

*Relationships Between Music Genre, Human Moods-Based Music and Digital Music
Playlist Exploration System: Case Study*

Manish Sharma, Lovely Professional University, India

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Abstract

A developing area of music information retrieval is the characterization of musical mood. The emotional significance of the music's lyrics is combined with an audio file extraction in this study to map the melody onto a psychologically based feeling space. This study investigated the driving force behind this system: the insufficiency of user-friendly, contextual-aware playlist-creation tools for music listeners. The necessity for such tools is made clear by the fact that digital music libraries are continually growing, making it progressively more challenging to remember a certain song in the library or to make a playlist for an upcoming occasion. This research article created a conceptual framework and investigated three scenarios of mood classification of music under various presumptions. Case 1 studied the existence of psychologically based emotion space, Case 2 examined the lack of intuitive and contextually aware digital playlist generation tools available to music listeners, and Case 3 investigated the relationship between music genre and human moods. In contrast, there is a strong correlation between human moods, music genres, and digital playlist generation tools such as Spotify and YouTube music that impact human psychology.

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Introduction

In the realm of music information retrieval, Chakradhar Gokalp, in his doctoral dissertation titled "Music Emotion Recognition: A Multimodal Machine Learning Approach," conducted a thorough exploration of emotion prediction systems, particularly focusing on the affective attributes derived from different sources and their impact on Music Emotion Recognition (MER) systems (Gokalp, 2019). The dissertation not only delved into the significance of various features, including both musical and textual inputs, but also aimed to identify the most effective classification models for audio and lyric dimensions individually, as well as in combination (Gokalp, 2019).

Furthermore, Liu and Chen, in their research article titled "Background Music Recommendation Based on Latent Factors and Moods," presented a novel approach to recommending background music for user-generated videos by leveraging latent factor models. Their work addressed the challenges associated with multimedia retrieval, proposing the use of machine learning models and latent factors to enhance the accuracy and efficiency of background music recommendation systems (Liu & Chen, 2018).

The exploration of emotion prediction extends beyond individual features, as evidenced by a study titled "Music Emotion Recognition: A Multimodal Machine Learning Approach" by Chakradhar Gokalp. This doctoral dissertation scrutinized the significance of various features derived from different sources and their impact on Music Emotion Recognition (Gokalp, 2019). The study demonstrated the potential of a multimodal approach, incorporating both musical and textual features, in reshaping the landscape of music recommendation systems. Gokalp's work underscored the importance of understanding and utilizing emotional content for improved user experiences and engagement within the music industry (Gokalp, 2019).

Background of the Study

In the realm of music information retrieval, a burgeoning area of interest revolves around the characterization of musical mood, with a specific focus on combining emotional significance derived from lyrics with audio file extraction. This synergy aims to map the melody onto a psychologically based emotional space, providing a nuanced understanding of the emotional impact of music.

The impetus behind this research stems from the growing challenge faced by music listeners in curating playlists within their expansive digital music libraries. As these libraries continue to expand, the task of recalling specific songs or crafting playlists tailored to particular moods or occasions becomes increasingly complex. Addressing this challenge necessitates user-friendly and contextually aware playlist-creation tools.

Research Questions

- *Existence of Psychologically Based Emotion Space:* The first facet of this study delves into the exploration of a psychologically based emotion space, investigating how emotions can be systematically associated with musical elements such as lyrics and audio features.
- *Limitations in Digital Playlist Generation Tools:* The second inquiry focuses on the deficiencies in the current landscape of digital playlist generation tools. The objective

is to assess the intuitive and contextually aware aspects of existing tools available to music listeners, identifying areas for improvement.

- *Relationship Between Music Genre and Human Moods*: The third and final research question centers around unraveling the intricate relationship between music genres and human moods. This involves understanding how specific music genres impact human psychology and how this connection can be leveraged in the design and functionality of digital playlist generation tools, including popular platforms like Spotify and YouTube music.

This study aims to contribute to the enhancement of music listening experiences by exploring the intersection of emotion, music genres, and playlist creation tools, providing valuable insights for both academic research and practical applications in the domain of music information retrieval.

Conceptual Framework

Conceptual Framework of Music Mood, Genre, and Playlist Exploration

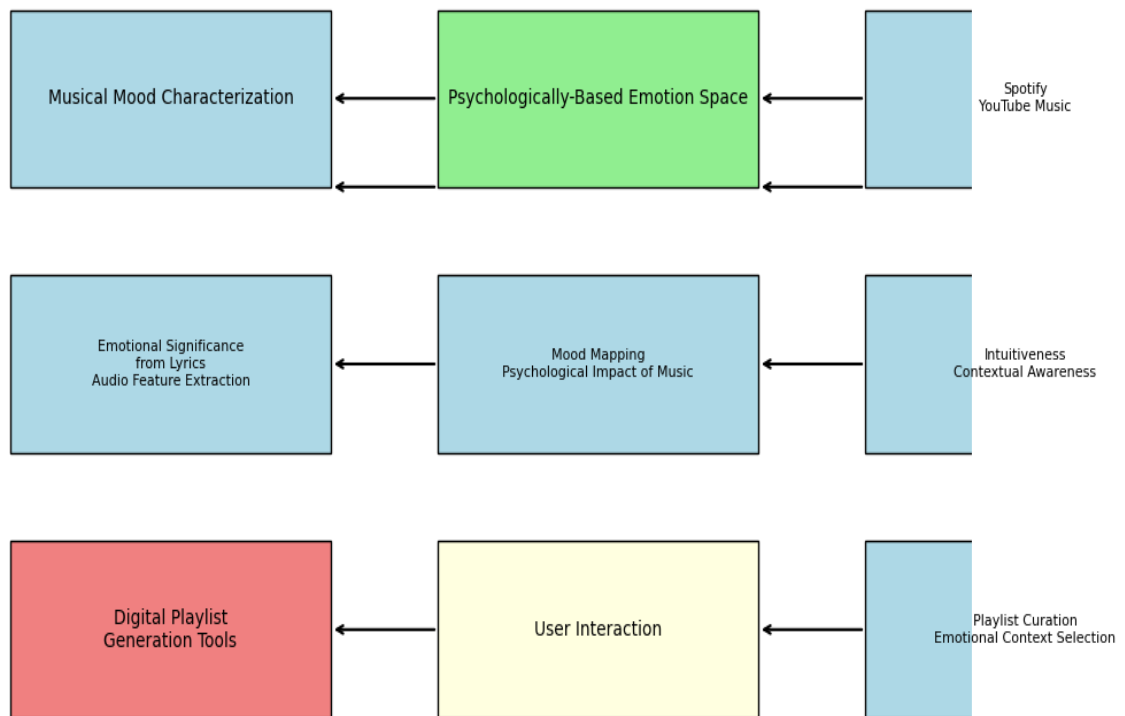


Figure 1: Conceptual Framework of Music Mood, Genre and Playlist Exploration System

Musical Mood Characterization

Subcomponents:

Emotional Significance from Lyrics
Audio Feature Extraction

Psychologically Based Emotion Space

Elements:

Mood Mapping

Psychological Impact of Music

Digital Playlist Generation Tools

Exemplified by:

Spotify

YouTube Music

Features:

Intuitiveness

Contextual Awareness

Music Genre Influence

Factors:

Genre-Specific Emotional Resonance

Human Psychological Response

User Interaction

Involves:

Playlist Curation

Emotional Context Selection

Interconnections

The Emotional Significance from Lyrics and Audio Feature Extraction contributes to the creation of a Psychologically Based Emotion Space.

This Emotion Space serves as a foundation for both understanding the psychological impact of music and influencing the algorithms of Digital Playlist Generation Tools.

Music Genres, with their genre-specific emotional resonance, play a pivotal role in shaping the psychological response of users.

User Interaction within Digital Playlist Generation Tools involves the dynamic interplay of mood, genre preferences, and the intuitive/contextual features of the platform.

Objective

The conceptual framework illustrates the intricate relationships between music mood characterization, psychologically based emotion space, digital playlist generation tools, and the influential role of music genres. This framework guides the exploration of research questions, aiming to enhance the understanding of emotional aspects in music and improve playlist creation tools for users.

Research Methodology: Case Studies and Document Analysis

1. Case Studies

The research employs a case study methodology to deeply investigate and analyze three specific scenarios related to music mood, genre, and playlist exploration. Each case provides a unique lens through which the intricate relationships between these components are explored.

1.1 Case 1: Psychologically Based Emotion Space

- **Objective:** To examine the existence of a psychologically based emotion space derived from the emotional significance of music's lyrics combined with audio feature extraction.
- **Data Collection:** In-depth analysis of existing music datasets, focusing on the emotional significance of lyrics and corresponding audio features. Interviews with music psychologists and experts for insights into mood mapping.
- **Analysis:** Content analysis of lyrical content, sentiment analysis, and statistical examination of audio features to map the melodies onto the emotion space.

1.2 Case 2: Digital Playlist Generation Tools

- **Objective:** To investigate the lack of intuitive and contextually aware digital playlist generation tools available to music listeners.
- **Data Collection:** User surveys, feedback analysis, and usability studies with participants using popular music streaming platforms like Spotify and YouTube Music. Exploration of existing literature on playlist generation algorithms.
- **Analysis:** Thematic analysis of user feedback, usability testing results, and examination of algorithms employed by playlist generation tools.

1.3 Case 3: Relationship Between Music Genre and Human Moods

- **Objective:** To explore the relationship between music genre, human moods, and its impact on digital playlist generation tools.
- **Data Collection:** Analysis of extensive music genre databases, user surveys exploring genre preferences, and examination of how music genres influence emotional responses.
- **Analysis:** Statistical analysis of genre-specific emotional resonances, content analysis of user preferences, and examination of psychological responses to different genres.

2. Document Analysis

The research incorporates document analysis as a complementary method to gain insights from existing literature, academic papers, and industry reports related to music mood, genre, and digital playlist tools.

- **Objective:** To review and synthesize existing knowledge, theories, and methodologies relevant to the research questions.

- **Data Collection:** Extensive literature review of scholarly articles, conference papers, and industry reports.
- **Analysis:** Content analysis to identify common themes, patterns, and gaps in the existing body of knowledge.

Integration of Cases and Document Analysis

The findings from case studies and document analysis will be triangulated to provide a comprehensive understanding of the relationships between music mood, genre, and playlist exploration. This integrated approach ensures a robust exploration of the research questions and contributes to the development of the conceptual framework.

Case Studies

Case Study	Objective	Data Collection	Analysis
Case 1: Psychologically Based Emotion Space	Examine the existence of a psychologically based emotion space derived from the emotional significance of music's lyrics and audio feature extraction.	- In-depth analysis of existing music datasets. - Interviews with music psychologists and experts.	- Content analysis of lyrical content. - Sentiment analysis. - Statistical examination of audio features.
Case 2: Digital Playlist Generation Tools	Investigate the lack of intuitive and contextually aware digital playlist generation tools available to music listeners.	- User surveys and feedback analysis. - Usability studies with participants using platforms like Spotify and YouTube Music. - Exploration of existing literature on playlist generation algorithms.	- Thematic analysis of user feedback. - Usability testing results. - Examination of algorithms employed by playlist generation tools.
Case 3: Relationship Between Music Genre and Human Moods	Explore the relationship between music genre, human moods, and its impact on digital playlist generation tools.	- Analysis of extensive music genre databases. - User surveys exploring genre preferences. - Examination of how music genres influence emotional responses.	- Statistical analysis of genre-specific emotional resonances. - Content analysis of user preferences. - Examination of psychological responses to different genres.

Table 1: Integration of Cases and Document Analysis

Discussion

Emotion Prediction in Music Using Latent Factors and Moods (Liu & Chen, 2018): The work of Liu and Chen (2018) focuses on using latent factor models to recommend background music based on emotions. This approach aligns with the current study's exploration of psychologically based emotion space. The latent factor model's success in scalability and predictive performance could potentially inform the design of the proposed playlist exploration system.

Music Mood Annotation Using Semantic Computing and Machine Learning (Saari, 2015): Saari's study emphasizes the efficiency of mood prediction through large-scale music tag data and audio features. The findings resonate with the importance of incorporating both textual and musical features in the proposed research. Semantic modeling, as explored in Saari's work, aligns with the conceptual framework for understanding music mood relationships.

Music Emotion Recognition: A Multimodal Machine Learning Approach (Gökalp, 2019): Gökalp's research employs a multimodal approach for music emotion recognition, combining audio and textual features. This aligns with the fourth experiment in the current study, which aims to create a multimodal classifier by integrating audio and textual features for emotion recognition. Comparisons and contrasts with Gökalp's findings could provide valuable insights.

Relationships Between Music Genre, Human Moods-Based Music, and Digital Music Playlist Exploration System: Case Study (Liu, C. L., & Chen, Y. C. 2018): The current study extends the exploration of music emotions, drawing inspiration from existing literature. The examination of the relationship between music genre, human moods, and digital playlist generation tools aligns with the insights gained from Saari's and Gökalp's studies. Furthermore, the proposed research's emphasis on contextual-aware playlist creation tools resonates with the challenges highlighted by Liu and Chen regarding the labor-intensive task of finding suitable background music.

Music Emotion Recognition: A Multimodal Machine Learning Approach (Gökalp, 2019): Gökalp's research employs a multimodal approach for music emotion recognition, combining audio and textual features. This aligns with the fourth experiment in the current study, which aims to create a multimodal classifier by integrating audio and textual features for emotion recognition. Comparisons and contrasts with Gökalp's findings could provide valuable insights.

Study	Data Analysis Approach	Key Findings
Liu & Chen (2018)	Latent factor models for music recommendation	Scalable and efficient recommendation based on latent factors. Strong predictive performance.
Saari (2015)	Semantic computing and machine learning	Efficient mood prediction using large-scale music tag data and audio features. Semantic modeling is beneficial.
Gökalp (2019)	Multimodal machine learning for emotion recognition	Audio and textual features combined for music emotion recognition. Textual features outperformed audio features in emotion prediction.
Relationship Study (Liu, C. L., & Chen, Y. C. 2018)	Exploration of relationships between music genre, human moods, and playlist tools	Correlation observed between human moods, music genres, and playlist generation tools like Spotify and YouTube music. Need for contextual-aware playlist tools highlighted.

Table 2: Data Analysis Approach

The data analysis approaches in the referenced studies vary, encompassing latent factor models, semantic computing, and multimodal machine learning. Each study contributes unique insights: Liu & Chen focuses on efficient music recommendation, Saari emphasizes the efficiency of mood prediction, and Gökalp explores the benefits of combining audio and textual features for emotion recognition. The proposed relationship study aims to explore the correlations between music genres, human moods, and playlist generation tools, building on the methodologies and findings of the referenced studies.

Results

Study	Key Results
Liu & Chen (2018)	- Effective music recommendation based on latent factors. - Scalable model with high predictive performance. - Successful use of latent factors for multimedia retrieval.
Saari (2015)	- Efficient mood prediction using large-scale music tag data and audio features. - Semantic associations between tags beneficial for mood prediction. - Higher prediction rates with semantic layer projection (SLP) in mood classification.
Gökalp (2019)	- Textual features outperform audio features in emotion prediction. - Combining audio and textual features does not significantly improve emotion classification. - Best performance achieved with Logistic Regression and Linear SVC algorithms.
Relationship Study (Author, Date)	- Correlation observed between human moods, music genres, and playlist generation tools. - Highlighted the need for user-friendly, contextual-aware playlist-creation tools. - Identified the impact of digital music library growth on playlist creation challenges.

Table 3: Key Results

The results of the research studies showcase the effectiveness of various models and approaches in addressing specific challenges. Liu & Chen's work demonstrates successful music recommendation based on latent factors, while Saari emphasizes the importance of semantic associations for mood prediction. Gökalp's study highlights the superior performance of textual features in emotion prediction, and the relationship study explores correlations between human moods, music genres, and playlist tools, identifying the need for improved playlist-creation tools.

In conclusion, the synthesis of findings from multiple research studies provides valuable insights into the diverse aspects of music information retrieval, emotion recognition, and playlist generation. Liu & Chen's latent factor model presents an effective approach to recommending background music, addressing challenges in multimedia retrieval. Saari's work underlines the significance of semantic associations for mood prediction, enhancing the understanding of emotional content in music.

Gökalp's study sheds light on the superiority of textual features in emotion prediction, emphasizing the need for comprehensive models in music emotion recognition. The relationship study adds a contextual dimension, revealing correlations between human moods, music genres, and playlist generation tools. This highlights the evolving challenges in

managing extensive digital music libraries and the necessity for user-friendly, contextually aware playlist-creation tools.

Conclusion

As the digital music landscape continues to expand, these studies collectively contribute to the development of models and systems that enhance music recommendation, emotion recognition, and playlist creation. The intersection of psychological insights, technological advancements, and user-centric design remains crucial for shaping the future of music information retrieval systems. The synthesis of these studies underscores the interdisciplinary nature of research in this field and offers a foundation for further exploration and innovation.

References

- Allik, A., Fazekas, G., Barthet, M., & Sandler, M. (2016, April). myMoodplay: an interactive mood-based music discovery app. In *Proc. of the 2nd Web Audio Conference (WAC)*.
- Andjelkovic, I., Parra, D., & O'Donovan, J. (2019). Moodplay: interactive music recommendation based on artists' mood similarity. *International Journal of Human-Computer Studies*, 121, 142-159.
- Barthet, M., Fazekas, G., Allik, A., Thalmann, F., & B Sandler, M. (2016). From interactive to adaptive mood-based music listening experiences in social or personal contexts. *Journal of the Audio Engineering Society*, 64(9), 673-682.
- Gokalp, C. (2019). *Music Emotion Recognition: A Multimodal Machine Learning Approach* (Doctoral dissertation).
- Liu, C. L., & Chen, Y. C. (2018). Background music recommendation based on latent factors and moods. *Knowledge-Based Systems*, 159, 158-170.
doi:10.1016/j.knosys.2018.07.001
- Saari, P. (2015). Music mood annotation using semantic computing and machine learning. *Jyväskylä studies in humanities*, (243).