Intrinsic Connection between the Artistic Characteristics of Guangxi Folk Songs and the Community Consciousness of the Destiny of the Chinese Nation

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Abstract: Guangxi folk songs, as an important part of Zhuang and other minority cultures, carry deep historical and cultural heritage and national emotions. First, the music files of Guangxi folk songs are preprocessed to extract the main melody and harmony, and analyze their musical elements and structural features. Secondly, audio features and lyrics text features are extracted from Guangxi folk songs to form audio feature matrix and lyrics text feature matrix respectively. Then, a multimodal feature fusion correlation between Guangxi folk songs and Chinese national destiny community consciousness is carried out, and combined with the mapping matrix mechanism, a new matrix with fused multimodal features is obtained, which organically fuses the musical features and lyrics text features of Guangxi folk songs with the textual emotional features of Chinese national community consciousness. The melodic material has a significant effect in expressing the tranquil and sacred emotions of the Chinese nation, with the highest correlation coefficients of 0.72 and 0.71 respectively, and the scale material has a significant effect in expressing the sad, happy and passionate emotions, with the highest correlation coefficient of 0.74. The tempo of the musical elements is closely related to the emotion of the sense of community of the destiny of the Chinese nation, and the slow and heavy tempo of 60-80 bpm is closely related to the sadness, reflecting the Chinese nation's feelings in the face of challenges. The slow and heavy tempo of 60-80 bpm is closely related to the emotion of sadness, which reflects the inner sadness of the Chinese people when facing challenges and difficulties. The very fast and exciting tempo of 140-160 bpm is more likely to stimulate passionate emotions, showing the grandeur of the Chinese nation when celebrating victory and pursuing dreams.
Keywords: Guangxi Folk Songs; Audio Characteristics; Lyric Text; Chinese Nation; Community of Destiny

1. INTRODUCTION

In the rich and colorful cultural heritage of the Chinese nation, various ethnic groups, with their unique art forms and cultural traditions, jointly

weave a splendid chapter of Chinese culture (Li et al., 2020). Folk songs occupy a pivotal position with their unique artistic charm and profound cultural heritage (Åkesson, 2012; Li, 2022). Among them, Guangxi folk songs are an important part of Zhuang and other minority cultures, but also a treasure in the treasure house of Chinese music and art, carrying a deep historical and cultural heritage and national emotions (Song & Gee, 2020). Therefore, an in-depth study of the intrinsic connection between Guangxi folk songs and the sense of community of destiny of the Chinese nation not only contributes to a more comprehensive understanding of the cultural connotation of Guangxi folk songs, but also provides new perspectives and ideas for the promotion of the inheritance and development of Chinese national culture (Strmiska, 2012). In recent years, more and more scholars have been making new connections between music and emotion and community awareness.Sams, A. S et al. focus on multimodal music emotion recognition of Indonesian songs, where mel spectrogram features will be used for the audio data, and lyrics features will be extracted by tokenization from XLNet. Using Convolutional Long Short-Term Memory Network to perform audio classification tasks, multimodal music emotion recognition allows for a deeper understanding of the emotional elements embedded in Indonesian songs, which in turn reveals how these emotional elements contribute to a sense of identity and belonging within a community. Analyzing how music plays the role of uniting people and expressing their aspirations through these occasions, which in turn promotes the formation and development of a sense of community (Sams & Zahra, 2023). Jia, X. Efficient extraction of low-level features of music by weighted combination of audio cepstrum coefficients and residual phases. Convolutional recurrent neural networks are utilized to process the acoustic spectrograms to capture the time domain, frequency domain and sequence features of the audio. The low-level features are fed into a bidirectional long term memory network to deepen the understanding of the audio sequence information. Reveals that the emotional dimensions of music compositions can be deeply parsed by advanced technological tools such as improved convolutional neural networks. A deeper understanding of how music evokes and conveys emotions and how these emotions are perceived and interpreted in human consciousness can be achieved (Jia, 2022). Zeng, F. proposed a method for music emotion recognition using multimodal data, fusion of audio, video and text. The information of different modalities is comprehensively utilized to improve the accuracy and robustness of emotion recognition. Through elements such as melody, rhythm, and timbre, music can convey

rich emotional information such as happiness, sadness, and anger (Zeng, 2023). Wu, Z. addressed the problem of recognizing and categorizing folk music emotions based on abstractionte (Wu, 2024). Folk music, as an expression of emotion in a specific cultural context, has fully demonstrated the diversity and richness of its emotional connotation. By learning and analyzing a large number of music samples through machine learning algorithms, researchers are able to capture those subtle and profound emotional changes in the music, so as to realize the automatic classification of emotions. Notomi, Y., Ochi, K., et al. through empirical analysis, identified the key factors affecting the resonance of emotions in the music, including the ups and downs of the melody, the changes in harmony, and the rapidity of the tempo, etc., and these factors work together to make music a universal tool for emotional expression across languages and cultures (Notomi et al., 2021). Jandaghian, M et al. introduced an optimized brain emotion learning model by modifying and optimizing the brain emotion learning model to identify and classify emotions in music, revealing how music is profoundly connected to human emotions (Jandaghian et al., 2023). Music is more than just a combination of sounds; it is capable of triggering an emotional response in the listener through elements such as melody, rhythm and harmony. First, the Skyline algorithm is executed for each track. Then, audio features and lyrics text features are extracted from each track to form audio feature matrix and lyrics text feature matrix respectively. Finally, a multimodal feature fusion correlation between Guangxi folk songs and Chinese national destiny community consciousness is carried out, and a mapping matrix mechanism is introduced so that the audio feature matrix and the lyrics text feature matrix can be transformed to the same dimensional space. A new matrix fusing multimodal features is obtained, which realizes the effective association and complementarity between different modal features. These analyses will reveal how Guangxi folk songs, through their unique musical elements and artistic expressions, provide powerful support for promoting cultural exchange and integration among ethnic groups and forging a strong sense of Chinese national community.

2. PRE-PROCESSING OF GUANGXI FOLK SONG MUSIC FILES

2.1 Main Theme Extraction

Guangxi folk songs are characterized by their unique rhythm, which gives them a lively and vivid musical character, with beautiful melodies,

loud and clear tones, long breaths, and varied melodies with big ups and downs. In terms of rhythm, Guangxi folk songs are often free and full of changes, and there is often a long duration of high pitch between sentences, which seems to be stretching and unrestrained, rough and powerful. In addition, the lyrics of Guangxi folk songs are mostly in four lines of seven or five, with end rhymes, and more liner notes are used, which provide rich materials for the extraction of the main melody. Melody is usually the most representative melodic fragment in a song, which can reflect the main emotion and style of the song (Kumar et al., 2020). The Skyline algorithm is executed for each track, and the average pitch value $\bar{p}_i$ of track c_i is calculated:

$$\bar{p}_i = \sum_{j=1}^{n} p_{ij} / n \quad (1)$$

Where: p_{ij} denotes the pitch value of note j in track c_i, and n is the number of notes in track c_i. A 12-dimensional mapping projection of the pitch values of the notes on each track is made, and each statistic is shown below:

$$h_i = (h_{i1}, h_{i2}, \cdots, h_{i12}) \quad (2)$$

Among them:

$$\bar{h}_i = \sum_{j=1}^{n} h_{iC} / C \quad (3)$$

Where c represents the number of tracks in the music media file. Calculate the Euclidean distance between $(h_i = h_{i1}, h_{i2}, \ldots, h_{i12})$ and $\bar{h} = \bar{h}_1, \bar{h}_2, \ldots, \bar{h}_{12}$):

$$edist_j = \sqrt{\sum_{i=1}^{12} (h_{ij} - h_j)^2} \quad (4)$$

Cluster division of the two Guangxi folk song tracks on the basis of the above distance difference calculation results is judged as follows:

$$\left| edist_i - edist_j \right| < \delta \ for \ \forall h_i, h_j \quad (5)$$

Where δ denotes the set threshold. If the Euclidean distance between any two Guangxi folk song tracks, h_i, h_j is satisfied, it means that these two tracks belong to the same cluster. In terms of scales, Guangxi folk songs are often characterized by the use of natural scales, tonal scales and melodic scales. The natural scale is the most common scale in folk songs, consisting of seven tones, and the intervals between the tones conform to the laws of natural vocalization, with strong national characteristics. The tonal scale refers to the name of the scale composed of tones specified within a tonal pattern, such as major, minor, etc. The tonal scale is the most

common scale in folk songs. Guangxi Mashan Zhuang three-voice folk songs often use different tonal scales, giving the folk songs deep feelings and distinctive local characteristics (Garzoli, 2020). Melodic scale is also one of the important features of Guangxi folk songs, which makes the folk song melodies more layered and expressive through different scale changes.

2.2 Harmonic Analysis

The harmony of Guangxi folk songs often adopts the forms of free harmony and hierarchical harmony, which makes the folk song melody more colorful. Setting n_i, n_{i+1} to denote different notes, e_i, e_{i+1} to denote the stop moment of two notes, and s_i, s_{i+1} to denote the start moment of two notes, two note harmonies will be obtained (Rege & Sindal, 2022). The representation is:

$$\{(n_i, n_{i+1}) | s_i \le s_{i+1}, e_i > e_{i+1}\} \quad (6)$$

The interval of n_i, n_{i+1} is calculated as follows:

$$I_{i,i+1} = |p_i - p_{i+1}| \quad (7)$$

Where p_i, and p_{i+1} denote the pitch values of two notes, respectively. In addition, the split-box operation of music using frequent and infrequent statistics is implemented as follows:

$$f_i = \begin{cases} frequenet, f(x_i) > \delta_i \\ not, else \end{cases} \quad (8)$$

Where $f(x_i)$ represents the frequency.

2.3 Characterization of Musical Element Associations

Table 1 shows the associated feature sets of musical elements of Guangxi folk songs, which can deeply understand and analyze the artistic characteristics of Guangxi folk songs. The tempo-associated feature set includes Onset Rate with 4 dimensions, 3 dimensions of spectral contrast, 3 dimensions of incongruity, 2 dimensions of spectral complexity, etc., as well as features such as spectral extension, spectral entropy, roughness, beat center of mass, and intensity of beat hierarchy. Together, these features describe the variation of tempo and rhythmic sense in Guangxi folk songs, which are important aspects for understanding the rhythm and dynamics of folk songs. The rhythmic strength correlation feature set covers three dimensions of Onset Rate, three dimensions of Spectral Contrast, four dimensions of Dissonance, three dimensions of Spectral Entropy, etc., as well as features such as Harmonic Level Entropy and Roughness (Shorey

et al., 2024). These features reflect the intensity and strength changes of rhythm in Guangxi folk songs, which are crucial for feeling the rhythm and sense of power of folk songs. Rhythmic complexity describes the complexity and diversity of rhythms in Guangxi folk songs, and is the key to understanding the rhythmic structure and changes of folk songs. Performance Technique reflects the use and expression of performance techniques in Guangxi folk songs, and is important for understanding the performance styles and techniques of folk songs.

Table 1: Associated feature set of musical elements of Guangxi folk songs

Musical Elements	Associative features	Dimensionality
Tempo	Onset Rate (4), Spectral Contrast (3), Discordance (3), Spectral Complexity (2), Spectral Expansion, Spectral Entropy, Roughness, Beat Center of Mass, Beat Level Intensity	17
Rhythmic Intensity	Onset Rate (3), Spectral Contrast (3), Discordance (4), Spectral Entropy (3), Harmonic Level Entropy, Roughness	15
Rhythmic Complexity	Spectral Complexity (2), Spectral Contrast (2), Beat-Level Map (2), Pitch Chromatogram (2), Roughness (5), Spectral Flux, Harmonic Levels, Undulation (2), Spectral Expansion, Harmonic Histograms	19
Technique	Onset Rate (3), Beat Hierarchy Map (2), Beat Intensity, Spectral Contrast (2), Spectral Complexity, Spectral Entropy	10
Harmonic Complexity	Natural Temperament Intensity (2), Onset Rate (3), Chorus Level (6), Danceability (2), Undulation (2), Tonal Strength, Dynamic Complexity, Beat Histogram, Decay Slope, Beat Center of Mass	20

3. CLASSIFICATION OF GUANGXI FOLK SONGS AND CHINESE NATIONAL DESTINY COMMUNITY CONSCIOUSNESS

3.1 Lyrics Text Feature Extraction

Musical emotion is a reflection of human emotional perception, and composers and lyricists express their emotions through the content of the music. Similarly, the listener can also perceive the emotions of the composer, lyricist or even arranger according to the music content. In the

case of Guangxi folk music itself, the specific words in the lyrics, the gentle melody, the sharp rhythm, the timbre of the instruments, etc. all influence people's perception of the emotion of a certain piece of music. The same piece of music will produce different emotional answers due to people's experience, emotions, and other factors, but overall, the vast majority of people have similar, or even the same, results in judging the emotion of a particular piece of music (Goienetxea et al., 2019). Figure 1 shows the two-dimensional division of music emotion category, the emotion of different music can be considered from the two aspects of emotional polarity and the degree of activity, specifically by the four directions of excitement, happy, frustration and sadness.

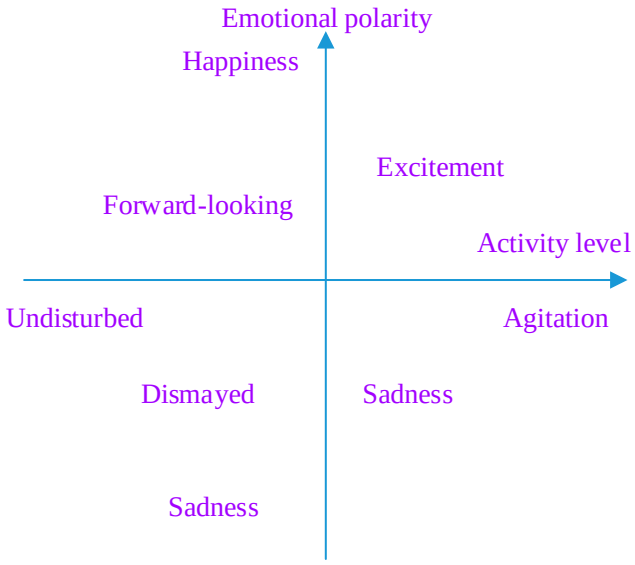


Figure 1: Two-dimensional division of music emotion categories

Lyrics need to be digitally converted for computer processing. Pre-processing includes word splitting and de-duplication, followed by counting sentiment feature words using TF-IDF. TF-IDF consists of word frequency TF and inverse text frequency IDF (Krols et al., 2023). It measures the frequency of occurrence of feature words in the lyrics:

$$TF = \frac{N_{ij}}{N_{*j}} \tag{9}$$

Where t_i denotes the feature word, N_{ij} denotes the number of times, N_{*j} denotes the document, the number of feature words in d_j, and the inverse text frequency IDF:

$$IDF = \log\left(\frac{D}{D_i + 1}\right) \tag{10}$$

Where D represents the total number of lyrics texts and D_i represents

the total number of documents containing feature words. If the number of documents containing feature words is small, the value of IDF is large, and the feature words are more expressive of the emotional trend of the lyrics. The TF-IDF value is obtained after calculating $TF-IDF$ to determine the feature words that best represent the emotion of the lyrics (Liu & Yap, 2022; Susanto & Watik, 2017). The formula is:

$$TF\text{-}IDF_{i,j}=\frac{N_{ij}}{N*j}\times\log\left(\frac{D}{D_i+1}\right) \quad (11)$$

The feature words in Guangxi folk song lyrics are converted into feature vectors using CBOW model of word2vec. For a given word w, the word vectors of c words before and after it are taken, and the feature vectors are obtained by summing and averaging, where V is a matrix of word vectors, the size of which is determined by the number of words in the sample corpus. Let the sample be $(c(w),w)$, where c represents the corpus, c represents some lyrics, $c(w)$ represents the context of w, and the word vector matrix V of size $m|C|.|C|$ represents the number of words in the sample library. The word vectors corresponding to $2c$ words in V, i.e., $V(C(w)_{-C}),V(C(w)_{-C+1}),\ldots,V(C(w)_{C-1}),V(C(w)_{C})$, are taken out and summed and averaged to obtain the feature vector x_w:

$$x_w=\sum_{i=1}^{2c}V(C(w)_i)/(2c) \quad (12)$$

3.2 Audio Feature Extraction

Audio is the key to emotion recognition of Guangxi folk songs, and audio features, such as tonal, timbre and essential characteristics, directly affect the classification results. Because the audio format is diverse and contains redundancy, it is necessary to convert the format, weighting processing, and then extract features such as Mel frequency cepstrum coefficient, gene frequency, resonance peaks and time-frequency information (Berglund & Dahllöf, 2021). All the song formats are converted to wav format, the audio is pre-emphasized and filters are added:

$$H(n)=1-\mu n^{-1} \quad (13)$$

Where n represents the input signal and μ is the pre-emphasis factor, which is generally close to 1 and takes the value of 0.95. The sampling points are transformed by Fourier transform into a spectrum and energy distribution:

$$x(m)=\sum_{m=0}^{N-1}x(n)e^{-j\frac{2\pi nk}{N}},0\le m\le N-1 \quad (14)$$

Where $H_m(k)$ is the frequency response of the Mayer filter. The resulting logarithmic energy is subjected to a discrete cosine transform, thereby converting the music signal from the frequency domain to the cepstrum frequency domain:

$$C(n) = m = \sum_{m=0}^{N-1} s(m) \cos\left(\frac{\pi n(m-0.5)}{M}\right), n = 1, 2, \ldots, L \tag{15}$$

The fundamental tone detection uses the cepstrum method, which utilizes the principle that the time domain convolution is equivalent to the frequency domain product, and the cepstrum of the original signal is obtained by Fourier transform, logarithmic operation and Fourier inverse transform (Thompson et al., 2023). The expression form is:

$$c[n] = \frac{1}{2\pi} \int_{-\pi}^{\pi} \log|S(\omega)| e^{jn\omega} d\omega \tag{16}$$

Assuming that $S_n[i]$ is the time-domain representation of the music signal of Guangxi folk songs, and substituting the variance equation:

$$Var = \sum_{i=0}^{N-1} \left(s_n[i] - \frac{1}{N} \sum_{i=0}^{N-1} s_n[i] \right)^2 \tag{17}$$

3.3 Multimodal Association Between Guangxi Folk Songs and Chinese National Destiny Emotions

An in-depth audio feature and lyrics text feature extraction work has been carried out in m song targeting Guangxi folk songs, resulting in a $m \times n$ -dimensional audio feature matrix and a $m \times p$ -dimensional lyrics text feature matrix. Fig. 2 shows the modal feature fusion correlation, where p represents the dimension of the lyrics text feature vector x_w and n represents the dimension of the audio feature combination vector x_a. Using specific mapping matrices, a $(I|0)$ or $(0|I)$ matrix consisting of an $n \times n$ -dimensional unitary matrix and an irregular matrix spliced with 0 elements, the audio feature matrix and the lyrics text feature matrix are transformed respectively, which results in two new $m \times (n+p)$-dimensional matrices (Vavaroutsos & Vikatos, 2023). These two new matrices not only contain the original audio and lyrics text features, but also realize the extension and fusion of features through the transformation of the mapping matrix. In order to explore the multimodal feature fusion association between Guangxi folk songs and Chinese national destiny community consciousness, the Chinese national community consciousness text sentiment analysis was also performed to extract the relevant sentiment features. A $m \times (n+p)$-dimensional multimodal feature matrix is obtained by adding the audio feature matrix and the lyrics text feature matrix after

the mapping matrix transformation, and this process not only realizes the effective fusion of audio features and lyrics text features, but also introduces the Chinese national community consciousness text sentiment analysis.

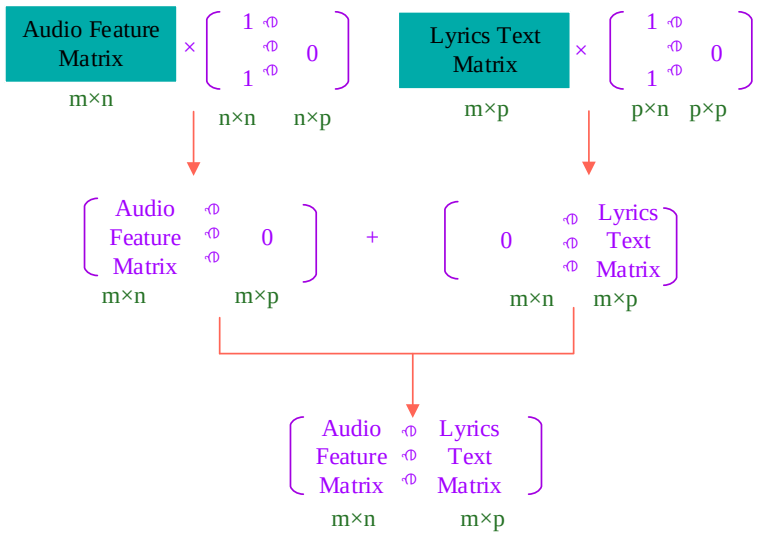


Figure 2: Modal feature fusion correlation

4. THE CONNECTION BETWEEN THE CHARACTERISTICS OF GUANGXI FOLK SONGS AND THE COMMUNITY CONSCIOUSNESS OF THE DESTINY OF THE CHINESE NATION

4.1 Correlation between Tone Perception Characteristics and Chinese National Emotions

In exploring the connection between Guangxi folk songs and the sense of community of destiny of the Chinese nation, timbre perception characteristics, as an important dimension of musical expression, play a key role in understanding and conveying Chinese national emotions. In the following, the correlation between timbre and Chinese national emotions will be analyzed from the aspects of performance content and time domain characteristics.

4.1.1 The Effect of Performance Content on Timbre and Emotional Relevance

The materials were categorized according to the performance content, and the correlation coefficients between the timbre perception features of Guangxi folk songs and the emotion of the consciousness of the Chinese national destiny community were calculated separately, and the effect of

the performance content on the correlation between perception and emotion is shown in Figure 3. Most of the timbre perceptual features of the melodic material are positively correlated with each emotion, for the melodic material, the dry-soft has a high positive correlation with the two emotional dimensions of serenity and sanctity, with correlation coefficients of 0.72 and 0.71 respectively, and the hoarse-concordant has a high positive correlation with the two emotional dimensions of serenity and sanctity, with correlation coefficients of 0.59 and 0.58 respectively, i.e., the more soft and harmonious the timbre of the song with the melody, the higher the correlation coefficient between the melodic and emotional dimensions of the song with the melodic. The softer and more harmonic the timbre, the more serene and sacred the timbre sounds. In scale material, bright-dark is highly correlated with sadness, with a correlation coefficient of 0.74. When the tone is darker, it is more likely to trigger sadness in the listener. The correlation coefficients for roughness-purity and happiness and passion were 0.73 and 0.71, and for sharpness-thickness and happiness and passion were 0.73 and 0.70, which further proves that the sharpness or richness of the tone color has an important effect on the expression of happiness and passion in scale performance. Changes in the content of the performance lead to changes in the influence of timbre perceptual characteristics on the expression of emotion, with softer melodies being more likely to evoke a feeling of serenity and brighter scales being more likely to inspire pleasant emotions.

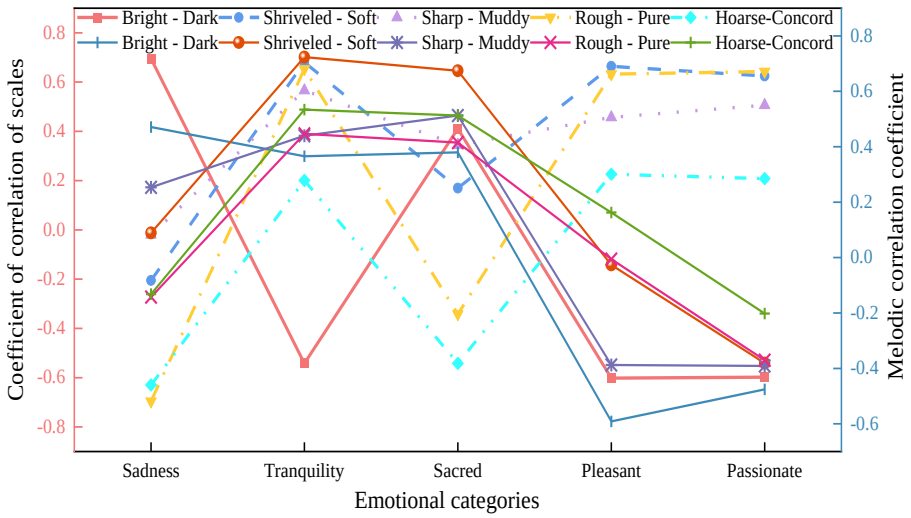


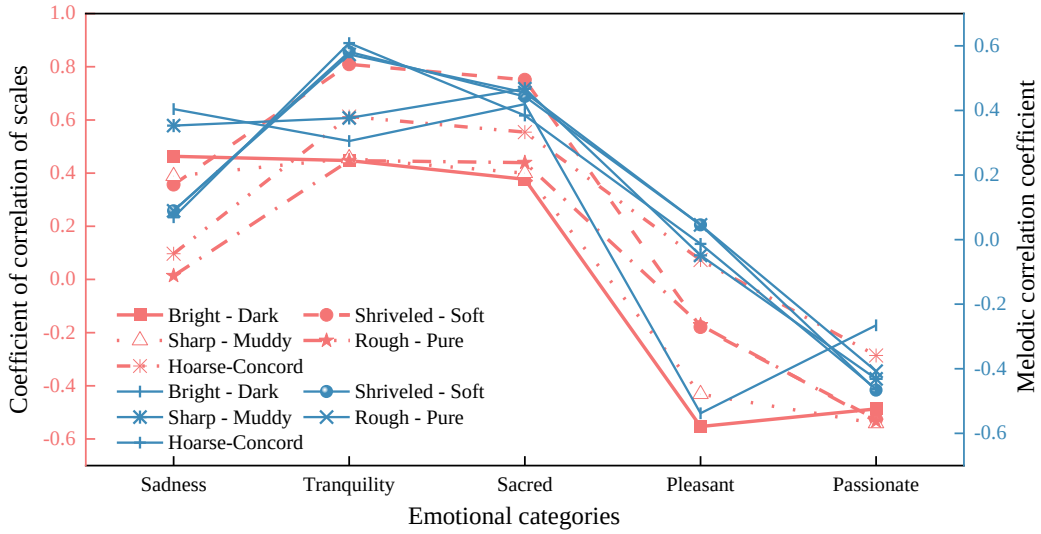
Figure 3: Effect of performance content on perceptual and emotional correlations

4.1.2 Influence of Time-Domain Properties on Timbre and Emotional Correlations

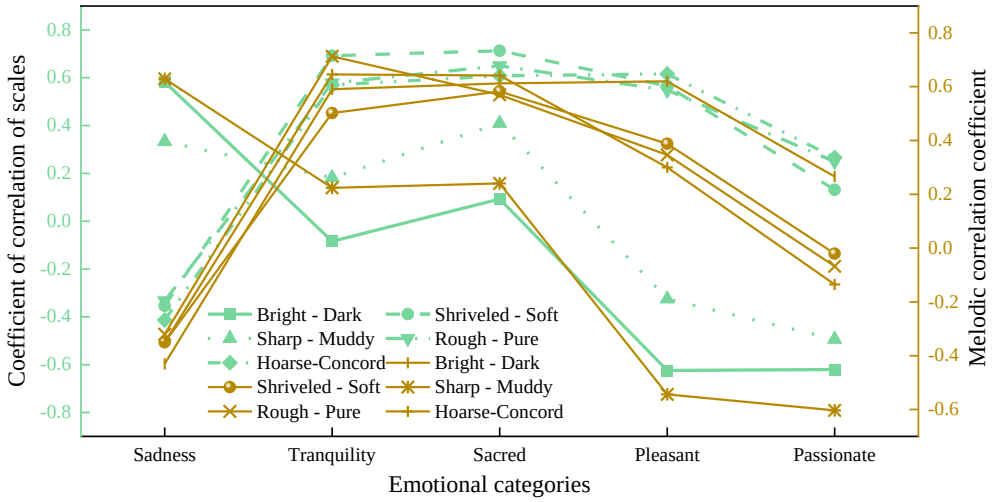
According to the different vocalization methods of Guangxi folk song

instruments, the scale material and melodic material can be divided into two categories as persistent instruments and non-persistent instruments. The effect of correlation of time domain characteristics is shown in Fig. 4. Fig. 4(a) shows the correlation coefficients of all the melodic timbre perceptual characteristics in the sad emotional state are low, between 0.01 and 0.45. It shows that in sad emotion, the influence of melodic timbre perceptual features on the expression of emotion is relatively weak. The correlation coefficients are higher in the serene emotion, ranging from 0.19 to 0.78, indicating that the perceptual features of melodic timbre have a more significant effect on emotion in the serene emotion. For sacred emotion, the correlation coefficients are also high, ranging from 0.31 to 0.77, indicating that the perceptual characteristics of melodic timbre also have a more significant effect on emotion in sacred emotion. The correlation coefficients for the emotional states of pleasure and passion were negative, ranging from -0.56 to 0.19 and -0.54 to -0.23, respectively. This indicates a negative correlation with the expression of pleasant and passionate emotions for certain perceived features of melodic timbre, i.e., these features may be more inclined to express emotions opposite to pleasant and passionate. Overall, the perceptual features of melodic timbre were more significant in sadness, serenity, and sacred emotions, whereas certain perceptual features of melodic timbre may be negatively correlated with the expression of emotions in pleasant and passionate emotions. Figure 4(b) shows the scale timbre perception features, and it can be seen that the two timbre perception features, bright-dark and sharp-thick, are positively correlated with sadness emotion for both sustained and non-sustained instruments. The correlation with sadness is higher for non-sustained instruments, with 0.74 for bright-dark and 0.61 for sharp-thick, while it is relatively lower for sustained instruments, with 0.51 and 0.36, respectively. The other three timbre perception features, dry-soft, muted-concordant, and rough-pure were all negatively correlated with sadness emotion, implying that sadness emotion may be reduced when these features are more significant. Of all the timbre perception features associated with sadness, non-sustained instruments showed more significant correlations. In particular, the feature of roughness-purity had the highest negative correlation with sadness, at -0.79. In expressing sadness, non-sustained instruments in Guangxi folk songs may convey sadness more effectively by enhancing the features of bright-dark and sharp-muddy, and at the same time attenuating features such as roughness-purity. Although sustained instruments in Guangxi folk songs can also express sadness through bright-dark and sharp-thick features, they may be

less effective in comparison.



(a) Melodic timbre perception characteristics



(b) Scale timbre perception characteristics

Figure 4: Effect of correlation of time domain characteristics

4.2 Correlation between Musical Elements and Chinese National Emotions

In order to distinguish the frequency bands of different musical instruments, this paper carries out the 1078-dimensional objective feature set obtained by three-frequency processing of the original audio, while the conventional feature extraction method does not require frequency division operation. In order to verify the effectiveness of this paper's method of frequency division processing, Fig. 5 Comparison of the effect of frequency division of the musical elements of Guangxi folk songs, the global optimal number of features R2 as an evaluation index as shown in Fig. The R2 of the unsubdivided dataset is 0.74, 0.65, 0.50, 0.74, 0.46, and the R2 of the subdivided dataset in the five musical elements is 0.76, 0.69, 0.54, 0.77, respectively, 0.50, and the results are all better than the

unfractionated dataset. It indicates that feature extraction on the crossover frequency signal can more accurately capture the musical element characteristics of Guangxi folk songs of the signal, which helps the performance of the regression model. Comparing the regression results of the three frequency band datasets, it can be found that the high-frequency features have the best performance in the prediction of the elements of performance techniques, and the mid-frequency features have the best performance in the prediction of all musical elements except performance techniques, although the enhancement of the prediction effect on a single musical element is not significant.

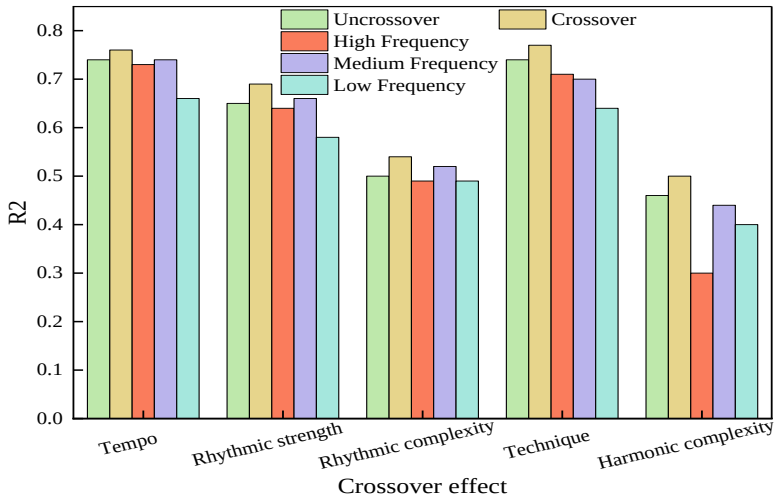


Figure 5: Comparison of crossover effect of musical elements of Guangxi folk songs

Table 2 shows the results of the correlation between the musical elements and the emotion of the sense of community of destiny of the Chinese nation. It can be seen that, from the point of view of the tempo musical elements, the emotion of sadness is closely related to the slow and heavy tempo of 60-80 bpm of the musical elements, which embodies the inner sadness of the Chinese nation in the face of challenges and difficulties. The moderate and smooth tempo of 80-100 bpm is compatible with the emotion of tranquility, which expresses the inner yearning of the Chinese nation in pursuit of harmony and smooth development. The moderate and smooth rhythm of 80-100 bpm is compatible with the serenity emotion, which expresses the Chinese people's inner desire for harmony and smooth development, while the slightly faster and more solemn rhythm of 100-120 bpm is more likely to convey the sacred emotion, which reflects the Chinese people's reverence for traditional culture and spirituality. The pleasant and passionate emotions are associated with the light, lively rhythm of 120-140 bpm and the very fast, exciting rhythm of 140-160 bpm, respectively, showing the joy and

grandeur of the Chinese people when celebrating their victory and pursuing their dreams. In terms of the musical elements of rhythmic strength, the gentle 20-40 dyn range is compatible with sadness, the smooth 40-60 dyn range echoes serenity, and the powerful 100-120 dyn range is more likely to inspire passionate emotions. In terms of rhythmic complexity, the simple 1-2 level rhythms are more likely to evoke sadness, while the smooth and repetitive 2-3 level rhythms create a stable atmosphere for serenity. The orderly changing 3-4 level rhythm is solemn and orderly in conveying the sacred emotion, while the complex and changing 5-6 level rhythm has a strong correlation with the passionate emotion of the Chinese nation. The musical elements of playing techniques, such as glissando and vibrato, are associated with the delicate expression of sadness, while the solemn technique is particularly solemn and deep in conveying sacred emotions, and the 6-8 times/bar frequency of the strong contrasting technique is more capable of arousing passionate emotions. Finally, in terms of harmonic complexity, the simple harmonized 2-3 chords are more likely to convey the depth and sadness of sadness, while the muted harmonized 3-4 chords create a harmonic and smooth atmosphere for serenity. The 4-5 chords of the solemn chord progression are particularly solemn and solemn in conveying sacred emotions, while the bright and rich 5-6 chords and the contrasting 6-7 chords add more color and dynamics to the pleasant and passionate emotions, respectively.

Table 2: Correlation between folk songs and national destiny community consciousness

Musical Elements	**Sadness**	**Tranquility**	**Sacred**	**Pleasant**	**Passion**
Tempo	60-80 bpm	80-100 bpm	100-120 bpm	120-140 bpm	140-160 bpm
Rhythmic Intensity	Soft (20-40 dyn)	Smooth (40-60 dyn)	Solemn (60-80 dyn)	Lively (80-100 dyn)	Powerful (100-120 dyn)
Rhythmic Complexity	Simple (1-2 levels)	Smooth Repetition (2-3 levels)	Orderly (3-4 levels)	Varied (4-5 levels)	Complex and varied (5-6 layers)
Technique	Slide, Vibrato (2-4 times/bar)	Smooth playing (1-2 times/bar)	Solemn Technique (1-2 times/bar)	Technically rich (4-6 times/bar)	Strong contrasting techniques (6-8 times/bar)
Harmonic Complexity	Simple harmony (2-3 chords)	Muted harmony (3-4 chords)	Solemn chord progression (4-5 chords)	Bright and rich (5-6 chords)	Strong contrast (6-7 chords)

5. CONCLUSION

Through the preprocessing of music files of Guangxi folk songs, the analysis of emotional characteristics, and the study of multimodal feature fusion and association, we reveal the important role of Guangxi folk songs in the inheritance and promotion of the sense of community of the Chinese nation. The conclusions are as follows: (1) The correlation coefficients of dryness-softness with serenity and sacred emotion in melodic material are 0.72 and 0.71, respectively, and the correlation coefficients of hoarseness-concordance with these two emotions are 0.59 and 0.58, respectively. the degree of softness and concordance of melodic material is crucial to the expression of serenity and sacred emotion. The correlation coefficients of bright-darkness with sadness emotion are 0.74, sharp-muddy with sadness emotion are 0.61 for non-sustained instruments and 0.36 for sustained instruments in the scale material. (2) Scale material is able to strongly convey sadness through dark and sharp timbral characteristics, especially for non-sustained instruments. In terms of tempo music elements, different tempo ranges are closely related to different emotions of the Chinese nation. the slow, heavy tempo of 60-80 bpm is closely related to the emotion of sadness, reflecting the heartfelt sadness of the Chinese nation in the face of challenges and difficulties, whereas the very fast, impassioned tempo of 140-160 bpm is linked to the emotion of passion, showing the joy and grandiosity of the Chinese nation in the celebration of victories and the pursuit of dreams. It shows the joy of the Chinese nation when celebrating victory and pursuing dreams. Guangxi folk songs are not only the treasures in the treasure house of Chinese music and art, but also play a unique and important role in passing down the national culture and promoting the sense of community of the Chinese nation. Through the in-depth study of Guangxi folk songs, we can better understand and appreciate its artistic value and cultural connotation, and at the same time promote the cultural exchange and integration among various ethnic groups, and forge the sense of community of the Chinese nation.

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