

**ÇANKAYA UNIVERSITY**  
**COMPUTER ENGINEERING DEPARTMENT**  
**CENG 407**  
**2024-2025**  
**LITERATURE REVIEW**  
**EmoTagger-A-Community-driven-Emotion-Annotation-Tool**

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## Abstract

Music, as a universal medium of communication, has played a profound role in human history by deeply resonating with individuals' emotional worlds. With the advancement of technology, digital music platforms have transformed the way people interact with music, offering an opportunity to explore the emotional connections they establish with songs. Today, approaches to analyzing music's impact on individuals' moods have gained importance, especially in research that aims to better understand listener psychology and preferences.

This project involves the development of a music survey application that gathers feedback from users about the songs they listen to, aiming to capture the emotional effects these songs evoke. The survey results reveal that users respond to music not only with primary emotions like happiness, sadness, or energy, but with a broader spectrum of emotions shaped by personal experiences. This highlights the multidimensional impact of music on individuals and underscores the need to analyze diverse emotional responses among users.

The next phase of the project involves developing a website and mobile applications to make these survey-based analyses accessible to a wider audience and to enrich user experience. Through these platforms, individuals will be able to experience music from various emotional perspectives and share their musical experiences within a community. This study aims to deepen the understanding of the connection between musical preferences and emotional responses, offering new insights into the psychological impact of music based on extensive data.

## Literature Review:

### Crowdsourcing and Data Annotation in Music Labeling

Crowdsourcing is an innovative method for harnessing the collective power of diverse groups worldwide through internet platforms. It enables people to participate by decomposing difficult tasks into smaller, more manageable components. It enables people to effectively contribute data, opinions, and information by decomposing difficult tasks into smaller, more manageable components. "Crowdsourcing involves seeking knowledge, goods, or services from a large body of people." [1] This approach produces richer, more responsible data and is consistent with the "wisdom of the crowd" theory. Crowdsourcing's cost-effectiveness, speed, and diversity make it increasingly valuable for large-scale data collection, giving organizations affordable access to a wide range of expertise. Most crowdsourcing projects revolve around four core concepts: gaining wisdom or knowledge through problem solving; creating new content, such as through wikis; voting on policies or people; and crowdfunding,

which involves raising money for various purposes, usually by collecting small amounts from a large pool of people.[2]

By allowing individuals from various cultural and personal backgrounds to tag music according to their emotional perceptions, crowdsourcing is crucial to our project's goal of creating a rich and varied emotional dataset. "By improving the dataset, learning applications can become more effective and personalized. Using a diverse emotional dataset improves the accuracy and efficiency of machine learning and AI applications. This allows us to better analyze different emotional interpretations." [3] We hope to achieve a wide range of emotional interpretations by requesting contributions from a diverse user base, reflecting the ways in which different audiences perceive music. Crowdsourced data labeling harnesses the power of the crowd to expedite the process. Crowdsourcing platforms engage a large-scale diverse pool of human annotators from around the world, each contributing their skills and knowledge. [4] The dataset will be enhanced by this inclusivity, increasing its value for machine learning applications that need a variety of emotional data. Crowdsourcing platforms engage a large-scale diverse pool of human annotators from around the world, each contributing their skills and knowledge. A greater diversity of labelers can offset the potential for unconscious biases of any particular types of people to influence datasets.[5]

## How Crowdsourcing Works for Music Labeling

In music, data tagging is a process used for this purpose, which allows machine learning models to learn musical features. Different types of tagging, such as note recognition, chord detection, tempo analysis, and even genre classification, allow for deeper analysis of music data.[6] Crowdsourcing tagging often uses methods such as voting or surveys, allowing users to efficiently categorize content. As part of our project's crowdsourcing implementation, users will be asked to tag each track with the emotion they believe best expresses it. Similar to community-driven platforms like Last.fm, this tagging process uses subjective feedback from a large audience to produce a robust dataset that captures subtle variations while highlighting common emotions. Data quality is also an important factor that directly affects tagging results. Incorrect or incomplete tagging can negatively impact the performance of machine learning models.

## Data Annotation in Music

Data annotation, specifically for audio and music, involves categorizing and tagging audio files manually based on predefined criteria. Users who assign emotions to musical tracks will provide crowdsourced input for our project's emotional labeling. This annotated data then becomes training material for AI systems, helping them recognize and classify emotions in music more accurately. This method bridges the gap between objective machine learning

and subjective human experiences by utilizing crowdsourcing for AI development.

## Music and Emotion Analysis

Recent studies have highlighted that music evokes a range of emotional states (e.g., joy, sadness, anxiety), and cultural factors influence how listeners from different backgrounds perceive these emotions. For instance, both Chinese and U.S. listeners may recognize a piece as joyful or angry, though cultural nuances affect whether they view these emotions favorably or unfavorably. For instance, applications can analyze user preferences and emotional responses to music, tailoring playlists or recommending new songs that align with the user's current emotional state. [7] Researchers can quickly and cheaply gather this subjective data using crowdsourced platforms like Amazon Mechanical Turk[8], which is a great resource for creating algorithms that can suggest music based on users' moods. As this field continues to evolve, it promises to bridge the gap between human emotions and technological advancements, leading to more intuitive and empathetic software solutions [8]

## Practical Applications and Benefits of Crowdsourcing for Our Project

Crowdsourcing is essential to our project's creation of an extensive, culturally diverse dataset for the classification of emotional music. This variation in emotional labeling aids in the creation of music platform recommendation systems, enabling tailored, mood-based music recommendations. The value of crowdsourcing in user-driven data collection is further demonstrated by its facilitation of psychological applications, such as the therapeutic use of music to elicit or regulate emotions. By leveraging the power of crowdsourcing, we can gather a massive amount of data from individuals with diverse cultural backgrounds and musical preferences. This diverse dataset will allow us to identify nuanced emotional responses to music, going beyond broad categories like "happy" or "sad." We can explore more specific emotions like nostalgia, anger, or tranquility, providing a richer understanding of the emotional impact of music. Furthermore, crowdsourcing can help us uncover cultural differences in music perception. Different cultures may associate certain musical elements with different emotions. By analyzing the responses of participants from various cultural backgrounds, we can gain insights into these cultural nuances and develop more accurate and culturally sensitive music recommendation systems.

## Gamification for Enhanced Engagement

To keep users motivated, our platform incorporates gamification elements such as points, badges, levels, challenges, and leaderboards. These features encourage users to contribute more labels, fostering a sense of achievement and community participation. This combination of crowdsourcing and gamification aims to maximize label accuracy, user engagement, and dataset volume. By providing immediate feedback and recognition, gamification elements incentivize users to actively participate and contribute to the project. This creates a positive cycle where users are motivated to label more music, leading to a higher-quality dataset and a more engaging user experience.

## Conclusion

Crowdsourcing in music annotation allows us to efficiently gather emotional labels from a diverse audience, yielding a data-rich foundation for training AI systems to recognize and categorize music by mood. The gamified approach incentivizes contributions, enhancing both the volume and quality of data collected. Ultimately, our project aims to advance the field of emotional music analysis, benefiting AI research, music recommendation algorithms, and therapeutic music applications.

## References:

- [1] <https://www.braineet.com/blog/crowdsourcing>
- [2] <https://www.britannica.com/money/crowdsourcing>
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