

# Mood on Keroncong Music

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# A Method of Mood Classification on Keroncong Music

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**Abstract**— Some researchers in Indonesia use keroncong music for depression reduction therapy in elderly and others. It is believed that keroncong music affects someone's mood. This research will classify mood of keroncong music in Thayer model, computationally, by median. MIRToolbox in Matlab used to feature extraction of keroncong music. Median values used to classify mood of keroncong music in Thayer model. The results of this research are expected to support other researchers related to the success of music therapy to reduce levels of depression in elderly.

**Keywords**—mood classification; mood music; median; music retrieval; mirtoolbox; thayer model mood; keroncong music

## I. INTRODUCTION

Music therapy can effectively overcome various depressive disorders including severe depression, as well as depression in elderly even with neurological disorders (stroke, dementia) [1]–[3]. Music therapy has been widely used to heal depression [4] with a common method is listening to music [3]. This widespread use is due to the excellence of safe and manageable music therapy [5] [6]. Various types of music that are considered qualified to be used for therapy [3], [4], [7], while [8] in his research uses a kind of music that is considered soothing without detailing the type of music. According to [9], acceptance of music is affectively determined by the cultural tradition rather than the quality of the music itself. This finding gives an idea to [6] to do a research on music therapy to reduce depression and stress levels by using local music, namely Raga's, classical music from India. Similar research also has been done with different research object [10]. Previous literature focused on music therapy to reduce symptoms of mild depression and a seasonal mood disorder in the elderly with Chinese local music [1].

In Indonesia there are several kinds of research on music therapy to reduce depression score with local music, which are utilizing keroncong music [11]–[13] and traditional Javanese music [14], [15].

Mood perception and its relation to local music were investigated by [16]. The method they used is collecting the opinion of the respondents, the listeners who have been selected. This is very subjective because the results depend on the culture, education, personality, and personal experience of

the respondents [17], [18]. Therefore, an objective method for classification is required in mood perception. Objective classification, in this case, can only be done computationally without involving human feelings. Related research has been conducted [17]–[22]. Some researchers are based on the classification of mood perceptions using Thayer model [17], [18], [21], [22]. It is because the Thayer model already covers all the basic moods that respond to music [17].

So far, there is no research on classifying mood perception on local Indonesian music, especially keroncong music. Keroncong music is chosen because it is Indonesian original music and also used for music therapy, especially for depression therapy as done by [12], [13], [23]. This paper will discuss classifying mood perception Thayer model based on Keroncong Music, computationally.

## II. RELATED WORKS

11 The relationship between music and mood has been studied for a long time. [24] began his research in 1935 and a year later [25] found 8 (eight) groups consist of 66 adjectives describing the mood of the music and creating the cycle. These eight groups of adjectives were corrected and grouped into nine groups of 50 adjectives [26]. The adjectives used to describe the mood are very free and numerous. Fortunately, as explained by [17], there is a study of the fundamental emotional dimensions done by [27] coupled with research conducted by [28] which provides the base of mood taxonomy as well as some important computational modeling cues for the classification of mood perceptions. However, there is no acceptable standard of mood taxonomy [17].

The identification of the mood of the music is important for human especially for music search and organizing [29]. This is because humans want to listen to music in accordance with the mood at the time [30]. This can underlie the music used for therapy.

Music therapy successfully reduced levels of depression associated with mood [4]. There is a mood change in elderly while listening to Javanese Langgam music that has a slow and regular tempo (about 60 beats per minute). Therefore, based on a statistical evaluation, it reduced the level of anxiety in the elderly [14], [15]. Similarly, [3] and [7] said that listening to music could affect and improve the mood that [3]

asserts as a healing process. It is because tempo, loudness (sound level), spectrum (timbre), and articulation affect the expression of one's emotions [19].

Research related to the influence of music including local music to the psychological condition of the individual has been widely practiced. The results of these researchers are summarized by [13] as the emergence of physical and mental reactions in response to music. These reactions can be a calm, relaxation or a change in the rhythm of breathing, blood pressure and blood flow to the heart and hormone production which lead to better mood changes. These reactions are also presented by [11], [14], [15].

Another research was conducted by [20] who successfully automatically extracted the various expressions of emotion inherent in a work of music embodied in the form of human facial expressions in a 3D model. Previously, [17] stated that it is possible to establish a mood perception classification system in certain contexts, in this case: classical music in western culture. He provided a method to automatically classify mood perceptions from music data based on Thayer model. Similar research with different contexts has been done by [18] who provided a method for automatically classifying mood perception on Indian Bollywood music based on Thayer model. This model has also been used by [21] as a model to track mood changes in a musical composition, especially western classical music. [22] also used the Thayer model to perceive the mood of western music and Indian music.

There are many researchers on music related to human mood, but those which use Indonesian music such as keroncong music haven't been found. There has been a lot of researchers on keroncong music for therapy, one of them was conducted by [31] who found that keroncong music positively influences performances of data input operators because it can reduce stress and monotony of work. While other researchers more on elderly as done by [12] and [13] who found that keroncong music reduced the level of depression in the elderly. In addition, keroncong music can also reduce the incidence of insomnia in the elderly as proposed by [32]. Decreasing levels of anxiety in the elderly were also successfully performed with keroncong music therapy by [23].

### III. MUSIC AND MOOD

Characteristics of music such as rhythm/tempo, melody, harmony, pitch, and timbre have an important role in the physiological and psychological functions of humans, so as to create mood changes [33]. They can be used to communicate the mood of the music to the listener. Several kinds of research have been done, especially the computing mood classification using acoustic characteristics [19].

At the psychological level, music can involve multiple social functions, improve communication and social cohesion, and can promote empathetic relationships, especially in an active music therapy approach. While from a rehabilitative point of view, music can affect motor function and regulation. This effect is associated with pleasure so that positively affects the mood and causes the healing process to occur [3].

Thayer model is used as the base for the classification of the human mood to music or to create a mood classification of music to facilitate the search for music and organizing. This is because the four clusters already cover all the basic mood that responds to music [17].

Fig. 1 shows the Thayer model rewritten by [17] and drawn by [22]. There are two basic stimuli affect the mood response, namely Stress, and Energy. From left to right represent pleasant to unpleasant, and from bottom to top show Calm to Energetic. Four quadrants represent happy-energetic (Exuberance), happy-quiet (Contentment), tense-energetic (Anxious / Frantic), and tense-quiet (Depression). It should be noted that the names of each dimension and each cluster are not the same (varies) in different literature. For example, the Energy dimension is also referred to as Arousal or Activity Level, while the Stress dimension is also called Pleasure or Valence. In Fig. 1, all names are attempted to be written.

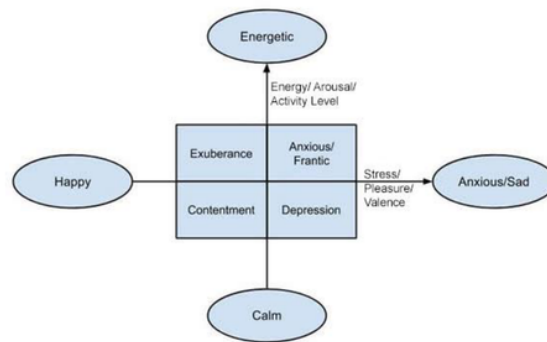


Fig. 1. Thayer model for classification mood [22]

For classification music mood computationally, [22] extracted 4 (four) features based on the mood that represents the basic moods, which are intensity, timbre, pitch, and rhythm. While [17] and [18] extracted 3 (three) features only, which are intensity, timbre, and rhythm. They are very important because affect the particular mood.

The mood grouped into two major groups, namely Group 1: Contentment and Depression and Group 2: Exuberance and Anxious / Frantic [17]. For mood classification of a music, [17] provided the basic rules, if the intensity is low, then the music will be grouped into Group 1 (Contentment and Depression). If the intensity is HIGH, then the music is grouped into Group 2 (Exuberance and Anxious / Frantic). While [18] provided other which are if music has a rhythm with LOW/SLOW tempo, it will be grouped into Group 1. If music has a rhythm with a FAST/HIGH tempo, it will be grouped into Group 2. Combining basic rules from [17] and [18] will be used in this research.

### IV. METHOD

86 songs of Keroncong music are collected from various sources, ranging from CD to downloaded music files from youtube. This collection then cleaned from the duplicate, so only get 1 version of the song per title, because, at the time of



collecting song, there are some songs with same titles with different versions, especially at tempo. Therefore, must choose one of the songs only. The selection method is random, not based on the version of the songs.

Finally obtained 78 songs of keroncong music which then extracted their features: intensity and tempo. Intensity and tempo are gained by computing RMS (Root-Mean-Square) as well as did by [22] and [18]. This work done by MIRToolbox in MATLAB [34].

The data of each feature extraction are saved to Microsoft Excel that will be classified. Method to classified the data is by Median as [35] did, which were divided the data into two sub-data. The LOW if it is less than the Median value, and the HIGH if it is the opposite. This is to determine the group mood of a song, whether grouped to Group 1 (Contentment and Depression) or Group 2 (Exuberance and Anxious / Frantic). This illustrated in Fig. 2.

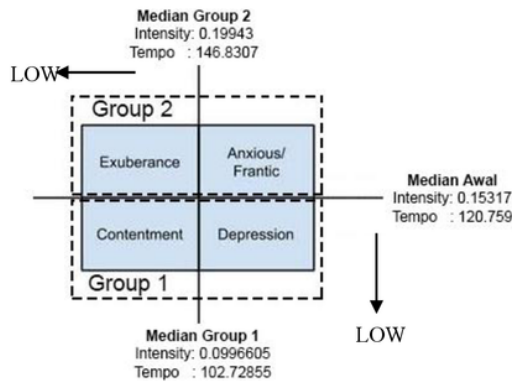


Fig. 2. The Median value for grouping mood

With this classification, there are songs that are contradictory, which have LOW Intensity, but HIGH tempo, whereas the song must meet LOW on both Intensity and Tempo as well as for HIGH. This is to accommodate the basic rules given by [17] about the intensity and [18] about the tempo, which must have the same category for both Intensity and Tempo, to be able to group in one of the mood groups.

To do this, author developed an algorithm that implemented in Microsoft Excel's Visual Basic Macro. The algorithm will match one by one song title which had the same intensity and tempo. If the intensity and tempo both were the same, then the song title will be saved. The song title then stored in a specific column in the worksheet. With this algorithm, many songs are not grouped, either in Group 1 nor Group 2.

Once the songs grouped into the appropriate group, then calculating Median in each group. This will put the songs into their according to mood. Fig. 3 and 4 show the median as the limit value of LOW or HIGH from the intensity and tempo, which will be classified into Group 1 (Contentment & Depression) or Group 2 (Exuberance & Anxious/Frantic).

## V. RESULTS AND DISCUSSIONS

That algorithm generate 22 songs grouped to Group 1, which have both LOW Intensity and Tempo, while 23 songs grouped to Group 2, which have both HIGH Intensity and Tempo.

From this point, each group be calculated its Median again to find LOW and HIGH groups, which would be categorized by definite mood. Fig. 5., Fig. 6., Fig. 7., Fig. 8. show this respectively. This categorization is done with the same algorithm as before.

From Fig. 2, it seen that in Group 1, the LOW both Intensity and Tempo will placed into the Contentment mood, otherwise, it will placed into the mood of Depression. In Group 2, the LOW both Intensity and Tempo will placed into the Exuberance mood, otherwise, it will placed to the Anxious / Frantic mood.

In the final result, only 23 songs title are classified properly, while the rest cannot fit into either of 4 categories of Thayer mood models. There are 5 songs in Group 1 belong to Contentment and 5 songs belong to Depression as in Table I. While 6 songs in Group 2 belong to Exuberance and 7 songs belong to Anxious/Frantic as in Table II. This is due to the basic rule the intensity [17] and [18] about the tempo as stated above.

TABLE I. MOOD GROUP 1

CONTENTMENT		DEPRESSION	
No.	Song Title	No.	Song Title
1	Sampul Surat	1	Kicir-kicir
2	Rujak Uleg	2	Nyiur Hijau
3	Kau Selalu Dihatiku	3	Kalung Mutiara
4	Lambaian sang merah putih	4	Senyuman Chandra
5	Dunia Berdamai	5	Wuyung

TABLE II. MOOD GROUP 2

EXUBERANCE		ANXIOUS/FRANTIC	
No.	Song Title	No.	Song Title
1	Jenang Gulo	1	Hasrat Menyala
2	Sebelum Aku Mati	2	Dinda bestari
3	Gethuk	3	Jembatan Merah
4	Juwita Malam	4	Solo Diwaktu Malam
5	Rindu Malam	5	Mahameru
6	Kota Solo	6	Bengawan Solo
		7	Sejak Kita Berpisah

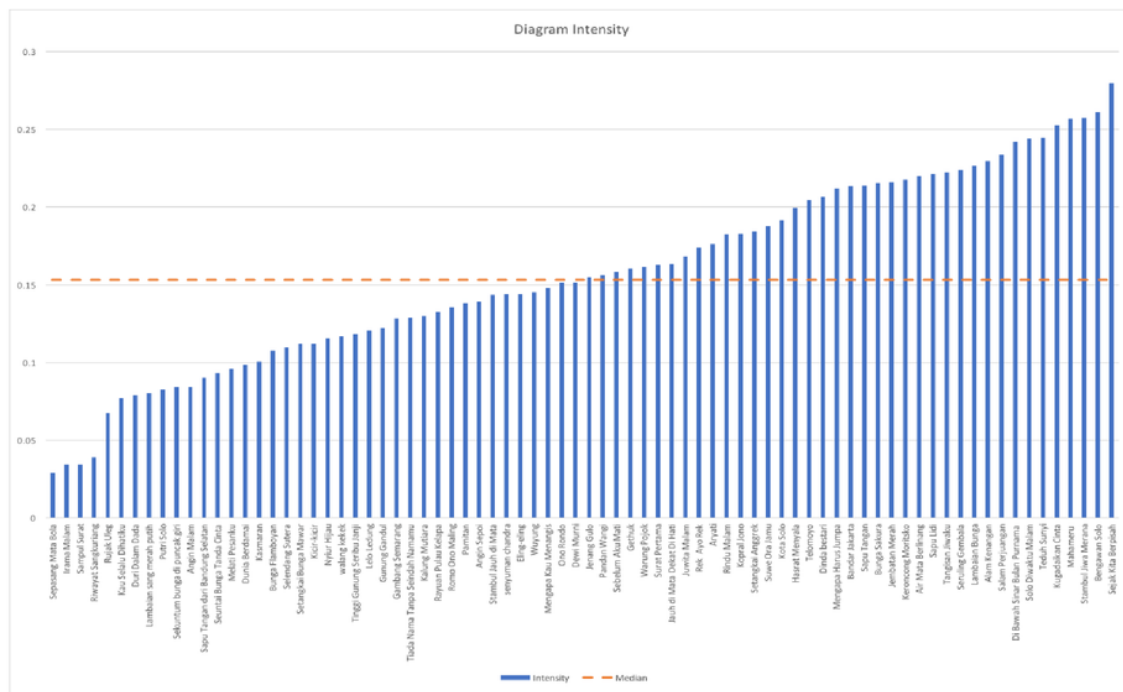


Fig. 3. The Median of Intensity

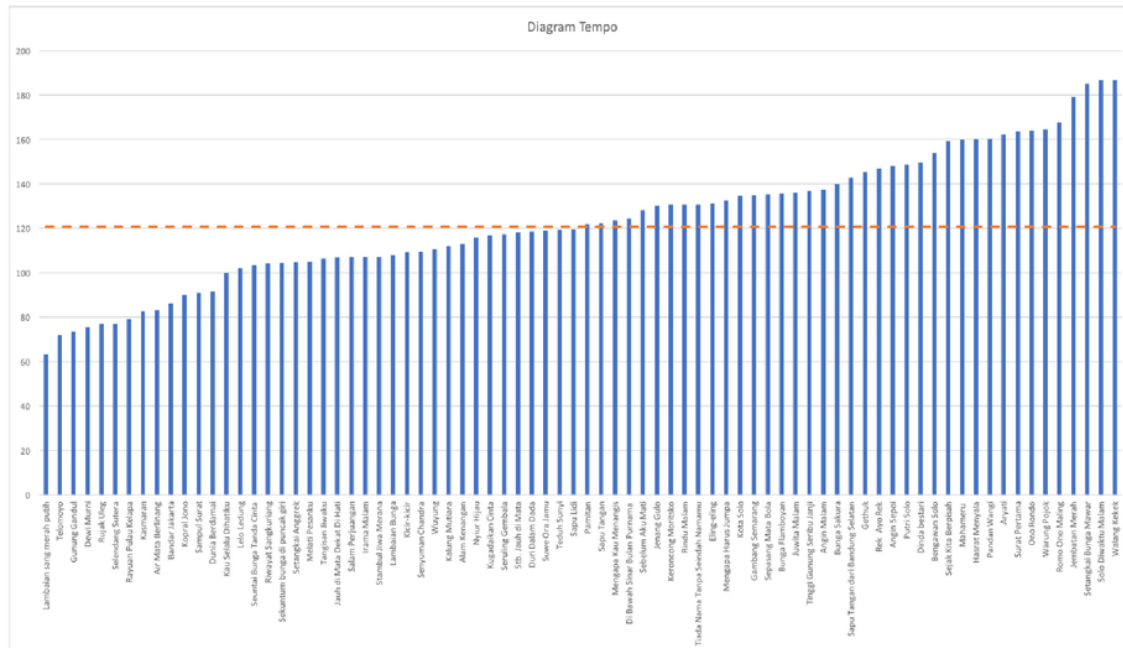
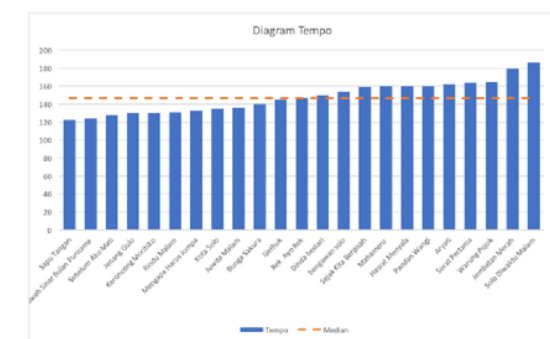
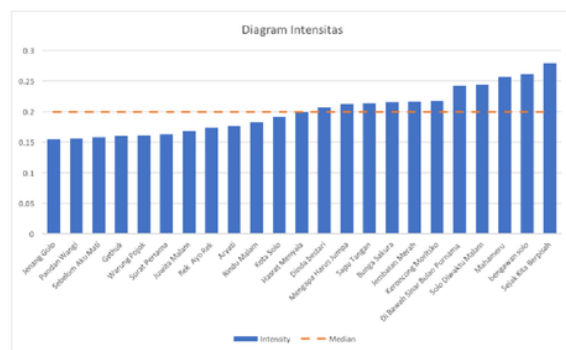
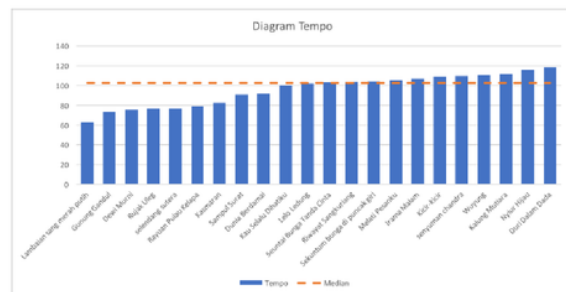
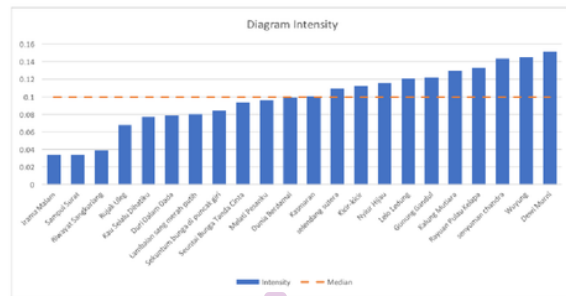


Fig. 4. The Median of Tempo



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