

Music and Human Emotions: Sentiment Analysis of the Impact of Lyrics and Melodies

Nur Fathi Auni Azlan *

Fakhitah Ridzuan**

aunifathi546@gmail.com *, *fakhitah.r@umk.edu.my* (Corresponding Author)**

Abstract

Music plays an important role in society and is a medium to influence emotions, behavior and local culture. In addition, the lyrical and melodic elements contained in music can also evoke extraordinary emotional sentiments in the audience. Therefore, this study was conducted to explore new dimensions related to music sentiment analysis, including the subfield of natural language processing (NLP). This application is important to assess the role of the richness of song lyrics inspired by the composer in influencing the psychology and soul of the listener. In this regard, this study aims to identify musical sentiment based on Taylor Swift's work, in addition to analyzing the lyrical content that is able to influence the audience's emotional response. The limitations of this study focus on the categorization of songs based on the classification of 10 basic emotions including surprise, sadness, disgust, fear, negative, anger, trust, anticipation, joy and positivity. In terms of methodology, this study uses a quantitative design based on a computational approach. Data analysis was carried out on the Taylor Swift song data set by applying the VADER sentiment analysis tool and word frequency analysis. This process is supported by the theory of language polarity classification to classify lyrical sentiment into three main categories, namely positive, negative, or neutral. In conclusion, the findings of this study have proven that music functions as an effective psychological instrument; where the intertwining of lyrics successfully translates measurable sentiments, thus directly shaping the emotional landscape of its listeners.

Keywords: *music, song lyrics, emotions, sentiment analysis*

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* Final Year Student at Faculty of Data Science and Computing, Universiti Malaysia Kelantan, Kota Bharu, 16100 Kelantan.

** Lecturer at at Faculty of Data Science and Computing, Universiti Malaysia Kelantan, Kota Bharu, 16100 Kelantan.



Muzik dan Emosi Manusia: Analisis Sentimen Terhadap Impak Lirik dan Melodi

Nur Fathi Auni Azlan *

Fakhitah Ridzuan**

aunifathi546@gmail.com*, fakhitah.r@umk.edu.my (Penulis Koresponden)**

Abstrak

Muzik memainkan peranan penting dalam kalangan masyarakat dan menjadi medium untuk mempengaruhi emosi, tingkah laku serta budaya setempat. Selain itu, elemen lirik dan melodi yang terangkum di dalam muzik juga dapat membangkitkan sentimen emosi yang luar biasa kepada khalayak pendengar. Oleh itu, kajian ini dilaksanakan untuk meneroka dimensi baharu yang berkaitan analisis sentimen muzik merangkumi subbidang pemprosesan bahasa semula jadi (NLP). Pengaplikasian ini penting bagi menilai peranan kekayaan lirik lagu yang diilhamkan oleh komposer dalam mempengaruhi psikologi dan jiwa pendengar. Sehubungan dengan itu, kajian ini bertujuan untuk mengenal pasti sentimen muzik berdasarkan karya Taylor Swift, di samping menganalisis kandungan lirik yang berupaya mempengaruhi tindak balas emosi khalayak. Batasan kajian ini tertumpu pada pengkategorian lagu berdasarkan klasifikasi 10 emosi asas termasuk kejutan, kesedihan, jijik, ketakutan, negatif, kemarahan, kepercayaan, jangkakan, kegembiraan dan positif. Dari segi metodologi, kajian ini menggunakan reka bentuk kuantitatif berasaskan pendekatan komputasional. Penganalisan data dilaksanakan terhadap set data lagu Taylor Swift dengan mengaplikasikan alat analisis sentimen VADER serta analisis kekerapan perkataan (*word frequency analysis*). Proses ini disokong oleh teori pengelasan polariti bahasa bagi mengklasifikasikan sentimen lirik kepada tiga kategori utama, iaitu positif, negatif, atau neutral. Kesimpulannya, dapatan kajian ini telah membuktikan bahawa muzik berfungsi sebagai instrumen psikologi yang berkesan; yang mana jalinan lirik berjaya menterjemahkan sentimen yang terukur, sekali gus secara langsung mencorakkan landskap emosi pendengarnya.

Kata Kunci: muzik, lirik lagu, emosi, analisis sentimen

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* Pelajar Tahun Akhir di Fakulti Sains Data dan Komputeran, Universiti Malaysia Kelantan, Kota Bharu, 16100 Kelantan.

** Pensyarah di Fakulti Sains Data dan Komputeran, Universiti Malaysia Kelantan, Kota Bharu, 16100 Kelantan.



1.0 Introduction

Music plays a deep and complex role in society. It influences emotions, behavior, and even cultural movements. According to Vuilleumier and Trost (2015), music has this rare ability to arouse feelings in its listeners, which range from happiness and enthusiasm to sadness and nostalgia. Other than the melodies and rhythms, the words of songs have a huge impact on such emotional appeal. The sentiment analysis of entertainment music, with a major emphasis on lyrical content, shows insight into the psychological effect songs and their emotional undertones create on listeners.

Sentiment analysis-or, more vaguely, opinion mining-is the computer study of people's beliefs, feelings, attitudes, and emotions as they are conveyed in text (Wankhade et al., 2022). It is a branch of natural language processing (NLP) which may be used in music to identify the composer's underlying mood and feelings through the lyrics (Wankhade et al., 2022). In the music domain, sentiment analysis provides critical insights into a songwriter's thematic intent, optimizes music recommendation algorithms (Revathy et al., 2023). The analysis can facilitates listeners's musical preferences and allows Spotify and other music recommender systems automatically create playlists Furthermore, sentiment analysis enables music producers to meet consumer expectations by finding common emotional trends in popular music and helps composers understand the emotional influence of their work.

A song can have much emotional expressiveness in the lyrics. The lyrics that routinely mirror the deepest emotions, thoughts, and experiences of the songwriter establish a personal bond between the singer and the listener (Baker, 2015). Based on the emotions that are there in these lyrics, scholars classify songs into emotional states of happiness, sadness, wrath, fear, and surprise (Revathy et al., 2023). This categorization furthers the study of music psychology, which is the discipline that studies the effects of music on human behavior and emotion, and provides a better understanding of the emotional landscape of a musical composition. As technology and methodologies in sentiment analysis continue to advance, the potential for deeper and more nuanced understanding of the emotional power of music will only grow. It also can enriching the experience for both creators and consumers of music.

Despite the profound impact that music has on human emotions and behaviors, a significant disconnect exists between the lyrical content created by songwriters and the emotional experience of listeners (Lipscombe, 2015). Songwriters often focus predominantly on crafting lyrics without explicitly considering the mood and emotions that these lyrics might convey. This oversight can lead to a mismatch between the intended emotional expression and the listener's perception. Moreover, many listeners finds it difficult to grasp the lyrics, especially when they are masked by complex language, cultural references, or differences in language proficiency. Consequently, it is hard for them to infer a song's mood from its melody alone as long as they unable to comprehend its lyrical content (Meyers, 2007).

This gap in interpretation also lowers the emotional impact and commercial success of songwriters' songs, who cannot convey meaning and emotion to great effect. It also impacts current approaches for music analysis and classification, most of which rely entirely upon lyrical content to determine the emotional tone-a methodology which will fall short should the lyrics be inaccessible or incomprehensible to a general audience. The missing link for effective capturing



and transmission of desired mood and feelings emphasizes a more integrated approach in sentiment analysis within music, including both the lyrical and melodic perspectives (Çano, 2018).

To address this gap, this study explicitly defines its scope and limitations by focusing on the artist discography of Taylor Swift between the years 2006 and 2015. This specific timeframe is deliberate, as it encompasses the artist's pivotal stylistic evolution from country to mainstream pop. Limiting the analysis to this decade and genre shift provides a controlled yet rich dataset to examine how lyrical sentiment, word frequency, and emotional polarity transition across distinct musical styles.

2.0 Literature Review

2.1 Sentiment Analysis

Sentiment analysis is a subfield of NLP focused on the detection, extraction, and classification of sentiments, emotions, or opinions within textual data (Wankhade et al., 2022). Typically the data will be categorized as positive, negative, or neutral. Techniques used in sentiment analysis range from rule-based systems relying on lexicons and syntactic patterns to advanced machine learning and deep learning models such as Recurrent Neural Networks (RNN), Convolutional Neural Networks (CNN), and transformer-based architectures like BERT (Ray & Chakrabarti, 2022; Sharma et al., 2024). Sentiment analysis is especially valuable in understanding human emotions at scale, offering actionable insights by transforming unstructured data, such as social media posts, product reviews, or song lyrics into structured emotional feedback.

In the real world, sentiment analysis has been deployed across a diverse range of domains. In business, it supports brand monitoring, customer satisfaction analysis, and market research by evaluating consumer sentiments toward products or services (Kim & Lim, 2021). In the political perspective, it is used to assess public opinion on policies, speeches, and candidates by analyzing online discourse and news commentary (Rita et al., 2023). In healthcare, sentiment analysis contributes to mental health monitoring by identifying emotional distress in patient narratives or social media behavior (Jones et al., 2021). In entertainment, particularly music, it allows platforms to deliver mood-based recommendations, helps artists tailor emotionally resonant content, and even assists therapists in creating therapeutic playlists for emotional regulation (Bavarava et al., 2024). Sentiment analysis offers a great chance to expand the knowledge of human emotions as it manifest in language, leading to more responsive and sympathetic systems in a variety of fields.

2.2 Importance of Sentiment Analysis in Music

Sentiment analysis plays a significant role in the music domain, particularly when applied to song lyrics, due to its impact on stakeholders including music streaming platforms, artists and record labels, and therapists or researchers. Sentiment analysis enables platforms to recommend songs based on emotional mood, rather than just genre or popularity. For example, (S et al., 2025) classifies songs as happy, sad, calm, or energetic to provide more personalized user experiences. (Hu & Downie, 2010; Schaab & Kruspe, 2024) show that combining lyrical sentiment with audio features further enhances recommendation



accuracy. By understanding the emotional tone of songs, these systems can go beyond genre or popularity to deliver content that resonates more deeply with individual users.

Besides, sentiment analysis of lyrics helps therapists create emotionally appropriate playlists or track emotional expressions important for psychological studies. (Hong & Xue, 2025) uses multilingual BERT-based models to support music therapy applications, especially in cross-cultural contexts. (Xu et al., 2021) investigates how lyrical features correlate with emotional dimensions like valence and can impact psychological interpretation of songs. Emotionally categorized songs can be used to regulate mood, reduce anxiety, and support psychological well-being, particularly when tailored to the emotional needs of individuals. Sentiment analysis in music especially when applied to lyrics enables practical benefits for streaming platform and mental health professionals.

Sentiment analysis is also beneficial to the listeners of the music. Sentiment analysis can enhance user experiences at a time when digital music platforms are highly adopted, by providing recommendations based on the preferences or current mood of the listener (Sarin et al., 2022). It can be envisioned, for instance, that sentiment analysis enables a music streaming service to recommend some happy songs for a user who has been listening to too much depressing music, thus evening out the emotional experience.

Also, the sentiment analysis may be used by marketers and music producers to understand the audience preferences and current trends (Rompolas et al., 2024). By examining the emotional content of well-known songs, they can learn more about the kinds of music which are now popular with the public. This information can inform marketing strategies, playlist curation, and even the development of new artists who align with the prevailing emotional trends.

3.0 Methodology

Sentiment analysis on entertainment music aims to classify song lyrics into several classes of feelings using state-of-the-art NLP techniques. VADER (Valence Aware Dictionary and sEntiment Reasoner) is a rule-based sentiment analysis tool designed to detect sentiment in text, particularly social media content (Chavan et al., 2024). It leverages a combination of lexical and grammatical heuristics to determine the sentiment expressed in a sentence. VADER is known for its effectiveness in handling emoticons, slang, and short phrases, making it particularly useful for analyzing social media posts or user reviews.

The process of analyzing song lyrics begins with text preprocessing, where raw lyrics are cleaned and standardized for analysis. Common techniques include tokenization, stemming or lemmatization, stop-word removal and Part-of-Speech (POS). Tokenization divide a sentence into tokens, and these tokens can be formed of words as written in the sentence, or they can be formed of different forms of words (Erkan & Gungor, 2023). Tokenization is a crucial step in text preprocessing, as it transforms raw text into a format that can be effectively analyzed. It allows for the identification and analysis of individual words, making it easier for algorithms to process the text.

Additionally, stemming and lemmatization were used to reduces words to their root forms. Stemming is a rule-based process that strips off suffixes in a word in order to obtain the stem (root



form) of the word (Erkan & Gungor, 2023). Lemmatization is similar to stemming in the sense that the root form of the word is extracted cases (Erkan & Gungor, 2023). The difference is that it also takes into account morphophonemic rules and irregular. In lyric analysis, stemming or lemmatization helps condense variations of words into their primary form, preventing redundant analysis of similar words and allowing the algorithm to focus on the core meaning of the lyrics.

Stopwords removal is necessary steps in text processing. Stopwords are words that are frequently used in all types of documents in a language (Erkan & Gungor, 2023). They are common words that do not add significant meaning to the analysis and are usually removed during text preprocessing. These words, such as “the,” “and,” “in,” “of,” and “to,” are often abundant in text and can distort the outcomes of text analysis if included in the dataset. Meanwhile, POS tagging helps to identify nouns, verbs, and other grammatical elements to assist in feature weighting. It is one of the most important addressed areas and main building block and application in the NLP discipline (Chiche & Yitagesu, 2022). It is particularly useful for understanding the grammatical structure of a sentence and can aid in the extraction of more nuanced features.

The next step is feature extraction and representation. It is a systematic process of finding and transforming relevant information from its original form into a more concise and meaningful representation in order to facilitate analysis (Semary et al., 2024). It encodes the text into numerical vectors suitable for machine learning models. Once the features have been extracted and represented numerically, the data is ready for the application of machine learning models.

3.2 Dataset

The dataset obtained from GitHub (Data Science Learning Community, 2020) contains a comprehensive collection of Taylor Swift's song lyrics, offering a valuable resource for analyzing her musical evolution and thematic trends. The dataset consists of 7,169 song lyrics, each associated with specific metadata, including the Artist, Album, Title, and the full Lyrics of each song. This data provides an extensive view of Taylor Swift's discography, covering multiple albums across various phases of her career. Taylor Swift is known to make some of the most personal lyrics possible. The song lyrics that are written by Taylor Swift, filled with relatable emotions and featuring complex storytelling. Themes range from love and grief down to growth, nostalgia, and empowerment.

4.0 Result and Discussion

Song lyrics are a powerful form of storytelling, often reflecting universal human emotions and experiences. This analysis explores the linguistic features, emotional tone and flow of lyrical sentiment across multiple songs. The research will enable the establishment of relations and ideas which capture the audience's attention. This study provides valuable insight into the identification of the common and distinctive lyrical features in various song types, from different genres and artists, using word frequency, sentiment distribution, and emotional categories.

4.1 Word Frequency Analysis

Word frequency analysis is a basic text analysis that identifies the most frequently used words in a given data set. This technique is very valuable in understanding the thematic elements of the text. This is because frequently appearing words often highlight main ideas



such as emotions or motives. Based on the word frequency count of Taylor Swift's lyrics, the listener can determine the common theme and learn more about her narrative style.

The top words used in Taylor Swift's lyrics are "know" with 286 occurrences, "like" with 285 occurrences, and "love" with 159 occurrences. These words are the recurring theme in her songs. For instance, "know" conveys a feeling of self-reflection and consciousness, which are significant in her songwriting. "Like" is also widely used in similes and comparisons. It helps to highlight the vivid imagery that she employs in order to reach out to her audience. Finally, "love" helps to emphasize its varied applications in his music. This has ranged from a romantic setting, family, and self-exploration. The word's visibility is in line with Taylor Swift's reputation for writing songs that delve into the intricacies of human feelings and relationships. Figure 1 shows top 15 frequent words in Taylor Swift's lyrics.

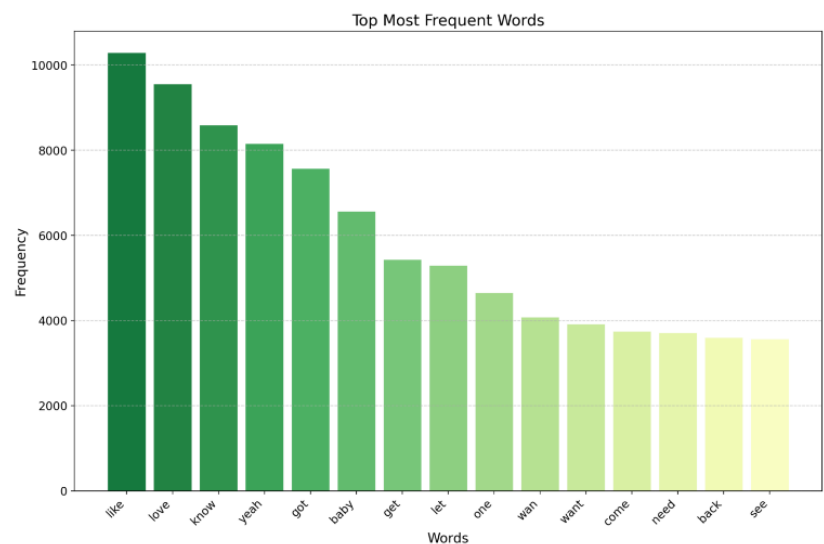


Figure 1: Top 15 Frequent Words

Word frequency analysis is a basic text analysis that identifies the most frequently used words in a given data set. This technique is very valuable in understanding the thematic elements of the text. This is because frequently appearing words often highlight main ideas such as emotions or motives. This analysis allows listeners or analysts to gain a deeper understanding of the artist's narrative and creative expression.

4.2 Sentiment Analysis

Figure 2 shows the distribution of sentiment in Taylor Swift's lyrics is as follows; positive sentiment at 29.3%, neutral sentiment at 54.6%, and negative sentiment at 16.1%. The dominance of neutral sentiment reflects his narrative-driven songwriting. This situation where scenes and stories are depicted without an overtly positive or negative emotional tone. Positive sentiments highlight uplifting themes of love, hope and joy, while negative sentiments explore weaknesses, sorrows and personal struggles.



Positive terms has a total of 1,899 words, including the terms "happy," "love" and "beautiful." Negative terms consist of 1,039 words, including the terms "cry," "bad" and "lost." Neutral terms make up most with 9,494 tokens. This gives richness and background to the story. This division shows how Taylor Swift achieves a balance of emotion in her writing. This forms a rich and relatable emotional terrain to its listeners.

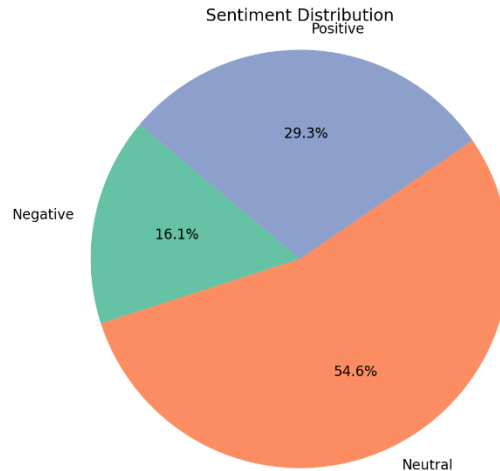


Figure 2: Sentiment Distribution in Taylor Swift's Songs

4.3 Emotion Analysis

Emotion analysis extends sentiment analysis by categorizing text into specific emotional states such as joy, sadness, trust, fear and anger. This approach helps reveal the depth of emotion conveyed in the body of the text. Using the NRC Emotion Lexicon, Taylor Swift's lyrics were analyzed to identify the frequency and salience of various emotions.

The emotion analysis in Figure 3 reveals a predominantly positive emotional spectrum across the dataset, with broad positive polarity leading at 18.5%, compared to negative polarity at 14.4%. Among specific emotional categories derived from the NRC emotion framework, joy (13.4%) and anticipation (10.2%) emerge as the primary drivers of the lyrical narrative, reflecting themes of optimism, romance, and forward-looking expectations. Conversely, emotional nuance is maintained through substantial representations of sadness (9.3%), trust (9.1%), and fear (8.6%), with anger (5.9%), surprise (5.9%), and disgust (4.7%) forming the lower threshold. These results demonstrate that while the lyrical content trends overall toward positive resolution, it maintains high thematic complexity by balancing uplifting emotions with elements of conflict, vulnerability, and heartaches.



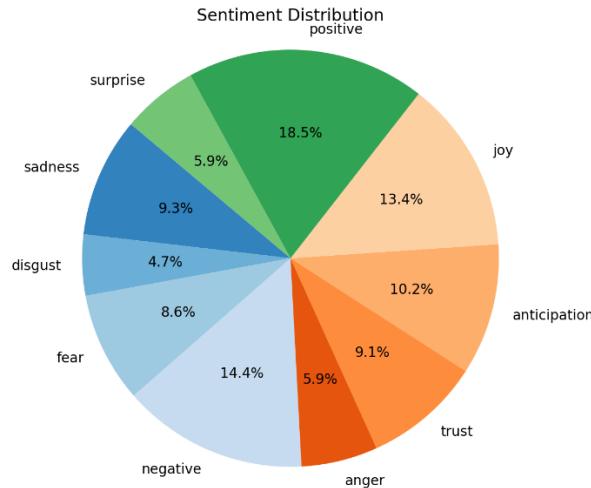


Figure 3: Emotion Analysis in Taylor Swift's Songs

When these lyrical emotions combine with music, such as bright melodies for happy words or slower tunes for sad words, they strongly influence how a person feels. Ultimately, applying sentiment analysis to lyrical content offers empirical evidence of how songwriters intentionally engineer thematic complexity, proving that the dual interplay of textual narrative and melodic framing is central to evoking, shaping, and regulating human emotional responses.

5.0 Conclusion

This paper focused on sentiment analysis in entertainment music specifically for Taylor Swift. By using NLP, specifically sentiment analysis, the lyrics could be easily classified into happiness, sadness, anger, fear, and surprise. It was observed that sentiment analysis may be useful for composers, listeners, and the overall music industry. The emotive power of the lyrics could help the composer connect with their audience more effectively. For listeners, sentiment analysis provided a way to find songs that would match their current emotional state and therefore enrich the overall experience of music listening. It allowed the music industry to understand more about market trends and preferences for certain emotions, thus enabling effective marketing and playlist curation. However, this study is limited to English-language lyrics. This means the results may not fully apply to songs in other languages, where cultural context and different ways of expressing emotions may affect how lyrics are interpreted. In the future, this research can be extended to include other languages by developing multilingual sentiment analysis tools. It would also be beneficial to combine lyric analysis with musical features such as rhythm, melody, and tempo to understand a song's emotional effect more completely.

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