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AESTHETICS RESPONSE TO MUSIC

A PILOT STUDY ON RABINDRASANGEET WITH LISTENING TEST

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Abstract: The beauty of music lies in its ability to express our thoughts, feelings, and emotions in a deeply meaningful way. There are various ways like lyrics, melody, harmony, tempo, rhythm, dynamics that are powerful medium for expressing inner thoughts and aesthetic emotions. Rabindranath Tagore had profound insights into the art of music that can be explored through the lens of musical aesthetics. Tagore songs (Rabindrasangeet) always evoke deep and different emotions within us, guiding us through every stage of our lives. In this work, we have tried to identify the correlation between aesthetics and different parameters like emotion, melodic features, rhythmic features, lyrics etc., using Rabindrasangeet as the input media. No such work has been reported so far, to the best of our knowledge and we hope this novel venture contributes significantly to this field and put forward some new information regarding musical aesthetics.

Index Terms - Rabindrasangeet, Musical aesthetics, Audience-response, Tempo.

I. INTRODUCTION

Since the onset of human civilization, artistic and aesthetic activities have been deeply associated with human lives. Excavations show carefully curated weapons, uniquely designed tools, utensils, various styles of garments, ornaments, from over 100,000 years ago. All these boil down to the basic concept of using color, proportion, design, rhythm etc. to add beauty to our daily lives, and this has been in practice for over centuries now. When it comes to any art form, the ultimate aim is to always generate a feeling of beauty. This sense of beauty, which comes hand in hand with artistic mastery is what greatly influences the aesthetic experience from that particular art form. Right from the time of carving in cave walls, inventing calls for communication of different kinds, humans have showed a natural affinity towards expressing their inner imagination with the help of 'Arts' and thus this has become a fundamental aspect of our species' biological and cultural heritage.

Art and aesthetics, therefore, contribute to our species' identity and distinguish it from its living and extinct relatives. Aesthetics is generally considered to be a subjective parameter, and often correlated with the sense of beauty generated within every individual separately. Since this perception of beauty, artistic value, and likability of factor towards any art form is influenced to a large deal by personal experience, taste, perspective, cultural and socio-economic backgrounds of every human, it is very difficult to generate or even propose a generic algorithm to identify or compute the parameters governing aesthetic quotient of any art form. But, there are still certain parameters like color, melody, rhythm, tempo, proportion etc., which are believed to contribute significantly to the aesthetic appeal of different art forms, highlighting the objectivity of aesthetics as well. It can thus be stated, that both subjectivity and objectivity work in a balanced blend during aesthetic experiences.

Music, like any other art form is deeply connected with aesthetic experiences along with emotional perceptions. Music can strongly evoke visual imagery, with studies showing that listeners often experience story-like imagery or visual narratives while listening, leading to a phenomenon popularly known as "films in your mind's eye". This experience can be both unique for a particular individual, or common for a large audience. The emotional content of music plays a significant role in shaping the type of visual imagery evoked. For example, calm music might evoke imagery related to nature, relaxation, or spirituality, while sad music might lead to images of pain, agony, or desolate landscapes. Also, since music is a very powerful tool to evoke imagination, this triggers visual imagery which in turn affects the aesthetic experience as a whole.

Music, like a language can both express and induce [1]. Numerous studies have investigated how different musical variables (e.g rhythm, tempo, dynamics etc.) are directly related to the perception of emotions of different shades [2]. Also, the fact that different music-generated emotions are majorly influenced by the tempo of the melodic piece [3-5] is also a greatly researched topic. Happiness and sadness have been respectively linked to fast and slow tempo in music through strong associations. Ratings of happiness and peacefulness have similarly been linked to simple melodies with fewer variations in melodic contour and more repetition; the relationship between complex melodies, which have more variation and less repetition, and perception of sadness and anger has been studied, similarly the connection between regular rhythms and positive moods, as well as irregular rhythms and negative moods, has also been investigated. Since, emotional and aesthetic experiences are interlinked, it is important to study both the topics together. Similarly, a deep understanding of how tempo is perceived by human is also essential to study the emotional appraisal and aesthetic appeal of the melodic piece played.

There has been certain works exploring the correlation between melodic renditions and aesthetic experiences generated from those. Going back to the eighteenth and nineteenth century, detailed works have been reported on this domain [6-8]. In the twenties, this field has seen more exploration, with studies on aesthetic experience from different musical genres like rock [9, 10], jazz [11]. Comparative study of musical aesthetics and musical parameters contributing to this has been reported between Western and Chinese music [12]. Aesthetics and musicology relation has been explored in a celebrated book [13]. In case of Indian music also, certain interesting works have been reported so far [14, 15], including some reports on Hindustani Classical Music [16]. In this work, we have worked with Rabindrasangeets, one of the most popular genre of Indian Music, with the aim to understand what roles different musical parameters and emotions play on the overall aesthetic quotient of the chosen compositions.

One of the most celebrated Indians of all times is the renowned poet, philosopher [17] and composer Rabindranath Tagore (1861-1941). Other than being a prolific poet [18], he wrote novels, short stories, essays, dramas, and composed numerous songs, and his collection Gitanjali (Song Offerings) brought him international recognition and the Nobel Prize. He composed the national anthems of both India ("Jana Gana Mana") and Bangladesh ("Amar Shonar Bangla"). Tagore was a philosopher and educator who founded Visva-Bharati University, aiming for a holistic approach to education. He was a social reformer who advocated for social justice and human dignity. Tagore was also a painter, and his artwork is known for its expressive style. Due to his immense knowledge and contribution to the field of poetry, he is known as "Kabiguru" (teacher of poetry) and "Biswakabi" (world poet).

Tagore was an exceptional individual, and one of the very few persons with the magical ability to compose thousands of songs and poems depicting different emotions, stories, narratives, historical events etc. Each creation of his is a masterpiece of supreme aesthetic appeal. Over centuries, his songs are relevant even in current times. To explore the aesthetic feature of music, his creations are most suitable to be used as inputs. His compositions are adorned with pleasant melodic tunes and lyrics portraying visual imagery of different kinds, and strong emotional appreciation is associated with almost all his creations. Even if a song feels sad, it still feels beautiful! This is a prime concept of aesthetics, which says that no matter what the conveyed emotion is, the sense of beauty is what mediates the aesthetic experience associated with the music. Since Tagore's songs are rich musically, lyrically and also emotionally, it will be easier for us to study how different parameters influence the aesthetic parameter. In this work, we have tried to identify the correlation between aesthetics and different parameters like emotion, melodic features, rhythmic features, lyrics etc., using Rabindrasangeet as the input media. No

such work has been reported so far, to the best of our knowledge and we hope this novel venture contributes significantly to this field and put forward some new information regarding musical aesthetics.

II. EXPERIMENTAL PROCEDURE

All the steps followed for the study are discussed below in details.

2.1. Selection and preparation of audio clips

In this study, we have taken vocal renditions of four popular Rabindra Sangeets, which are given below-

1. Hare re re re re
2. Hridoy amar nachere
3. Amar praner pore
4. Ratri eshe jethaye meshe

To prepare the musical clips, which will be next used as the input signals for the study, the first stanza of all 4 songs were recorded by a trained vocalist, without of any kind of instrumental arrangement. Each clip was approximately of 60 secs duration, and was recorded in a sound proof, professional studio. Finally, all clips were normalized using audio-editing software, Wavepad.

2.2. Audience Response Survey

All four recordings were played to a large audience pool and an extensive emotion-marking survey was performed with 100 Bengali-speaking participants.

For each of these chosen clips, every participant was provided with a questionnaire with seven emotions- happy, sad, calm, anxiety, romantic, devotion and excitement, and was asked to mark the intensity they felt most strongly for each emotion, on a 5-point Likert scale, where 1 to 5 ratings correspond to intensity very low, low, moderate, high and very high intensities respectively.

The participants were also asked to mark according to their individual perception, the aesthetic appeal of each clip, tempo or speed of the clip, time of pause on individual notes, and the time of transition between two notes on a similar Likert-scale of 1 (very low) to 5 (very high) ratings.

A sample questionnaire is shown in the Appendix section at the end of the paper.

From the total response of all the participants, the weighted average intensity of each term was calculated and reported, the details of which are explained in the 'Results and Discussions' part of the paper. The following section discusses the computational techniques applied on the responses collected from the survey.

2.2.1. Calculation of weighted average intensity-

The following formula was applied to calculate the average intensity of each term;

$$(AI)_k = (in_i)/N$$

Where, $(AI)_k$ = weighted average intensity of k-term, and k= happy, sad, calm, anxiety, romantic, devotion, excitement, aesthetic rating, tempo, pause of individual note, and transition time between notes

i= Likert rating (i=1,2,3,4, and 5)

n_i = no. of participants marking i^{th} Likert Rating for the k-term under study

N= Total no. of participants

From the average intensity marking of all the terms, an overall idea could be generated regarding the emotional and aesthetic appraisals perceived by unbiased, non-musician audience, in response to all four songs.

It should be kept in mind here that the responses for the tempo-related terms have been marked by untrained audience, simply from the perception point of view. We have tried to capture how tempo is perceived by unbiased listeners, only by listening to a melodic piece, and not with the help of any tempo-determining software or device. What they feel about the tempo, how long they feel each note is been sung, and also how long they feel it is taking to move from one note to another, are the prime points of interest here. We have attempted to determine how tempo-perception is related with aesthetic rating of musical clips from the responses of these terms, which have been computed from the survey responses with the similar technique explained above.

2.2.2. Calculation of m/M ratio

Next, from each rendition, the m/M ratio was calculated which works as a musical signature of the used rendition. Here, m refers to the number of ‘komal/tivra’ or ‘flattened/sharp’ notes used and M refers to the number of ‘suddha’ or ‘major’ notes used. This ratio has been elaborately discussed in some works [19, 20] and we have used similar concepts to explore whether value of this ratio plays any correlation trend with the conveyed emotion and aesthetic appeal of the chosen compositions.

Results from both the parameters explained above were compared to correlate emotional appraisal, tempo-perception and other musical parameters with the overall aesthetic experience corresponding to each song.

III. RESULTS AND DISCUSSIONS

First, the average intensity marking of the 7 emotion-terms were plotted for all four songs, which are shown in the bar-plot below.

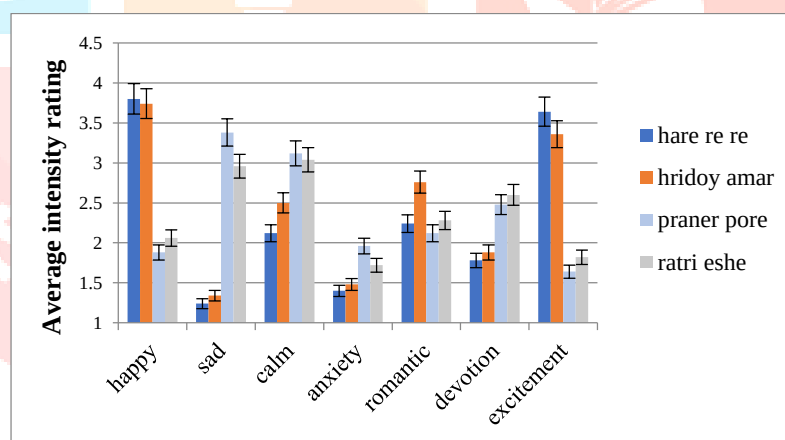


Fig 1. – Average intensity rating for 7 emotions from the Rabindrasangeet Listening Test

From the plot above, certain conclusions can be made. The first two songs, ‘hare re re’, and ‘hridoy amar’ show higher marking for ‘happy’ emotion, along with prominent co-elicitation of excitement and romantic emotions. Whereas, the other two songs, ‘amar praner pore’ and ‘ratri eshe’, show prominently higher marking for ‘sad’ emotion, along with distinct co-elicitation of ‘calmness’, ‘anxiety’, and ‘devotion’.

We can now designate ‘hare re re’ and ‘hridoy amar’ as the happy-clips and ‘amar praner pore’ and ‘ratri eshe’ as the sad clips. Next, we move on to the results of aesthetic rating of the clips, along with the ratings of the other three terms, signifying three kinds of tempo, as perceived by untrained audience. Finally, we plot the computed m/M ratio value for all four clips, with the aim to explore any existing correlation between aesthetic rating of clips and this parameter.

All results are explained in the plots below. First we discuss about the response trends of ‘happy clips’.

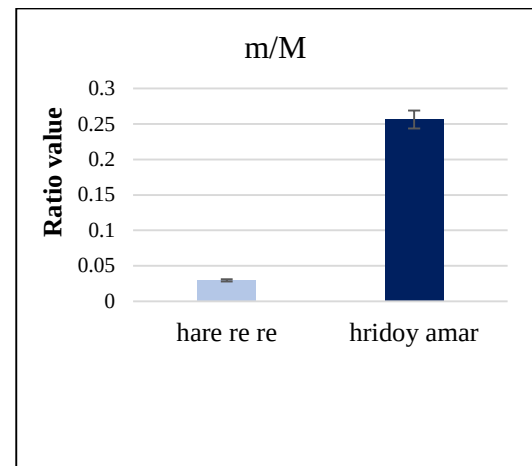
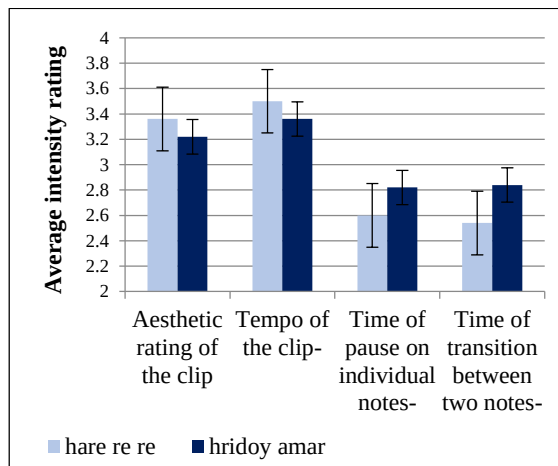


Fig 2.1. – Aesthetic rating from the Listening Test of ‘happy clips’

Fig 2.2. – m/M ratio of ‘happy clips’

As can be see here, the clip with higher aesthetic rating, (hare re re) has corresponding higher rating for tempo and lower rating for ‘Time of pause on individual notes’, ‘Time of transition between two notes’, and also m/M ratio. Thus for happy clips, it can be said that the aesthetic quotient of a clip varies directly with ‘clip-tempo, and inversely with ‘pause-time on individual note’, ‘transition-time between notes’, and ‘m/M ratio’.

Next, we discuss about the response trends of ‘sad clips’.

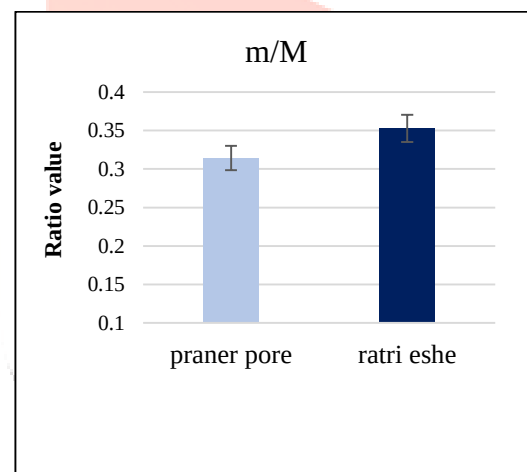
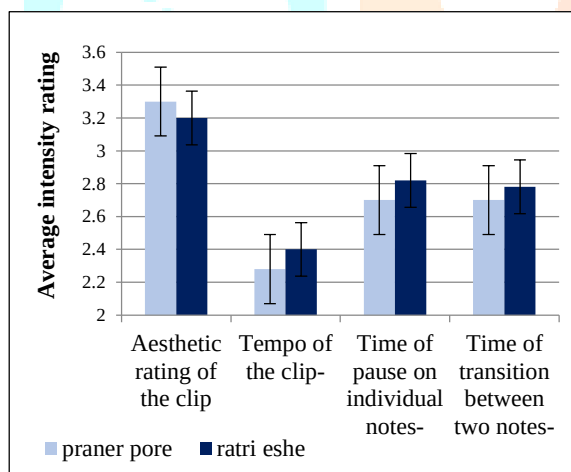


Fig 3.1. – Aesthetic rating from the Listening Test of ‘sad clips’

Fig 3.2. – m/M ratio of ‘sad clips’

As can be seen here, the clip with higher aesthetic rating, (praner pore) has corresponding lower rating for ‘Tempo of clip’, ‘Time of pause on individual notes’, ‘Time of transition between two notes’, and ‘m/M ratio value’. Thus for sad clips, it can be said that the aesthetic quotient of a clip varies inversely with ‘clip-tempo’, ‘pause-time on individual note’, ‘transition-time between notes’, and ‘m/M ratio value’.

IV. CONCLUSION

This study is a first of its kind attempt to correlate aesthetic rating of popular Rabindrasangeets with emotion, tempo-parameters, and note-blueprint designated by the m/M ratio. The following conclusions can be summarized.

First, we discuss the subjective properties, as obtained from the audience response ratings.

- i. Clips with prominent elicitation of happiness as the primary emotion, show distinct co-elicitation of secondary emotions like romantic and excitement.
- ii. For clips emoting happy emotion, aesthetic quotient varies directly with 'clip-tempo', and inversely with 'pause-time on individual note', 'transition-time between notes'. Thus, clips characterized with overall high tempo along with lower pause time on individual note and also lower time of transition in between notes, show higher rating of aesthetic appeal.
- iii. Clips with prominent elicitation of sadness as the primary emotion, show distinct co-elicitation of secondary emotions like calm, anxiety and devotion.
- iv. For clips emoting sad emotion, aesthetic quotient of a clip varies inversely with 'clip-tempo', 'pause-time on individual note', 'transition-time between notes'. Thus, clips characterized with overall low tempo, lower pause time on individual note and also lower time of transition in between notes, show higher rating of aesthetic appeal.

Results obtained from Audience-response data show interesting correlations between the aesthetic quotient of a clip, and perceived parameters like emotions elicited, 'tempo of the clips', 'pause time on individual note', and 'transition time in between notes'.

It can be distinctly seen that aesthetic appeal of happiness eliciting clips chosen increase with increasing clip-tempo, and decrease with increasing 'pause time on individual note' and 'transition time in between notes'. Similarly, aesthetic appeal of sadness eliciting clips chosen increase with decreasing clip-tempo, 'pause time on individual note' and 'transition time in between notes'.

Next, we also summarize the correlation between aesthetic rating of the melodic pieces with the m/M ratio

- i. For clips emoting both happy and sad emotion, aesthetic rating shows inverse relation with this ratio, i.e., for higher ratio (higher number of m or 'komal' notes), aesthetic rating gets reduced. Thus, in general it can be inferred that for the chosen melodic pieces, aesthetic rating shows lower marking when the number of 'komal' or 'tivra' notes get increased within the rendition, and this trend remains unaffected with changing emotion evoked by different melodic pieces.

V. SCOPE OF FUTURE WORK

There is a huge possibility of further studies in this field. We have worked with only 4 Tagore songs in this pilot study, and have chosen only popular songs to start with. This work can be extended to a greater set of songs, and can also be extended to Rabindrasangeets of different Porjay as mentioned in Geetobitan, emoting more layered emotions, and also with songs based on different Indian Ragas. Further, this type of aesthetic exploration should be done in case of Indian Classical music, which are aesthetically very rich and no research has been reported yet.

If we can work with a greater dataset of songs, emotional response and tempo-perception ratings, we might be able to identify and propose a generic correlation trend between the different musical parameters, emotional labels associated with music and the corresponding aesthetic experiences.

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APPENDIX

Table A1. Sample Questionnaire for Audience Response Survey

	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)
Happy					
Sad					
Calm					
Anxiety					
Romantic					
Devotion					
Excitement					
How would you mark the aesthetic quotient of the clip played?					
What do feel think about the tempo of the clip played?					
How long do you think the time of pause on individual note is?					
How long do you think the time of transition in between notes is?					