well as maintaining moderate tempos

with a fair balance between slow and fast paced music. Initially, the researcher predicted there to be direct relationships between all features and measures of economic success due to the expansion of western music in the Indian realm which previous research has established to have positive relationships between most features. However, this is not the case for all features possibly due to the contrast the variables of acousticness and spoken words have compared to danceability, energy and such creating an inverse relationship for both.

Balabantaray (2020) merely states music to be a determining factor in the economic success of an Indian film, however, by identifying several characteristics of Tollywood music, this study suggests reasoning as to why these distinguishing features are considered to be a strong financial asset towards the success of Tollywood films. The features determined in this study seem to have been influenced by the western market as well. The previously mentioned impact of rising electronic music technology in the Indian realm helps to ascertain as to why certain features have a tendency to perform better when values are higher. Through a qualitative analysis, it has been asserted that Telugu music has rapidly shifted towards a foreign based musical style evident from an American perspective such as Simonton (2007), Middlebrook and Sheik (2019), Baltazar and Västfjäll (2020) who all have determined the notable importance of high values of energy and loudness as it relates to increased success in the American music industry. This emphasizes the similar impact Telugu music hopes to retain through the acclimation of western music culture therefore allowing Telugu music and its components to be situated into a larger context highlighting its rising importance and contribution to markets overseas. This suggests that Tollywood's unique structure of music has diminished over time.

However, while the film industry's shift towards western globalization has only been qualitatively confirmed (Dastidar & Elliott, 2019), one recommendation that the author makes for future study is exploring Telugu music in a time-based perspective. This would have likewise improved the study and can help numerically determine the presence of long term cultural preferences for music, yielding meaningful results.

Conclusion

Limitations

There were some limitations to this study that future research could aim to address in order to for a better understanding of the components and characteristics of Telugu music and how they contribute to the economic success of the Telugu Film Industry, otherwise known as Tollywood. Many of these stem from the study's dependence on the Spotify API and song database. As established in the results section of the paper, 19 of the original 104 songs were unavailable on the Spotify database. Additionally, for three of the 104, the measure of box office success was irretrievable. Thus, the analyzed dataset consisted of only 82 songs. Furthermore, as stream data was only accessible through Spotify, the data gathered was only limited to this source. As such, outliers had a large impact on the graphs involving this measure thus skewing the trendlines that attempted to fit the data as a whole, providing a substantial limitation to the measure of a song's success in this study. Another issue that arose was in regards to the precision measure of the data points. The output of the program to retrieve the numerical measurements was in the form of text (string), such that the computer does not interpret the dataset as integer or

real values. Thus, an algorithm was used through the spreadsheet software to convert the text into the number data type that can be interpreted by the computer for the purpose of graphing. However, during this conversion process, the spreadsheet software eliminated a few numbers after the decimal point, choosing to round figures to the tenth place for some Spotify measures such as speechiness, thus inciting the loss of precision in some variables throughout the study. Another limitation to note is in regards to the economic measure of box office collections. The values for the film's box office revenues were originally collected in the rupee[13]. To aid reader comprehension, as the Indian currency system can be complicated to communicate, the revenues were converted to USD. As the currency conversion between these two nations is in the form of a flexible exchange rate, the revenues when collected were valued in rupees from that film's year. However, due to the conversion being taken in modern day, the value changed to either become higher or lower than the original value in terms of American dollars. Thus, the box office collections data may be either understated or overstated. Additionally, it is important to note that the extrapolation of the results from this study to Telugu songs that are only on Spotify as the main data was derived from this source. Future studies could attempt to use more optimized software and computer science algorithms to understand Telugu music more fully without the limits posed by this study.

Implications

The real-world implications of the findings from the investigation include being useful for film directors and movie producers. As the Telugu film industry is expanding not only

[13] The rupee is India's standard form of currency.

throughout India but into overseas markets, film songs are becoming one of the most publicized aspects of the movies. Thus, it is important to create music that will appeal to audiences thus increasing song and film revenues. Producers and directors can understand the qualities of music that have the most likeability and popularity and could try to emulate songs that strongly carry these features. As precedent was established for music to be a primary variable in the financial success of a film, it becomes important for Tollywood to attract audiences with features that are found to be more desirable as a decrease in the local demand for films, and by extension music, can hinder a large source of revenue for the Indian economy (McCarthy, 2014). As Tollywood becomes more westernized, it becomes essential to attract interest in younger audiences as they have been prone to greater exposure to foreign influences of music, making it vital to understand the revenue generating features of music. This can be expanded globally due to the rapid transformation of Indian society, the Tollywood film industry, and continual immigration of Telugu people, spreading the vast influence of Telugu music and film.

Future Directions

The results of this study inspire further inquiry into the applications of Telugu music. The music was shown to have several favorable features that may stem from a connection between the rapid modernization of the film industry. These findings prompt further investigation into additional variables, such as the aforementioned time-based aspect that can determine definite influence of western and other foreign styles of music. Adjusting not only audio metrics but other factors of economic success could yield strong characterizations for the film music of Tollywood that could be useful in the aforementioned areas of the songwriting and production

industries. As this study merely takes into consideration the characteristics of the music itself, another adjustment that could be made is to include the characteristics of the listeners as well, perhaps study differences between younger versus older audience receptions, or that of a Telugu population in general. Additionally, relevant literature mentions, but rarely explores in detail, many more features of a Telugu film's economic success besides the sole factor of music that was considered by this study. Given the exciting potential of the analyzed musical features, it is probable that, among the assortment of other determinants, there are some with a strong capacity to revolutionize and maximize success not only for Tollywood but other film markets as well.

Ultimately, this study was able to accomplish its primary goal of extending the scope of research on the quantitative features of Telugu music to understand how music acts as a determinant of Tollywood's economic success particularly in the realms of high danceability, energy, loudness, intensity, and positive valence, low acousticness, and minimal spoken words.

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Appendix A

Program written to gather audio analysis data from Spotify API:

```
package data.tracks;

import java.io.BufferedReader;
import java.io.FileNotFoundException;
import java.io.FileOutputStream;
import java.io.IOException;
import java.nio.file.Files;
import java.nio.file.Paths;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.List;
import java.util.stream.Collectors;

import org.apache.hc.core5.http.ParseException;
import org.apache.poi.ss.usermodel.Cell;
import org.apache.poi.ss.usermodel.CellStyle;
import org.apache.poi.ss.usermodel.FillPatternType;
import org.apache.poi.ss.usermodel.IndexedColors;
import org.apache.poi.ss.usermodel.Row;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;

import com.neovisionaries.i18n.CountryCode;

import se.michaelthelin.spotify.SpotifyApi;
import
se.michaelthelin.spotify.exceptions.SpotifyWebApiException;
import
se.michaelthelin.spotify.model_objects.credentials.ClientCredenti
als;
import
se.michaelthelin.spotify.model_objects.miscellaneous.AudioAnalysi
s;
import
se.michaelthelin.spotify.model_objects.miscellaneous.AudioAnalysi
sTrack;
import
se.michaelthelin.spotify.model_objects.specification.ArtistSimpli
fied;
import
se.michaelthelin.spotify.model_objects.specification.AudioFeature
s;
import
se.michaelthelin.spotify.model_objects.specification.Paging;
import
se.michaelthelin.spotify.model_objects.specification.Track;
import
se.michaelthelin.spotify.requests.authorization.client_credential
s.ClientCredentialsRequest;
import
se.michaelthelin.spotify.requests.data.search.simplified.SearchTr
acksRequest;
```

```
import
se.michaelthelin.spotify.requests.data.tracks.GetAudioAnalysisFor
TrackRequest;
import
se.michaelthelin.spotify.requests.data.tracks.GetAudioFeaturesFor
SeveralTracksRequest;

public class SahiSpotifyProject {
     private static final String FILE_NAME =
"src/test/resources/SpotifyFeatures.xlsx";

     private static final String clientId =
"8d59008787624c91a1e433c1a8e94c2d";
     private static final String clientSecret =
"eabe9b4f1e8e47ff83a497af8840c21b";

     private static final SpotifyApi spotifyApi = new
SpotifyApi.Builder().setClientId(clientId)
                .setClientSecret(clientSecret).build();

     private static final ClientCredentialsRequest
clientCredentialsRequest =
spotifyApi.clientCredentials().build();

     public static void main(String[] args) {
          authenticate();
          List<Song> songList = readSongList();
          songList.stream().forEach(song ->
song.setTrackId(searchTracks(song)));
          List<SongDetails> audioFeatures = songList.stream()
                    .filter(song -> song.getTrackId() != null
|| song.getTrackId().length() > 0)
                    .map(song ->
getAudioFeatures(song.getTrackId(), song))
                    .filter(sd -> sd != null)
                    .collect(Collectors.toList());

          //System.out.println(audioFeatures);
          writeToExcel(audioFeatures);
     }

     private static void writeToExcel(List<SongDetails>
songDetailsList) {
              XSSFWorkbook workbook = new XSSFWorkbook();
            XSSFSheet sheet =
workbook.createSheet("AudioFeatures");

            int rowNum = 0;
            System.out.println("Creating excel");

            Row row = sheet.createRow(rowNum++);
            int colNum = 0;
```

```
                writeToHeaderCell(sheet, "Song Name", row,
colNum++);
                writeToHeaderCell(sheet, "Artist", row, colNum++);
                writeToHeaderCell(sheet, "Track ID", row, colNum++);
                writeToHeaderCell(sheet, "Duration in ms", row,
colNum++);
                writeToHeaderCell(sheet, "Acousticness", row,
colNum++);
                writeToHeaderCell(sheet, "Danceability", row,
colNum++);
                writeToHeaderCell(sheet, "Energy", row, colNum++);
                writeToHeaderCell(sheet, "Instrumentalness", row,
colNum++);
                writeToHeaderCell(sheet, "Liveness", row, colNum++);
                writeToHeaderCell(sheet, "Loudness", row, colNum++);
                writeToHeaderCell(sheet, "Mode", row, colNum++);
                writeToHeaderCell(sheet, "Speechiness", row,
colNum++);
                writeToHeaderCell(sheet, "Tempo", row, colNum++);
                writeToHeaderCell(sheet, "TimeSignature", row,
colNum++);
                writeToHeaderCell(sheet, "type", row, colNum++);
                writeToHeaderCell(sheet, "Valence", row, colNum++);
                writeToHeaderCell(sheet, "Key", row, colNum++);

                //writeToHeaderCell(sheet, "CodeString", row,
colNum++);
                //writeToHeaderCell(sheet, "Duration", row,
colNum++);

                for (SongDetails sd : songDetailsList) {
                   row = sheet.createRow(rowNum++);
                   AudioFeatures af = sd.getAudioFeature();
                   //AudioAnalysisTrack at =
sd.getAudioAnalysisTrack();

                   colNum = 0;
                   writeToCell(sheet, sd.getSong().getName(), row,
colNum++);
                   writeToCell(sheet, sd.getSong().getArtist(), row,
colNum++);
                   writeToCell(sheet, sd.getSong().getTrackId(),
row, colNum++);
                   writeToCell(sheet, af.getDurationMs().toString(),
row, colNum++);
                   writeToCell(sheet,
af.getAcousticness().toString(), row, colNum++);
                   writeToCell(sheet,
af.getDanceability().toString(), row, colNum++);
                   writeToCell(sheet, af.getEnergy().toString(),
row, colNum++);
                   writeToCell(sheet,
```

```
af.getInstrumentalness().toString(), row, colNum++);
                writeToCell(sheet, af.getLiveness().toString(),
row, colNum++);
                writeToCell(sheet, af.getLoudness().toString(),
row, colNum++);
                writeToCell(sheet,
af.getMode().name()+"-"+Integer.valueOf(af.getMode().mode).toStri
ng(), row, colNum++);
                writeToCell(sheet,
af.getSpeechiness().toString(), row, colNum++);
                writeToCell(sheet, af.getTempo().toString(), row,
colNum++);
                writeToCell(sheet,
af.getTimeSignature().toString(), row, colNum++);
                writeToCell(sheet, af.getType().type, row,
colNum++);
                writeToCell(sheet, af.getValence().toString(),
row, colNum++);
                writeToCell(sheet, af.getKey().toString(), row,
colNum++);
                //writeToCell(sheet, at.getCodeString(), row,
colNum++);
                //writeToCell(sheet, at.getDuration().toString(),
row, colNum++);
            }

            try {
                FileOutputStream outputStream = new
FileOutputStream(FILE_NAME);
                workbook.write(outputStream);
                workbook.close();
            } catch (FileNotFoundException e) {
                e.printStackTrace();
            } catch (IOException e) {
                e.printStackTrace();
            }

            System.out.println("Done");
    }

    private static void writeToHeaderCell(XSSFSheet sheet,
String value, Row row, int colNum) {
        CellStyle headerCellStyle =
sheet.getWorkbook().createCellStyle();

    headerCellStyle.setFillForegroundColor(IndexedColors.LIGHT_Y
ELLOW.index);

    headerCellStyle.setFillPattern(FillPatternType.SOLID_FOREGRO
UND);
        row.setRowStyle(headerCellStyle);
```

```
            Cell cell = row.createCell(colNum);
            cell.setCellValue(value);
            sheet.autoSizeColumn(colNum);
      }

      private static void writeToCell(XSSFSheet sheet, String
value, Row row, int colNum) {
            Cell cell1 = row.createCell(colNum);
            cell1.setCellValue(value);
            sheet.autoSizeColumn(colNum);
      }

      public static List<Song> readSongList() {
            List<String> list = new ArrayList<>();
            try (BufferedReader br =
Files.newBufferedReader(Paths.get("src/main/resources/song-
names.txt"))) {
                  list = br.lines().collect(Collectors.toList());
            } catch (IOException e) {
                  e.printStackTrace();
            }

            return list.stream().map(str -> {
                  String[] lines = str.trim().split(",");
                  Song song = new Song();
                  song.setName(lines[0].trim());
                  song.setArtist(lines[1].trim());
                  return song;
            }).collect(Collectors.toList());

      }

      public static String searchTracks(Song song) {
            String ids = "";
            try {
                  SearchTracksRequest searchTracksRequest =
spotifyApi.searchTracks(song.getName()).market(CountryCode.IN)
                              .limit(1).build();
                  final Paging<Track> trackPaging =
searchTracksRequest.execute();
                  List<Track> items =
Arrays.asList(trackPaging.getItems());
                  ids = items.stream().filter(track ->
searchArtists(track.getArtists(), song.getArtist(),
song.getName()))
                              .map(track ->
track.getId()).collect(Collectors.joining(","));
                  // items.stream().forEach(track ->
System.out.println(track.toString()));
                  // System.out.println("Total: " +
trackPaging.getTotal());
            } catch (IOException | SpotifyWebApiException |
```

```
ParseException e) {
                System.out.println("Error: " + e.getMessage());
            }

            return ids;
      }

      private static boolean searchArtists(ArtistSimplified[]
artists, String artist, String songName) {
            List<ArtistSimplified> spArtists =
Arrays.asList(artists);
            boolean found = spArtists.stream().anyMatch(art ->
art.getName().equals(artist));
            if (!found) {
                System.out.println("song: " + songName + "
artist:" + artist);
                return false;
            }

            return found;
      }

      public static SongDetails getAudioFeatures(String id, Song
song)  {

            AudioFeatures[] audioFeatures = null;
            SongDetails songDetails = new SongDetails();
            try {

                if (id != null && id.length() > 0) {
                    Thread.sleep(1000);
                    String[] ids = { id };
                    GetAudioFeaturesForSeveralTracksRequest
getAudioFeaturesForSeveralTracksRequest = spotifyApi

      .getAudioFeaturesForSeveralTracks(ids).build();

                    audioFeatures =
getAudioFeaturesForSeveralTracksRequest.execute();
                    System.out.println("Length: " +
audioFeatures.length);
                    //AudioAnalysisTrack audioAnalysisTrack =
getAudioAnalysisForTrack(id);


                    songDetails.setSong(song);

      songDetails.setAudioFeature(audioFeatures[0]);
                    //if(audioAnalysisTrack != null) {
                    //
      songDetails.setAudioAnalysisTrack(audioAnalysisTrack);
                    //}
```

```
                        return songDetails;
                    }

            } catch (IOException | SpotifyWebApiException |
ParseException | InterruptedException e) {
                    System.out.println("Error: " + e.getMessage());
            }

            return null;
      }


      public static AudioAnalysisTrack
getAudioAnalysisForTrack(String id) {
            AudioAnalysisTrack audioAnalysisTrack = null;
            try {
                    GetAudioAnalysisForTrackRequest
getAudioAnalysisForTrackRequest = spotifyApi
                                .getAudioAnalysisForTrack(id)
                                .build();
                    final AudioAnalysis audioAnalysis =
getAudioAnalysisForTrackRequest.execute();
                    System.out.println("Track duration: " +
audioAnalysis.getTrack().getDuration());
                    audioAnalysisTrack =  audioAnalysis.getTrack();
            } catch (IOException | SpotifyWebApiException |
ParseException e) {
                    System.out.println("Error: " + e.getMessage());
            }

            return audioAnalysisTrack;
      }

      public static void authenticate() {

            try {
                    final ClientCredentials clientCredentials =
clientCredentialsRequest.execute();
                    // Set access token for further "spotifyApi"
object usage

      spotifyApi.setAccessToken(clientCredentials.getAccessToken()
);

                    System.out.println("Expires in: " +
clientCredentials.getExpiresIn());
            } catch (IOException | SpotifyWebApiException |
ParseException e) {
                    System.out.println("Error: " + e.getMessage());
            }
      }
```

```
}

class Song {
	private String name;
	private String artist;
	private String trackId;

	public String getName() {
		return name;
	}

	public void setName(String name) {
		this.name = name;
	}

	public String getArtist() {
		return artist;
	}

	public void setArtist(String artist) {
		this.artist = artist;
	}

	public String getTrackId() {
		return trackId;
	}

	public void setTrackId(String trackId) {
		this.trackId = trackId;
	}

}

class SongDetails {
	private Song song;
	private AudioFeatures audioFeature;
	private AudioAnalysisTrack audioAnalysisTrack;

	public Song getSong() {
		return song;
	}
	public void setSong(Song song) {
		this.song = song;
	}
	public AudioFeatures getAudioFeature() {
		return audioFeature;
	}
	public void setAudioFeature(AudioFeatures audioFeature) {
		this.audioFeature = audioFeature;
	}
	public AudioAnalysisTrack getAudioAnalysisTrack() {
		return audioAnalysisTrack;
```

```
	}
	public void setAudioAnalysisTrack(AudioAnalysisTrack
audioAnalysisTrack) {
		this.audioAnalysisTrack = audioAnalysisTrack;
	}


}
```

Appendix B

Box office Collections in both Indian Rupees (INR) and US Dollars (USD):

Spotify Song List	*Film Name*	*Estimated Film Box Office Collection (Crores)*	*US Dollar Conversion*
Inkem Inkem Inkem Kaavaale	Geetha Govindam	132	17,353,934.40
Pillaa Raa	RX 100	25	3,286,730.00
Ranga Rangaa Rangasthalaana	Rangasthalam	216	28,397,347.20
Peniviti	Aravinda Sametha Veera Raghava	165	21,692,418.00
Ninnila	Tholi Prema	45.1	5,929,260.92
Asha Pasham	C/O Kancherapalem	7	920,284.40
Mandaara	Bhaagamathie	67.2	8,834,730.24
Gelupuleni Samaram	Mahanati	83	10,911,943.60
Reddamma Thalli	Aravinda Sametha Veera Raghava	165	21,692,418.00
Yenti Yenti	Geetha Govindam	132	17,353,934.40
Yentha Sakkagunnave	Rangasthalam	216	28,397,347.20
Chivaraku Migiledi	Mahanati	83	10,911,943.60
Mellaga Tellarindoi	Sathamanam Bhavati	55	7,230,806.00
Oosupodu	Fidaa	90	11,832,228.00
Adiga Adiga	Ninnu Kori	510	67,049,292.00
Vachinde	Fidaa	90	11832228
Swing Zara	Jai Lava Kusa	130.9	17,209,318.28
Madhurame	Arjun Reddy	510	67,049,292.00
Hamsa Naava	Baahubali 2: The Conclusion	1810	257,000,000
Raavana	Jai Lava Kusa	130.9	17,209,318.28
Dandaalayyaa	Baahubali 2: The Conclusion	1810	257,000,000
You Are My MLA	Sarrainodu	127.6	16,775,469.92
Yellipoke Shyamala	A Aa	75.4	9,912,777.68
Oka Lalana - Male Version	Jyo Achyutananda	13	1,709,099.60
Taanu Nenu	Sahasam Swasaga Sagipo	8.76	1,151,670.19
Oye Meghamla	Majnu	28.4	3,733,725.28
Chinuku Taake	Pelli Choopulu	30	3,944,076.00
Pareshanura	Dhruva	87.55	11,509,816.78
Naidorintikada	Brahmotsavam	63.7	8,374,365.09
Nuvvante Naa Navvu	Krishna Gaadi Veera Prema Gaadha	16.06	2,111,339.14
Pranaamam	Janatha Garage	135.45	17,807,029.06
Oka Life	Oopiri	630	82,821,249
Bhaje Bhaaje	Gopala Gopala	66	8,676,511.80
Raa Mundadugeddham	Kanche	20	2,629,246.00
Srimanthuda	Srimanthudu	392	51,497,589
Charuseela	Srimanthudu	392	51,497,589
Meghaalu Lekunna	Kumari 21F	380 million	49930784
Jeeva Nadhi	Baahubali: The Beginning	650 crore	85407920
Size Sexy	Size Zero		33,165
Nijamenani Nammani	Kanche	20	2627936
Enduko Enduko	Gopala Gopala	66	8672188.8
Seethakaalam	S/O Satyamurthy	900 million	118257120
Saripovu	Karthikeya	20	2627936
Neeli Rangu Cheeralona	Govindudu Andarivadele	410 million	53862274
Inthakante Vere	Oohalu Gusagusalade	2	262742.8
Cinema Choopista Mama	Race Gurram	101.27	13303981.68
Ra Rakumara	Govindudu Andarivadele	410	53862274
Chinni Chinni Aasalu	Manam	620 million	81450268
Junction Lo	Aagadu	65	8540769.9
Em Sandeham Ledu	Oohalu Gusagusalade	2	262742.8
Kani Penchina Ma Ammake	Manam	620 million	81450268
Vachaadayyo Saami	Bharat Ane Nenu	225	29564212.5
Allasani Vari	Tholi Prema	45.1	5925982.15
Maate Vinadhuga	Taxiwala	42	5518653

Mooga Manasulu	Mahanati	83	10905909.5
Ammadu Let's Do Kummudu	Khaidi No. 150	164	21549026
Paisa Vasool	Paisa Vasool	25	3284912.5
Saahore Baahubali	Baahubali 2: The Conclusion	1,810	257,000,000
Bhramaramba	Rarandoi Veduka Chudham	50	6569825
Sailaja Sailaja	Nenu Sailaja	40.1	5268999.65
Vellipomaake	Sahasam Swasaga Sagipo	25	3284912.5
Evare	Premam	30.95	4066721.68
Pakka Local	Janatha Garage	135.45	17797655.93
Choosa Choosa	Dhruva	87.55	11502861.81
Telusaa Telusaa	Sarrainodu	127.6	16764879.12
Tikku Tikkantu	Babu Bangaram	46.2	6,070,042
Maranam Adi Tadhyam	Vangaveeti	6.5	854010.3
Itu Itu Itu Ani Chitikelu Evvarivo	Kanche	20	2627936
Super Machi	S/O Satyamurthy	900 million	118257120
Idhera	Yevade Subramanyam	8	1051089.6
Mamatala Talli	Baahubali: The Beginning	650	85401030
Jatha Kalise	Srimanthudu	392	51497588.8
Needhe Needhe	Gopala Gopala	66	8671489.2
Vennellona Mounam	Surya vs Surya	7.5	985396.5
Gathama Gathama	Malli Malli Idi Rani Roju	10	1313862
Dhivara	Baahubali: The Beginning	650	85401030
Nandalaala	Mukunda	3.4	446713.08
Nee Kanti Choopullo	Legend	37.95	4986106.29
Who R U	1 Nenokkadine	700 million	91975170
Bujjiamaa Bujjiamaa	Run Raja Run	20	2627862
Nee Jathaga	Yevadu	60	7883586
Vadhantune Nenu Vadhantune	Run Raja Run	20	2627862
SIIMA Songs			

Appendix C

Number of Spotify Streams for each song:

Spotify Song List	***Film Name***	***Spotify Streams***
Inkem Inkem Inkem Kaavaale	Geetha Govindam	18,985,812
Pillaa Raa	RX 100	11,829,336
Ranga Rangaa Rangasthalaana	Rangasthalam	906,502
Peniviti	Aravinda Sametha Veera Raghava	3,238,183
Ninnila	Tholi Prema	6,256,846
Asha Pasham	C/O Kancherapalem	3,394,866
Mandaara	Bhaagamathie	2,277,557
Gelupuleni Samaram	Mahanati	727,803
Reddamma Thalli	Aravinda Sametha Veera Raghava	456,145
Yenti Yenti	Geetha Govindam	12,322,241
Yentha Sakkagunnave	Rangasthalam	2,091,181
Chivaraku Migiledi	Mahanati	417,299
Mellaga Tellarindoi	Sathamanam Bhavati	547,102
Oosupodu	Fidaa	6,765,593
Adiga Adiga	Ninnu Kori	6,944,800
Vachinde	Fidaa	3,946,486
Swing Zara	Jai Lava Kusa	1,868,210
Madhurame	Arjun Reddy	2,639,861
Hamsa Naava	Baahubali 2: The Conclusion	1,148,102
Raavana	Jai Lava Kusa	2,022,354
Dandaalayyaa	Baahubali 2: The Conclusion	1,421,793
You Are My MLA	Sarrainodu	1,108,336
Yellipoke Shyamala	A Aa	891,473
Oka Lalana - Male Version	Jyo Achyutananda	37,280
Taanu Nenu	Sahasam Swasaga Sagipo	1,391,313
Oye Meghamla	Majnu	529,591
Chinuku Taake	Pelli Choopulu	555,233
Pareshanura	Dhruva	1,682,835
Naidorintikada	Brahmotsavam	301,087
Nuvvante Naa Navvu	Krishna Gaadi Veera Prema Gaadha	2,036,865
Pranaamam	Janatha Garage	683, 207
Oka Life	Oopiri	280,639
Bhaje Bhaaje	Gopala Gopala	713,685
Raa Mundadugeddham	Kanche	32,802
Srimanthuda	Srimanthudu	475,584
Charuseela	Srimanthudu	673,610
Meghaalu Lekunna	Kumari 21F	2,676,149
Jeeva Nadhi	Baahubali: The Beginning	545,682
Size Sexy	Size Zero	155,014
Nijamenani Nammani	Kanche	44,321

Enduko Enduko	Gopala Gopala	71,950
Seethakaalam	S/O Satyamurthy	4,042,234
Saripovu	Karthikeya	910,603
Neeli Rangu Cheeralona	Govindudu Andarivadele	337,989
Inthakante Vere	Oohalu Gusagusalade	30,098
Cinema Choopista Mama	Race Gurram	1,903,645
Ra Rakumara	Govindudu Andarivadele	294,543
Chinni Chinni Aasalu	Manam	1,021,387
Junction Lo	Aagadu	507,125
Em Sandeham Ledu	Oohalu Gusagusalade	833,509
Kani Penchina Ma Ammake	Manam	617,670
Vachaadayyo Saami	Bharat Ane Nenu	1,210,403
Allasani Vari	Tholi Prema	2,141,753
Maate Vinadhuga	Taxiwala	22,099,376
Mooga Manasulu	Mahanati	626,004
Ammadu Let's Do Kummudu	Khaidi No. 150	1,860,877
Paisa Vasool	Paisa Vasool	319,428
Saahore Baahubali	Baahubali 2: The Conclusion	1,831,406
Bhramaramba	Rarandoi Veduka Chudham	196,058
Sailaja Sailaja	Nenu Sailaja	690,812
Vellipomaake	Sahasam Swasaga Sagipo	7,256,384
Evare	Premam	3,078,309
Pakka Local	Janatha Garage	3,071,514
Choosa Choosa	Dhruva	3,055,470
Telusaa Telusaa	Sarrainodu	4,601,183
Tikku Tikkantu	Babu Bangaram	143,663
Maranam Adi Tadhyam	Vangaveeti	204,217
Itu Itu Itu Ani Chitikelu Evvarivo	Kanche	525,511
Super Machi	S/O Satyamurthy	2,259,797
Idhera	Yevade Subramanyam	263,889
Mamatala Talli	Baahubali: The Beginning	571,139
Jatha Kalise	Srimanthudu	1,442,980
Needhe Needhe	Gopala Gopala	112,963
Vennellona Mounam	Surya vs Surya	178,520
Gathama Gathama	Malli Malli Idi Rani Roju	126,025
Dhivara	Baahubali: The Beginning	1,689,767
Nandalaala	Mukunda	376,195
Nee Kanti Choopullo	Legend	265,740
Who R U	1 Nenokkadine	543,980
Bujjiamaa Bujjiamaa	Run Raja Run	373,041
Nee Jathaga	Yevadu	1,370,984

Vadhantune Nenu Vadhantune	Run Raja Run	394,519
SIIMA Songs		

Appendix D

Number of Music Video Views for each song:

Spotify Song List	***Film Name***	***YouTube Video Views IN MILLIONS: Lyrical & Video***
Inkem Inkem Inkem Kaavaale	Geetha Govindam	459
Pillaa Raa	RX 100	287
Ranga Rangaa Rangasthalaana	Rangasthalam	50
Peniviti	Aravinda Sametha Veera Raghava	99
Ninnila	Tholi Prema	48
Asha Pasham	C/O Kancherapalem	72.7
Mandaara	Bhaagamathie	47.53
Gelupuleni Samaram	Mahanati	12.2
Reddamma Thalli	Aravinda Sametha Veera Raghava	29.868
Yenti Yenti	Geetha Govindam	180
Yentha Sakkagunnave	Rangasthalam	93
Chivaraku Migiledi	Mahanati	3.9
Mellaga Tellarindoi	Sathamanam Bhavati	63.1
Oosupodu	Fidaa	102
Adiga Adiga	Ninnu Kori	38.757
Vachinde	Fidaa	380
Swing Zara	Jai Lava Kusa	89
Madhurame	Arjun Reddy	47.7
Hamsa Naava	Baahubali 2: The Conclusion	100.76
Raavana	Jai Lava Kusa	42
Dandaalayyaa	Baahubali 2: The Conclusion	172
You Are My MLA	Sarrainodu	56.7
Yellipoke Shyamala	A Aa	10.663
Oka Lalana - Male Version	Jyo Achyutananda	1.354
Taanu Nenu	Sahasam Swasaga Sagipo	7.8
Oye Meghamla	Majnu	8.548
Chinuku Taake	Pelli Choopulu	8.472
Pareshanura	Dhruva	74.4
Naidorintikada	Brahmotsavam	7.919
Nuvvante Naa Navvu	Krishna Gaadi Veera Prema Gaadha	40
Pranaamam	Janatha Garage	23.6
Oka Life	Oopiri	1.873
Bhaje Bhaaje	Gopala Gopala	23
Raa Mundadugeddham	Kanche	0.432
Srimanthuda	Srimanthudu	8.935
Charuseela	Srimanthudu	12.248
Meghaalu Lekunna	Kumari 21F	8.669
Jeeva Nadhi	Baahubali: The Beginning	1.027
Size Sexy	Size Zero	8.6
Nijamenani Nammani	Kanche	0.7765
Enduko Enduko	Gopala Gopala	2.067
Seethakaalam	S/O Satyamurthy	66.132
Saripovu	Karthikeya	6.0566
Neeli Rangu Cheeralona	Govindudu Andarivadele	3.682
Inthakante Vere	Oohalu Gusagusalade	0.4828
Cinema Choopista Mama	Race Gurram	24

Ra Rakumara	Govindudu Andarivadele	9.33
Chinni Chinni Aasalu	Manam	16.285
Junction Lo	Aagadu	37.366
Em Sandeham Ledu	Oohalu Gusagusalade	25.5
Kani Penchina Ma Ammake	Manam	37.513
Vachaadayyo Saami	Bharat Ane Nenu	92.529
Allasani Vari	Tholi Prema	24.4
Maate Vinadhuga	Taxiwala	161
Mooga Manasulu	Mahanati	10.1
Ammadu Let's Do Kummudu	Khaidi No. 150	95
Paisa Vasool	Paisa Vasool	14.6
Saahore Baahubali	Baahubali 2: The Conclusion	226
Bhramaramba	Rarandoi Veduka Chudham	14
Sailaja Sailaja	Nenu Sailaja	73
Vellipomaake	Sahasam Swasaga Sagipo	40.7
Evare	Premam	20.1
Pakka Local	Janatha Garage	84
Choosa Choosa	Dhruva	74.824
Telusaa Telusaa	Sarrainodu	84.665
Tikku Tikkantu	Babu Bangaram	10.5
Maranam Adi Tadhyam	Vangaveeti	0.529
Itu Itu Itu Ani Chitikelu Evvarivo	Kanche	16
Super Machi	S/O Satyamurthy	93.52
Idhera	Yevade Subramanyam	2.52
Mamatala Talli	Baahubali: The Beginning	33.9
Jatha Kalise	Srimanthudu	46.03
Needhe Needhe	Gopala Gopala	3.39
Vennellona Mounam	Surya vs Surya	0.635
Gathama Gathama	Malli Malli Idi Rani Roju	1.267
Dhivara	Baahubali: The Beginning	104.2
Nandalaala	Mukunda	4.4
Nee Kanti Choopullo	Legend	4.564
Who R U	1 Nenokkadine	5.295
Bujjiamaa Bujjiamaa	Run Raja Run	1.305
Nee Jathaga	Yevadu	31.531
Vadhantune Nenu Vadhantune	Run Raja Run	3.888
SIIMA Songs		

Appendix E

API Analysis Results:

Song Name	Artist	Track ID	Duration in ms	Acousticness	Danceability	Energy	Instrumentalness	Liveness	Loudness	Mode	Speechiness	Tempo	Valence	Key
Inkem Inkem Inkem Kaavaale	Sid Sriram	1S4gynyFIz8IROMfhDIh3V	266715	0.412	0.811	0.537	1.3E-6	0.083	-5.508	MAJOR-1	0.0478	136.943	0.57	4
Pillaa Raa	Anurag Kulkarni	3MXTLAouHSztOxoOSOnbb9	237569	0.624	0.662	0.655	9.66E-6	0.183	-5.448	MAJOR-1	0.0622	61.994	0.636	9
Ranga Rangaa Rangasthalaana	Rahul Sipligunj	5ppp8XrspJQqgGsZkOCCOh	305968	0.574	0.547	0.986	0.172	0.106	-4.705	MAJOR-1	0.227	90.054	0.593	0
Peniviti	Kala Bhairava	1YA5XoTcKyrpQ6cW6XsAfB	310000	0.366	0.48	0.6	3.37E-5	0.117	-6.75	MINOR-0	0.0315	177.002	0.576	11
Ninnila	Armaan Malik	2DDOQBKGmkv7bPoYF1bELz	234884	0.505	0.699	0.467	2.5E-6	0.152	-6.363	MAJOR-1	0.0298	128.989	0.277	6
Asha Pasham	Anurag Kulkarni	1IrgvbZzsjatMee0Uk8o0P	260000	0.803	0.469	0.439	0.0	0.198	-8.204	MAJOR-1	0.0413	179.474	0.531	3
Gelupuleni Samaram	Ramya Behra	0JBzugQtwAOEngxD6TSZDC	193491	0.897	0.283	0.225	7.66E-5	0.0921	-12.79	MAJOR-1	0.032	91.973	0.202	6
Reddamma Thalli	Mohana Bhogaraju	0IVYPYhkWOoKseBCnThkhF	117736	0.796	0.573	0.366	4.89E-6	0.269	-7.931	MAJOR-1	0.0584	78.985	0.416	11
Yettagayya Shiva Shiva	Ananya Bhat	64L8HeTeKs6Dzi8X5qtfbj	97312	0.404	0.732	0.194	0.0	0.123	-11.339	MAJOR-1	0.0366	119.928	0.446	0
Yenti Yenti	Chinmayi	37LmFIPnpsBISJjNvqbUkT	199200	0.223	0.742	0.541	2.08E-4	0.0888	-6.735	MAJOR-1	0.0455	75.021	0.48	2
Yentha Sakkagunnave	Devi Sri Prasad	6nhLm8GEkkH9kunfqdAFcO	262123	0.497	0.883	0.553	1.13E-5	0.156	-8.468	MAJOR-1	0.068	132.055	0.668	11
Chivaraku Migiledi	Sunitha	5214OknPe9jc6Ej2JNZhcH	179285	0.976	0.53	0.226	0.0114	0.0971	-9.788	MINOR-0	0.0264	94.874	0.346	6
Mellaga Tellarindoi	Anurag Kulkarni	01bhNo46PTQxTYLWAnRzIz	252785	0.543	0.694	0.575	0.00147	0.108	-8.037	MAJOR-1	0.036	91.972	0.628	1
Oosupodu	Hemachandra Vedala	0xNiDPK4YdZ51ALxSid0QV	273181	0.28	0.388	0.686	0.0	0.267	-5.178	MAJOR-1	0.0633	74.464	0.537	11
Adiga Adiga	Sid Sriram	3rjQDHgHUGnuJ5ZUaNFNbx	212233	0.923	0.554	0.291	0.0	0.105	-10.474	MAJOR-1	0.0298	129.874	0.138	10
Vachinde	Madhu Priya	7KkaBto4aewGt8wl6q6wxH	324546	0.352	0.825	0.786	0.0	0.0872	-4.5	MAJOR-1	0.12	102.98	0.901	0
Swing Zara	Neha Bhasin	1SJOGijQV7cRrfLstfZHzE	261387	0.455	0.514	0.86	0.00236	0.24	-4.706	MAJOR-1	0.148	88.719	0.495	2
Madhurame	Sameera Bharadwaj	4sbR8sUkAe6tJTooAQauEe	343214	0.376	0.639	0.575	4.01E-5	0.0894	-7.325	MAJOR-1	0.0539	140.042	0.249	2
Hamsa Naava	Sony	6F95i3jB5xFcHauFB92YOf	203820	0.747	0.674	0.715	2.98E-5	0.104	-10.143	MINOR-0	0.0548	137.909	0.298	5
Nuvvele Nuvvele	Shweta Mohan	2NEFT1kFinuwRgow5plEZE	268304	0.212	0.827	0.772	0.0526	0.0973	-5.692	MINOR-0	0.0331	104.042	0.575	2
Raavana	Divya Kumar	2JnZ5Q6YjE5fLiI5hg7WUT	258123	0.145	0.597	0.892	9.24E-5	0.118	-5.121	MINOR-0	0.0492	80.009	0.634	4
Dandaalayyaa	Kala Bhairava	1qNjwr1IWSNmTPMbiQ8sYt	209328	0.827	0.618	0.765	0.00246	0.404	-7.684	MINOR-0	0.0391	92.006	0.6	2
You Are My MLA	Dhanunjay Seepana	6p3L4v9ZiABHb5pzsSKieM	274088	0.15	0.734	0.834	0.00304	0.0471	-6.064	MINOR-0	0.0526	90.984	0.714	10
Yellipoke Shyamala	Karthik	6x0uurbe3O3v7ogFWdEjYa	215075	0.572	0.654	0.755	2.7E-4	0.121	-10.557	MAJOR-1	0.0602	170.105	0.898	6
Oka Lalana - Male Version	Shankar Mahadevan	3z5W7VlY7MYNU97qzc76R4	258467	0.707	0.612	0.501	0.0	0.108	-6.612	MINOR-0	0.0321	121.98	0.425	6
Taanu Nenu	Vijay Prakash	1Wc9z0B58aA3dpLuXEbHZb	253942	0.864	0.504	0.357	0.00838	0.125	-12.441	MAJOR-1	0.032	145.916	0.572	11
Oye Meghamla	Chinmayi	3bdDjuvvIlgU1sJ8gc40fj	263826	0.756	0.738	0.485	4.31E-5	0.112	-8.057	MAJOR-1	0.0368	102.992	0.423	2
Chinuku Taake	Amritavarshini KC	4ewe55AoVtNZQZMihVmp9u	291500	0.795	0.492	0.212	4.08E-5	0.123	-14.692	MAJOR-1	0.0374	171.996	0.398	9
Pareshanura	Padmalatha	0Uipby2S4eKrCm1VcydvI3	193180	0.173	0.642	0.703	9.97E-6	0.133	-5.13	MAJOR-1	0.0442	94.003	0.669	8
Naidorintikada	Anjana Sowmya	087doSHz98tIQDXMMmxvti	137509	0.349	0.642	0.77	2.37E-4	0.109	-6.013	MAJOR-1	0.0517	112.428	0.868	9
Nuvvante Naa Navvu	Haricharan	79usXWn1Sif3SUxbtq3ZKm	274308	0.523	0.53	0.507	0.0	0.0441	-7.951	MINOR-0	0.0475	179.857	0.561	7
Pranaamam	Shankar Mahadevan	75PLRXczgeUtwD9mFzDVsB	240409	0.122	0.721	0.925	1.59E-4	0.115	-3.908	MINOR-0	0.0503	122.002	0.757	5
Oka Life	Karthik	7xRb2y0Kh4HVztdxDn3qJ0	284108	0.251	0.928	0.311	0.00126	0.0917	-10.169	MAJOR-1	0.0893	112.963	0.444	4
Bhaje Bhaaje	Haricharan	5h3oTrX9BhkBNQ2hLqpZN9	239305	0.222	0.71	0.597	0.0	0.0771	-7.955	MAJOR-1	0.115	63.074	0.723	7
Raa Mundadugeddham	Vijay Prakash	3eJeRggYyDjZq2352GgdZi	409108	0.387	0.484	0.719	4.03E-6	0.0998	-8.475	MINOR-0	0.0542	153.973	0.382	2
Srimanthuda	M.L.R. Karthikeyan	0KUUwndiVNY4owL4sgjkTu	123745	0.565	0.652	0.708	0.0	0.206	-6.991	MAJOR-1	0.0532	169.902	0.86	9
Charuseela	Yazin Nizar	4EXaBrHaGrjiYoowkVHCB0	255453	0.061	0.782	0.802	7.52E-5	0.124	-5.927	MAJOR-1	0.0552	130.019	0.775	0
Meghaalu Lekunna	Yazin Nizar	4YpxBrMONvVqbmXmYI2P5M	299291	0.274	0.736	0.65	1.52E-6	0.179	-5.958	MAJOR-1	0.0318	134.859	0.608	0
Jeeva Nadhi	Geetha Madhuri	5HmfZIlFxtOO1Zpoofg88q	99892	0.976	0.297	0.0778	0.0	0.115	-11.891	MINOR-0	0.0357	135.09	0.48	9
Ye Kadha	Jonita Gandhi	5m8M7W9IR0ZkSroEwR1spG	237981	0.93	0.734	0.619	0.127	0.0969	-8.726	MAJOR-1	0.0318	138.034	0.773	3
Size Sexy	Mohana Bhogaraju	63I2wvTOIS4kgBfzEgDqEH	205082	0.1	0.751	0.916	0.0	0.137	-5.506	MINOR-0	0.296	90.031	0.667	4
Nijamenani Nammani	Shreya Ghoshal	3PtZlXh1ILipM8o7g6rivY	288209	0.725	0.595	0.421	0.00589	0.14	-9.526	MAJOR-1	0.0264	105.013	0.235	6
Enduko Enduko	Kailash Kher	0VGyPknHIpgNRrp5sJT5w	262969	0.49	0.802	0.641	0.00777	0.145	-8.411	MAJOR-1	0.0932	129.996	0.803	1
Seethakaalam	Yazin Nizar	2C72bOiY3kbCgDBBznoejk	262489	0.305	0.961	0.778	3.82E-6	0.305	-6.585	MINOR-0	0.085	112.967	0.88	2
Saripovu	Haricharan	3CDyEoBgQHC1hJATGfjwHn	244286	0.0801	0.737	0.616	1.45E-6	0.187	-9.386	MINOR-0	0.0501	92.001	0.685	10
Neeli Rangu Cheeralona	Hariharan	5hXrcXSKfcDVcjCPfgrW8F	286000	0.128	0.474	0.66	0.0	0.399	-8.657	MINOR-0	0.184	79.801	0.772	5
Inthakante Vere	Hemachandra	1SP9RgNEj9L38XAAvixj12	235917	0.588	0.647	0.335	2.27E-5	0.294	-16.059	MAJOR-1	0.0453	161.818	0.713	0
Cinema Choopista Mama	Simha Yadgiri	4HTDI31KMbRxWrH778ffvV	270064	0.744	0.671	0.896	1.86E-6	0.0978	-9.422	MAJOR-1	0.513	185.91	0.758	0
Ra Rakumara	Chinmayi	4zz7jJW6J6gdac8TflvOxn	222000	0.162	0.685	0.772	0.00629	0.153	-8.269	MINOR-0	0.0537	120.018	0.628	3
Chinni Chinni Aasalu	Shreya Ghoshal	3jCrVZOua2khYydUAxjuY4	320619	0.601	0.718	0.6	9.01E-5	0.232	-6.733	MINOR-0	0.0575	90.013	0.642	9
Junction Lo	Bheems	4hPdBivyqPoLQoHZss0FGe	320004	0.305	0.711	0.799	1.24E-6	0.246	-5.224	MAJOR-1	0.323	74.976	0.358	8
Em Sandeham Ledu	Kalyani Malik	6vsPBbLGfeLraBanG4HJaR	232914	0.63	0.722	0.499	1.81E-6	0.112	-5.958	MAJOR-1	0.032	127.915	0.541	2
Kani Penchina Ma Ammake	Bharath	4tdbEdkYcZxpYH4GixciOl	248323	0.583	0.789	0.74	2.75E-4	0.0719	-6.737	MINOR-0	0.0609	148.204	0.761	9
Vachaadayyo Saami	Kailash Kher	3VS9W9i3GjciUJf6Zen7yv	325218	0.66	0.747	0.906	0.0019	0.157	-4.6	MINOR-0	0.264	142.941	0.799	10
Allasani Vari	Shreya Ghoshal	6vI8sSx4J3oa9lt51ZrVZC	296163	0.654	0.597	0.739	3.61E-4	0.0924	-6.636	MAJOR-1	0.0947	171.985	0.587	3
Maate Vinadhuga	Sid Sriram	15tihU7QrnhaBvE7hXGDwa	296220	0.216	0.631	0.582	0.0	0.17	-9.367	MINOR-0	0.0536	159.959	0.493	11
Mooga Manasulu	Anurag Kulkarni	3ijpb4iybBivEt6ZKfdFns	254251	0.877	0.544	0.646	0.041	0.249	-7.408	MAJOR-1	0.0382	109.851	0.376	4
Ammadu Let's Do Kummudu	Devi Sri Prasad	4jy2ORlpTbFqI07KO3LgWl	208158	0.0917	0.537	0.952	0.0526	0.066	-4.92	MAJOR-1	0.101	95.017	0.773	9
Paisa Vasool	Daler Mehndi	1JN90g0awndZqWKeEsyraz	236444	0.417	0.841	0.909	2.45E-4	0.103	-4.375	MINOR-0	0.199	109.974	0.707	4
Saahore Baahubali	Daler Mehndi	09GP9mSbw1fQ6xmVlGQ8MU	202378	0.493	0.782	0.816	1.4E-6	0.321	-7.252	MINOR-0	0.0603	110.03	0.638	7
Bhramaramba	Sagar	1y1qHgD0KAzFegyMR5zR2o	225700	0.49	0.702	0.854	4.0E-5	0.179	-3.532	MAJOR-1	0.0828	79.987	0.941	10
Sailaja Sailaja	Sagar	1VKUvwVbThOJT8ypJYwMQ1	233968	0.543	0.792	0.923	1.21E-5	0.0348	-4.899	MINOR-0	0.142	161.973	0.921	10
Vellipomaake	Sid Sriram	6z15tFRtCyiSorSGaKLJeu	261369	0.0921	0.353	0.737	0.0	0.135	-5.952	MINOR-0	0.0533	98.181	0.235	9
Evare	Vijay Yesudas	1NXSmIEOulY9u4TxwuSUoe	309663	0.773	0.462	0.456	0.0	0.087	-11.408	MAJOR-1	0.0302	82.499	0.403	11
Pakka Local	Geetha Madhuri	3oLSlzMt3SD5PYSMf1Aqo0	259330	0.293	0.54	0.955	0.0107	0.127	-3.241	MAJOR-1	0.219	93.0	0.81	1
Choosa Choosa	Padmalatha	0iIvZ25h16B9DhjptYp8hK	200773	0.0172	0.633	0.879	6.46E-6	0.207	-5.136	MINOR-0	0.0559	89.993	0.523	2
Telusaa Telusaa	Jubin Nautiyal	1jz0PUb4rChtZUk4itn1Co	264544	0.769	0.499	0.636	0.0087	0.113	-8.176	MAJOR-1	0.0558	167.953	0.35	4
Tikku Tikkantu	Narendra	7fp2ebX6fx7GN7yaj5I3cy	102752	0.495	0.843	0.946	0.12	0.0661	-6.509	MAJOR-1	0.11	77.001	0.963	2
Itu Itu Itu Ani Chitikelu Evvarivo	Abhay Jodhpurkar	46QURz1FA2bt7kmz7mdGLE	310977	0.675	0.649	0.725	0.0	0.131	-5.436	MINOR-0	0.0413	99.982	0.626	4
Super Machi	Devi Sri Prasad	3WTHnUPLqVZXSw54PFLtiL	278189	0.431	0.759	0.948	0.0334	0.0288	-4.313	MAJOR-1	0.098	97.906	0.914	7
Idhera	Mohit Chauhan	1FJ9tc1IKwFFC9d3FO4PBF	344765	0.0172	0.513	0.471	3.61E-4	0.617	-6.872	MAJOR-1	0.023	85.009	0.283	2
Mamatala Talli	Surya Yamini	12su9JAr0u3wm2mascXddf	226650	0.397	0.611	0.419	0.0019	0.178	-9.539	MINOR-0	0.0284	100.915	0.361	9
Jatha Kalise	Sagar	7lsCmld8aCYXj1Nb5n9t2K	224195	0.262	0.78	0.653	7.26E-6	0.039	-6.393	MAJOR-1	0.0429	86.987	0.685	0
Needhe Needhe	Sonu Nigam	0QXDxzhojxnRc6yPOAEnsV	243717	0.784	0.607	0.6	5.87E-4	0.0941	-8.925	MAJOR-1	0.0648	94.959	0.565	4
Vennellona Mounam	Chinmayi	3SdDRB3k8rp4GJpAApQaWs	217647	0.759	0.568	0.466	1.54E-4	0.16	-9.707	MINOR-0	0.0319	89.895	0.179	9
Gathama Gathama	Priya Hemesh	47A2IIwv8hynf0dKkuDCZB	180022	0.888	0.562	0.214	0.0	0.166	-10.592	MAJOR-1	0.0297	77.0	0.198	9
Dhivara	Ramya Behra	0hFZn71Eyc8ajuQ2ax6bZW	325892	0.358	0.672	0.598	2.64E-4	0.0921	-9.162	MINOR-0	0.0426	154.051	0.547	0
Nandalaala	Swetha	7pq433DWGbLDY6RUtt8BF47	249000	0.833	0.667	0.526	0.166	0.106	-7.916	MAJOR-1	0.0328	87.975	0.689	11
Nee Kanti Choopullo	Vijay Yesudas	49Fs1F8TU8rCselArUkJ5D	244623	0.0757	0.763	0.758	6.54E-5	0.152	-7.203	MINOR-0	0.0456	120.038	0.923	5
Who R U	Dsp	40Z8bpGJPxjClb4NK8J0LJ	291519	0.0572	0.707	0.948	0.0538	0.879	-3.907	MAJOR-1	0.0723	138.035	0.78	7

Bujjiamaa Bujjiamaa	Gold Devaraj	7Ar8nEGW5tFZREmnPB5cLw	202150	0.572	0.847	0.707	0.0	0.172	-6.611	MAJOR-1	0.217	139.969	0.921	1
Nee Jathaga	Karthik	3XMGDq4wLX489HfqSS0NAI	274861	0.15	0.785	0.657	2.61E-4	0.203	-5.405	MAJOR-1	0.0423	96.001	0.921	0
Vadhantune Nenu Vadhantune	Chinmayi	75YSUF1uhEByu5oLixYEPz	258940	0.856	0.67	0.523	5.65E-5	0.137	-6.066	MINOR-0	0.0312	125.998	0.315	0

Appendix F

Removed Songs:

Removed	***Duplicates***
Rangamma Mangamma	Pillaa Raa
Hello	Peniviti
Telisiney Na Nuvvey	Ranga Rangaa Rangasthalaana
Mahanubhavudu	Inkem Inkem Inkem Kaavaale
Shatamanam Bhavati	Rangamma Mangamma
Follow Follow	Yenti Yenti
Ee Premaki, Counterpart: **Em Chepanu**	Chivaraku Migiledi
Marhaba	Yentha Sakkagunnave
Kanulanu Thaake	Dandaalayya
Aww Tuzo	Hello
Aa Seetadevi Navvula	Oosupodhu
Tik Tik Tik	Adiga Adiga
Nilavade	Vacchinde
Nannaku Prematho	Mahanubhavudu
Rang De	Swing Zara
Rama Rama	Hamsa Naava
Nippulaa Swasa Ga	Pranaamam
Jaago	Oka Laalana
Gopikamma	Bhaje Bhaaje
Count: 19	Nijamenani Nammani
	Kani Penchina
No Revenue Data Found	Em Sandeham Ledu
Yettagayya Shiva Shiva	Sari Povu Koti
Nuvvele Nuvvele	Cinema Chupista Maava
Ye Kadha	Kanulanu Thake
Count: 3	
	Aww Thujo Mogh Korta
Total: 22	Chinni Chinni Aasalu
	Count: 27
Songs in Dataset: 82	