JOURNAL OF URBAN SOCIETY'S ARTS

Volume 10 Number 1, April 2023: 32-42

Analysis of Timbre in Melodic Arrangements of Popular Minang Songs Using a Spectrum Analyzer

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ABSTRACT

Timbre is one of the main elements considered in musical arrangements, including contemporary Minang pop songs which have undergone significant development due to improvements in recording studio quality and increasingly qualified human resources. This study aims to describe the instrumentation and examine the characteristics of timbre in melodic instruments used in contemporary Minang pop song arrangements. Ableton Live 10 and Izotope Insight 2 software were used to analyze the audio spectrum produced by melodic instruments in recent Minang song arrangements. The results of audio processing using spectrum analyzer show that three main timbres of Minang songs are circulating and viral on social media: Acoustic Guitar, Bansi, and Overdrive Guitar. The first two instruments typically fill the melody line in the Intro, Interlude, and Coda, while the third instrument acts as a melody carrier in the transition part of the song. The instrumentation used in Minang song arrangements consists of acoustic instruments, specifically Yamaha guitars with Fishman Preamps, VST Instruments Sampletank2, and Real eight guitars. In this study, only two timbres were analyzed using the application: Acoustic Guitar and Bansi. The software analysis reveals that the two melodic timbres have unique characteristics formed by different overtone series formulas, with Acoustic Guitar having approximately 15 overtone pieces and Bansi having 8. Based on the results generated by the audio analysis application Izotope Insight 2, the timbre of guitar and bansi in contemporary Minang pop songs exhibit two unique characteristics. The guitar demonstrates a rich character with a significant number of overtone series at high frequencies. On the other hand, bansi tends to have a smooth and soft character due to its less dominant frequency points at each interval and lower amplitudes.

Keywords: timbre analysis; arrangements; pop minang; spectrum analyzer; overtone series

ABSTRAK

Analisis Timbre pada Aransemen Melodik Lagu Minang Populer Menggunakan Spectrum Analyzer. Timbre merupakan salah satu elemen utama yang menjadi sorotan dalam menciptakan sebuah aransemen musik, begitupun dalam lagu pop Minang kontemporer yang telah mengalami perkembangan signifikan karena adanya peningkatan kualitas studio rekaman dan sumber daya manusia yang semakin berkualitas. Penelitian ini bertujuan untuk menggambarkan instrumen dan mengeksplorasi karakteristik timbre pada instrumen melodi yang digunakan dalam aransemen lagu pop Minang kontemporer. Penelitian ini menggunakan perangkat lunak *Ableton Live 10* dan *Izotope Insight 2* untuk menganalisis spektrum audio yang dihasilkan oleh instrumen melodi dalam aransemen lagu Minang terbaru. Hasil penelitian menunjukkan bahwa terdapat

Received: 4 February 2023; Revision: 15 April 2023

tiga timbre utama yang menjadi populer dalam lagu-lagu Minang masa kini yaitu: Gitar Akustik, Bansi, dan Gitar Overdrive. Dua instrumen pertama biasanya mengisi garis melodi pada Intro, Interlude, dan Coda, sedangkan instrumen ketiga berfungsi sebagai pembawa melodi pada bagian transisi lagu atau fill in. Instrumen yang digunakan dalam aransemen lagu Minang terdiri dari instrumen akustik berupa gitar dengan merk Yamaha dengan preamp Fishman, VST Instruments Sampletank2, dan gitar Real 8. Dalam penelitian ini, hanya dua timbre yang dianalisis menggunakan perangkat lunak yaitu: Gitar Akustik dan Bansi. Analisis perangkat lunak tersebut mengungkapkan bahwa dua timbre melodi memiliki karakteristik yang unik yang dibentuk oleh formula seri overtone yang berbeda, dengan Gitar Akustik memiliki sekitar 15 bagian overtone Series dan Bansi memiliki 8 Overtone Series. Berdasarkan sinyal audio yang dihasilkan oleh aplikasi, timbre melodi lagu Minang populer ditandai oleh gitar dengan warna yang kaya dan Bansi dengan warna yang lembut dan halus. Selain itu, semua audio yang diperoleh dari sumber memiliki kualitas yang sangat baik.

Kata kunci: analisis timbre, aransemen, pop Minang, analisis spektrum, *overtone series*

Introduction

Minang Pop Music is popular music that incorporates Minang language in form of a poetry. Minang language is the language used by the Minangkabau community, where the Territorial of Minangkabau people occupy most of the West Sumatra Province in Indonesia. Minangkabau ethnic is one of the largest ethnic groups in Indonesia, apart from Javanese, Sundanese, and Madurese. The size of the Minangkabau tribe can be seen from the spread of the community in every corner of the province in Indonesia, with the habits of the people who "migrate" making the Minangkabau people live spread throughout the country, even around the world(Firman, 2018)

Recently the world community has used social media in their daily lives both in terms of finding information, communication, and even becoming a profitable source of income.(Puspitarini & Nuraeni, 2019) This social media activity is also beneficial for the Minang community, one of which is in the creative industry, namely the Minang Pop music industry. As a music industry with local content, Minang pop songs also use social media as a place for the promotion and marketing of their products.

Minang pop songs have penetrated the national market, which can be proven by the existence of several Minang songs that are trending on several social media platforms, e.g., is Youtube. The content of Minang pop songs is watched by tens to hundreds of millions of times in Youtube. As discussed by Hamdi on the Creative Hamdi Youtube Channel, one of the Minang pop songs entitled Panek Diwak Kayo Di Urang has been accessed for up to 94 million views in 2021 (Hamdi, 2021)and in 2022, this song has surpassed 122 million views. [3] This shows that Minang ethnic is an up-and-coming creative industry.

Minang pop music is currently very favored by various groups, one of which is by the younger generation, both from the fields of West Sumatra and from the outside. This is inseparable from the innovation and creativity of record producers who use western pop music as a reference for the formation of musical materials, such as melody, song lyrics, harmony, and timbre. In the past, the lyrics of Minang pop songs did not express feelings and thoughts openly and were more poetry about Minang philosophy, community conditions, territorial areas, and natural phenomena.(Firman, 2018) In this past Minang pop music, the Instrumentation used more traditional acoustic instruments recorded manually with makeshift and analog equipment. The resulting sound is certainly not as good as recent recorded productions. Whereas nowadays, Pop Minang songs are packaged with more general rhyming themes such as love for young people and passion for parents. The lyrics are more explicit and transparent so that young people can easily absorb the song's contents. In the context of existing music and audio forms, the

timbre character of vocal and instrument melodies sounds more modern with the excellent recording quality and midi sampling technology.

As one of the music that represents the character of its regional music, Minang music must maintain the existing consistency so that the identity of this music is not lost. The melodic character is one of the things that have been maintained until now. Melody is an arrangement of tones arranged horizontally in a time course of music. This melody serves as the main theme in a musical composition/song. To come up with a good melody, a music arranger first chooses an instrument with the right timbre/tone. Because, of course, the power of the melody depends on the color of the sound used

Instrumentation/melodic Timbre on Minang pop songs today has moved towards a more modern one,(Andre indrawan et al., 2018) producers nowadays tend to look for sound colors that are lighter, softer, and easy listening. Today's Minang songs aim to please the listener's ears as a popular product. Seeing the very rapid technological advances in the western world, the reference for listeners to Minang pop songs is also getting wider. Today, connoisseurs of Minang pop songs can already distinguish which Audio is good and which is not good. With today's social media, listeners are free to access references to Western pop songs. With this reference, it gives a new perspective to Minang music lovers, and automatically the hearing/audio taste standard is even more improved.

In addition to improving audio quality, producers in the Minang pop music industry are currently also trying to adapt their Minang pop song products to be liked by listeners, based on an interview with a Minang pop arranger who works at an Indoswara music studio in the city of Padang, namely Vandy Satria, he said , arrangements and Audio produced refer to Minang pop song products that are already trending in the digital market such as Youtube, Tik Tok, Joox, Spotify, and others.

One of the exciting innovations today is that many Minang pop songs have the same melodic Timbre. The melodic Timbre referred to here is the melody that is at the beginning (Introduction, middle (Interlude), and end (Coda/Outro) of the song. The selection of audio instruments has been made very well. One of them is the use of guitar instruments. Observed, the guitar timbre seems to have become a unique characteristic of contemporary Minang pop music. The researchers found that almost every Minang pop song uses this guitar instrument based on initial observations. Why did this happen? and what are the factors that motivate producers and arranger is more likely to use the color of this guitar sound? To get to know the instrumentation mapping and the characteristics of the melodic Timbre of the instruments in today's Minang pop songs, it is necessary to do a more detailed analysis using sound wave spectrum analysis media that can represent what the waveform looks like. At the same time, what are the essential elements of forming the Timbre of the present Minang song melody? So that the Timbre is preferred and always used by contemporary Minang pop arrangers.

Research Method

This study uses a qualitative paradigm that aims to describe the data analysis of the Instrumentation and Timbre that exist in contemporary Minang pop music melodies, which applies to the general public (Sugiono, 2016). While the stages in this research are divided into several stages, namely: (1) determining the material and research objects, (2) collecting data consisting of interviews, field studies, and document studies, (3) laboratory work, (4) Data analysis (5) Drawing conclusions.

Some of the stages above consist of several work steps. First, the researchers determined the material from the data of contemporary Minang pop songs that the researchers got on streaming music and video streaming platforms, then, the researchers collected and classified them. The data were analyzed in terms of form, structure and instrumentation used. After that, the researcher grouped the data in a table, so that the researcher got specific data about the instrumentation of the melody. The second step, the researchers began to conduct interviews related to the data obtained in the previous work step, the researchers conducted interviews with performers, producers, and singers

of Minang songs. In this step the researcher looks for data in the form of audio used by the producer or arranger. In the third working step, the researchers carried out laboratory work with several applications such as Ableton Live 10 and Izotope Insight 2. After that, in the fourth working step, the researchers analyzed the data processing results from the application to draw conclusions.

This research project is Instrumentation and timbre analysis in contemporary Minang pop songs. In this study, the researchers used four Minang pieces whose audience ratings have reached millions of viewers, namely the song Luko Badara Repeat- Pinki Prananda Feat Eno Viola, Oil Habih Samba Tak Lamak -David Iztambul & Ovhi Firstly, Bidadari Sarugo And - Talambek Comes- Ovhi Firsty. Data collection was carried out by interviewing Minang pop music arrangers to obtain instrumentation data and melodic Audio used. Then laboratory work was carried out using the Ableton Live10 and Izotope Insight 2 spectrum analyzer applications to classify the sound data, after that the researchers analyzed the data for each spectrum Audio

Finding and Discussion

The present Minang Pop song is a vocal musical work in Minang language that is worked on and packaged in a more modern form than the previous Minang pop song. This is inseparable from the rapid development of technology in recording studios. The process of making music is done in a more practical and quality way. The production process uses more sophisticated technology so that studio work, such as sound recording, is faster and done without troublesome equipment. All recording equipment has evolved from analog to digital. In addition to improving recording quality, these technological advances also make it easier for arrangers to create better music for Minang pop songs at this time in terms of automaticaly and consisely (Ruddin et al., 2022).

Creating or arranging music in the Minang pop industry is a creative process in producing Minang pop songs. In this process, a Minang pop arranger makes a concept about the structure of the form and the orchestration that will be made. Speaking of construction, because Minang pop is a vocal song, the identification of the design used by the arranger uses terms such as verse, chorus, pre-chorus, bridge, intro, and outro/coda. However, to shorten the term, it is sometimes written with the letters A, B, and C. It can be A as a verse, B as a Chorus, A' for 2nd Verse, and B' for a 2nd Chorus. These terms represent the presence of poetry/lyrics in the song's course from beginning to end. The use of capital letters can also be employed as symbols for a movement in instrumental music (Sholikhah, 2019). After analyzing the structure of the shape on the sample songs (Table 1), a standard form is obtained which is described in the following scheme:

Introduction	A	A'	B	B'	Interlude	A'	B	B'	Coda

Information :
Introduction : An opening musical sentence of a song
A : Verse 1
A' : Verse 2
B : Chorus 1
B' : Chorus 2
Interlude : Musical sentence in the middle of the song (Vocal pause)
Coda : Closing sentence of a song.

Based on the structure above, we see that several periods contain different melodic themes. The theme of the melody is the main idea of each part. As we know, the melody is a horizontal arrangement of notes that conveys musical ideas to listeners. As one of the main elements, this melody needs to be well prepared in terms of tone composition and selecting the right musical instrument/equipment. At this stage, the arranger works to determine the orchestration related to the determination of the musical instrument and Timbre that will be used later. Because Minang pop music is vocal music with Minang nuances, an arranger chooses musical instruments according to the characters he needs so that the nuances of Minang music will persist in his music later.

Instrumentation

This discussion is limited to the melodic instrumentation used in the Introduction, filler, interlude, and outro/coda melodies, because

vocals will undoubtedly perform the verse part of the melody. Pop Minang today has evolved into music with a new identity. The ability to adapt to technological developments makes Minang pop songs more interesting to observe and discuss. One of them is from the point of view of instrumentation selection. The story of technology has pushed the Minang pop song industry to develop. The Instrumentation of the Minang pop song melody has changed but does not leave the main values in the strength of the musical melody. The thing that has been the strength of Minang pop songs since ancient times is the unique melodic ornamentation, namely the presence of sayik and garcinia ornaments. The two ornaments are typical in the melodic structure of Minangkabau regional music/traditions.

Technological developments in the Minang pop industry positively impact Instrumentation in contemporary Minang pop songs. The melodies of Minang pop songs, usually played by midi instruments with poor quality, have changed. At this time, the melody sounded more brilliant and clearer compared to the Minang pop song arrangements in the past. Based on an interview with a Minang music arranger at the Indoswara Padang studio, namely Vandy Satria, he said that melodic sound is currently using better technology in the recording process, and midi technology has also developed and is of better quality.

To find out how the Instrumentation of Minang songs today is, several samples of Minang songs that were trending on the YouTube platform were analyzed (Table 1). This was done to see what instruments were used. So that we can arrange the instrument map on the melody line.

Table 1. The result of audio analysis of timbre instrument in several selected minang pop songs. (Source: Original processing by the authors)

No.	Judul Lagu	Melodic Phrase			
		Intro	Filler/ Transision	Interlude	Coda
1.	Luko Badarah Ulang (Singer: pinki prananda ft. Eno Viola)	• Bansi • Clean Guitar	• Clean Guitar	• Bansi • Clean Guitar	• Bansi • Clean Guitar
2.	Minyak Habih Samba Tak Lamak (Singer: david iztambul & ovhi firsty)	• Bansi • Clean Guitar • Overdrive Guitar	• Overdrive Guitar • Clean Guitar	• Clean Guitar • Bansi • Overdrive Guitar	• Bansi • Overdrive Guitar
3.	Bidadari Sarugo (Singer: Opik ft. shany)	• Bansi • Clean Guitar	• Overdrive Guitar • Bansi • Saluang	• Clean Guitar • Bansi • Saluang • Violin	• Clean Guitar • Bansi • Saluang • Violin
4.	Talambek Datang (Singer: Ovhi firsty)	• Clean Guitar • Bell • Bansi	• Bansi • Overdrive Guitar • Violin	• Clean Guitar • Bell • Bansi	• Clean Guitar • Bansi

Based on the observation table (Table 1), several instruments appear, e.g. Accoustic Guitar, Bansi, Overdrive Guitar, Bell, Saluang, and Violin. The results show three instruments appear in every song, e.g. Acoustic Guitar, Overdrive Guitar and Bansi. The arrangement of Minang Minang pop songs which in the past was often dominated by traditional instruments such as Talempong, Saluang and Bansi, has now changed with the dominance of Guitar instruments. This Guitar instrument is an instrument that is currently trending in Minang pop song arrangements. Almost all Minang songs today use this instrument in the introduction, interlude, and coda sentences (Meigalia & Satria Putra, 2018).

Acoustic Guitar

Based on the interview Minang song arrangers in the city of Padang, the color of Guitar came from an acoustic instrument recorded using a Soundcard and DAW (Digital Audio Workstation). The color of the sound produced by this acoustic guitar instrument is transpicuous while the impression of the noise pick sound on the Guitar remain. The appearance of the original sound of the instrument is still felt. Based on interviews with sources, he explained the process of recording the sound of this Guitar. The equipment includes a Soundcard and a Yamaha F310 Guitar with Fishman Preamp.

Installation for guitar recordings using a good quality canon jack with a path to one of the channels on the soundcard, then the soundcard translates the analog data into a computer device running the DAW. and the DAW starts processing the recording to produce digital audio data. According to the data source, apart from adjusting the reverb and delay, the audio data is re-edited with adjustments to the compressor and equalizer so that the sound sounds more stable and clearer (Kim & Cho, 2011).

Bansi

The Bansi instrument is one of the most popular Minang traditional musical instruments. This is due to the soft and lilting character of the sound. This instrument has the potential to play

moving melodies with soft Minang accents such as *saik*, and *garinyiak*. In today's Minang pop songs, arrangers rarely use original (acoustic) bansi, based on an interview with Vandi satria in Indoswara. The current bansi sound production uses one of the VST Plug-Ins Sample Tank 2 with the Indian Flute sound library. This arranger is reasonable if the sound color produced by the VST Plug-Ins is similar and has good sound quality. Apart from that, this is also done to save production costs, which means that producers don't need to look for bansi players anymore to do the recording process because the VST Plug-Ins can represent them.

Overdrive Guitar

The structure of the form of Minang pop songs today has a structure that is almost the same as Malay songs in general due to the presence of a song door at the beginning of each sentence or sentence displacement. In this transitional space, the melody with overdrive guitar timbre serves as an introduction to the next verse, especially in the transition from verse to chorus. This is also the arranger's strategy to increase the tension in the arrangement. This melody is often referred to as filler., Overdrive guitar with a slightly rough sound color causes the transition melody to be more contrasting between the verse and the chorus so that the dynamic changes become more pronounced.

Based on an interview with Vandy Satria, the overdrive guitar sound comes from VST Real Eight. Some arrangers also use VST Real PC. These two VSTs are often used because the character of the sound in the VST is quite suitable for producing guitar distortion sounds. In addition, Vandy also said that using VST aims to make it easier for arrangers to work on their melodies because to reduce production costs, an arranger can also play the melody with his midi controller without the need to find a professional guitar player.

Analysis Timbre

When we listen to music, we hear various sounds produced by different musical instruments. Musical instruments are producers of tones in the form of ordered sounds with multiple frequencies, and sometimes, we will hear sounds that seem smooth, soft, or thin, and sometimes, we also listen to sounds that appear strong, fat, dense, and heavy (Dunbar & Cooper, 2020). This is due to the variety of musical instruments/sound-producing instruments in the music to produce sound waves with different harmonic frequencies (Noble & Cowan, 2019). The color of the sound or the characteristics of the sound produced by the musical instrument is called the Timbre.

Timbre is a characteristic of a sound or voice. If we analogize it with fruit, we can compare the Timbre to apple fruit with various flavors. Apple is a fruit that is synonymous with a sweet taste. Although all apple are round or oval and have many colors, each apple turns out to have a different taste. There are lovely and sour, and sometimes there are just bland. Likewise, with the texture, there are soft Apple, some are melted, and some are dry. Each Apple has different taste characteristics. Likewise, with the Timbre that comes from musical instruments, there are always differences even though the two instruments are of the same type. In daily life, we can also detect timbre from the human voice that is around us, and there is always a characteristic when we hear the voices of grandmothers, mothers, and sisters talking. That characteristic/difference makes us able to digest and distinguish the quality of the sound produced by the vocal cords. Each of them (Wadley et al., 2007).

The existence of Timbre in a piece of music is fundamental because Timbre is one of the main elements that give character, characteristics, and even identity to a piece of music. Unlike the study of some musical features such as pitch and the loudness/softness of a sound (Ferdian et al., 2020). In today's Minang pop song arrangements, the study of Timbre has two essential things that become the main focus, the first thing is the instrument used as a sound producer, and the second is the physical dimension of the audio/sound produced. In this physical dimension, we will discuss the shape of sound waves and what elements make a difference in color in each melodic Timbre.

The physical dimensions of a sound can be viewed from several aspects. It can be in terms of Amplitude, time, waveform, and frequency. What

we know as sound is a longitudinal mechanical wave with a frequency in the area of our hearing (audio frequency), which is between 20 Hz to approximately 20,000 Hz (Ishafit, Khairil Anwar, 2018). In producing sound in the form of tones, a musical instrument has frequencies from vibrations that come from the sound source on the music instrument. It can be from string friction, guitar strumming, stick strokes, reed vibrations, and vibrations on the mouthpiece. These vibrations propagate through the medium of air to form sound waves.

Two types of frequencies will appear when a musical instrument plays one tone. Namely, the fundamental frequency, which is the primary position of the tone, (Shankland & Coltman, 1939) and several different frequency series or the Overtone Series (OS). Each Timbre has its OS. This OS gives a character to the sounds that our ears can hear. The OS is a series of other frequencies that appear together, either lower or higher than the fundamental frequency. For example, when we play a middle C or C3 note on a piano or Guitar with a fundamental frequency of 261.6 Hz, we produce sound waves at a different frequency. Each guitar tone is made of several waves with varying frequencies. If we listen carefully, we can hear other frequencies below or above the existing fundamental frequency. The existence of this frequency is very diverse in terms of Amplitude and number. Sometimes some sounds have multiple OS, and some consist of only a few OS. This OS has a big hand in the formation of a timbre

In this discussion, we will look at the physical dimensions of the Audio of the Acoustic Guitar, Bansi and use two types of applications, namely the Spectrum Analyzer Izotope Insight 2 and the Ableton Live10 spectrum. Izotope Insight is used to view the frequency distribution, and secondly, Ableton Live 10's Spectrum plug-ins are used to view the OS in terms of frequency, Amplitude, and pitch.

Acoustic Guitar

The Acoustic Guitar audio data were processed in the DAW Ableton Live 10 then the track is given a plug-in, namely Spectrum Ableton Live10.

Figure 1 are the data generated after inputting Acoustic Guitar audio data into the Ableton Live10 DAW with Spectrum Plugins. Figure 1 uses the x-axis = Frequency and the y-axis = Amplitude, while Figure 1 uses the x = pitch axis and the y-axis = Amplitude. The figure shows the indentation of the wave at many frequency levels. Each curve has a different pitch and Amplitude. The leading tone used in this one sound wave is C4 with a fundamental frequency (ff) of 524 Hz (Permana et al., 2014). Then in this sound wave, there are also many OS with various pitch and Amplitude, ff and Acoustic Guitar OS can be seen in the Table 2.

In the Table 2, the wave with the highest Amplitude is the C4 tone, which is the fundamental frequency with a position at 520 Hz and an amplitude of -19.7 dB. The number of OS of this Timbre is quite a lot. The spectrum analyzer identified at least more than 30 OS. Although with smaller Amplitude along with the higher frequency position of each

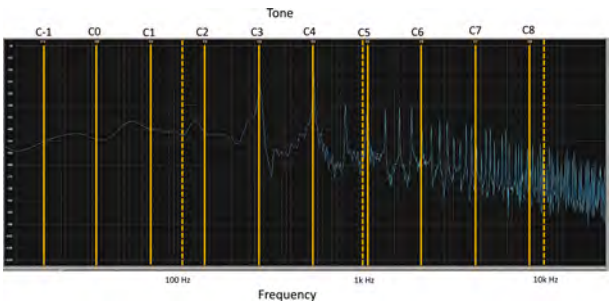

Figure 1. Accoustic guitar wave in Ableton Live10 Spectrum Frequency where Ff = C3, yellow line is tone and dashed yellow line is frequency in Hertz, y-axis= amplitude in dB. (Source: Original processing by the authors)

Table 2. The frequency and amplitude of accoustic guitar in C4 tone. (Source: The result of original audio processing by authors)

No.	Tone	Wave Type	Frequency	Amplitude
1	C3	Overtone Series (OS)	262 Hz	-26.9 dB
2	C4	Fundamental Freq	524 Hz	-19.7 dB
3	G4	OS	785 Hz	-35.9 dB
4	C5	OS	1.04 kHz	-37.8 dB
5	E5	OS	1.31 kHz	-38.8 dB
6	G5	OS	1.57 kHz	-37.4 dB
7	A#5	OS	1.83 kHz	-36.4 dB
8	C6	OS	2.09 kHz	-45.7 dB
9	D6	OS	2.37 kHz	-46.9 dB
10	E6	OS	2.63 kHz	-43.4 dB
11	F#6	OS	2.90 kHz	-44.1 dB
12	G6	OS	3.17 kHz	-53.0 dB
13	A6	OS	3.44 kHz	-54.1 dB
14	A#6	OS	3.70 kHz	-45.9 dB
15	B6	OS	3.97 kHz	-46.9 dB
16	C7	OS	4.24 kHz	-56.4 dB

OS. With the increasing number of frequencies that appear in one sound, the Guitar in this Minang song melody is categorized into a rich sound because it contains so many colors from the appearance of the OS that appears (Mcadams & Siedenburg, 2019).

Figure 2 are 3D spectrograms that show the physical presence of Acoustic Guitar waves with X axis = Frequency and Y Axis = time. In the spectrogram, the largest Amplitude is based on the brightness level of the color produced by the wave, with the highest wave at 524 Hz, followed by one OS at a lower frequency of 262 Hz. The frequency table in Giancoli's table, the frequency 262 is a tone one octave lower than C4, which is C3 (Ishafit, Khairil Anwar, 2018). Then the other OS is at a higher frequency than the fundamental frequency.

In Figure 3 is a waveform in one sound period, this picture shows how acoustic guitar audio waves survive the passage of time or in sound design terms it is called release time, which is about how long the duration of a wave lasts in one sound period (Wahyudi & Rahayu, 2015). In the figure, the x-axis = time and the y-axis = Frequency. There are

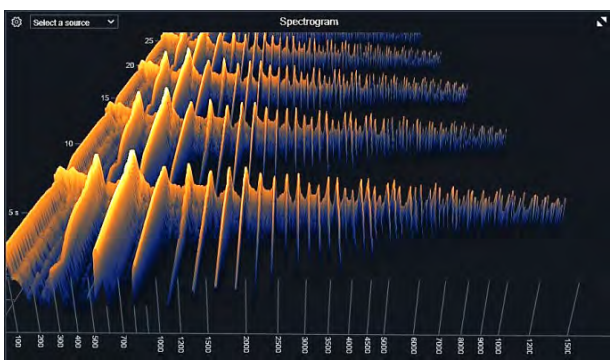

Figure 2. Accoustic guitar wave in Spectrogram 3D where the fundamental frequency is in C3. (Source: Original processing by the authors)

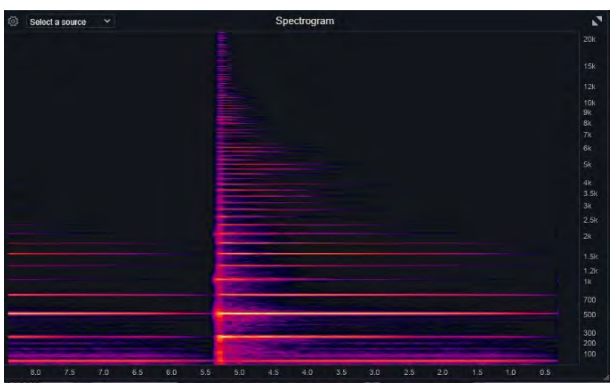

Figure 3. Acoustic guitar wave in Spectrogram 3D Wall of Sound 2 where the fundamental frequency is in C3. (Source: Original processing by the authors)

3 frequencies that last long enough, namely FF = 524, 262 Hz, and 780 Hz with a duration of one period of 5 seconds. It can be concluded that the release time on this acoustic Guitar shows that the higher the OS, the faster the amplitude of the frequency decreases (Wibowo, 2017).

Bansi

Many Minang pop song arranger used sampletank2 as one of the VST Instruments in the preparation of Minang song arrangements. The spectrum of the Bansi sound in the Ableton Live 10 spectrum is shown in Figure 4.

Figure 4 shows the distribution of sound frequencies in the range of 500 Hz-7 kHz Figure 4 uses the x = absolute pitch. Figure 4 shows the position of the leading tone, namely the C4 tone with the highest Amplitude, followed by the OS with a weaker amplitude. The OS on this Bansi can be seen in the Table 3.

The data table below recapitulation shows that the highest Amplitude is at the fundamental frequency with -18 dB, followed by seven OS with weaker amplitudes at higher frequencies with C5, G5, C6, E6, C7, E7, and C6 tones. G7. In addition to the higher frequency, there is one sound frequency at a

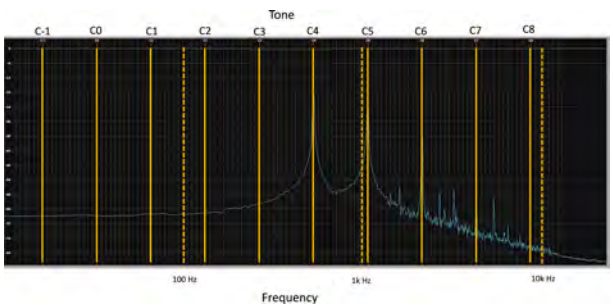

Figure 4. Bansi wave in Ableton Live10 Spectrum Frequency where, Ff = C3, yellow line is tone and dashed yellow line is frequency in Hertz, y-axis= amplitude in dB. (Source: Original processing by the authors)

Table 3. The frequency and amplitude of Bansi in C4 tone (Source: The result of original audio processing by authors)

No.	Tone	Wave type	Frequency	Amplitude
1	C3	Overtone Series	262 Hz	-26.9 dB
2	C4	Fundamental Freq	524 Hz	-18.4 dB
3	C5	OS	1.04 kHz	-20.1 dB
4	G5	OS	1.57 kHz	-56.7 dB
5	C6	OS	2.09 kHz	-33.6 dB
6	E6	OS	2.63 kHz	-59.8 dB
7	C7	OS	4.24 kHz	-58.0 dB
8	E7	OS	5.21 kHz	-60.4
9	G7	OS	6.26 kHz	-61.8

lower frequency, namely C3, with an amplitude almost the same as OS G5. The lower frequency has an essential function in forming the timbre of this bansi instrument because bansi is a musical instrument that plays a role in playing a melodic melismatic melody. The strains of the bansi melody required a soft character so that the melody played is heard. The low tone on the Bansi OS gives a thick and soft feeling to the resulting timbre and more comfortable to listen. This is evident in filtering high frequencies with the high-cut filter technique. Besides, the low frequencies give a smooth and soft feel to this bansi timbre (Wallmark & Kendall, 2021).

Figure 5 and Figure 6 are bansi sound waveforms generated in the form of 3D spectrograms and a Wall of Sound. Figure 5 shows the power level of each OS. a high bend shows higher Amplitude than the others, here it is seen, the most robust Amplitude is in the C3 (OS), C4 (Fundamental frequency), and C5 (OS) notes. Seeing that the amplitude of the three frequencies is relatively high, it can be said that these three frequencies

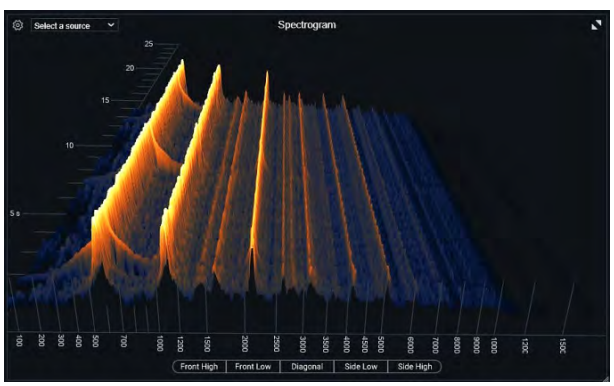

Figure 5. Bansi wave in Spectrogram 3D where the fundamental frequency is in C3. (Source: Original processing by the authors)

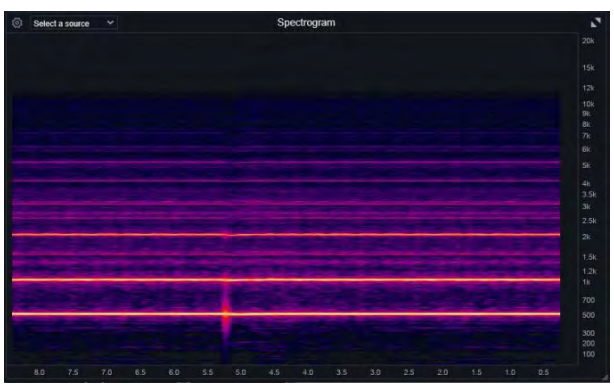

Figure 6. Bansi wave in Spectrogram 3D Wall of Sound 2 where the fundamental frequency is in C3. (Source: Original processing by the authors)

have the most significant role in the formation of the Timbre.

In Figure 6, the distribution of frequencies with the x-axis = time (s) and the y-axis = frequency (f). Figure 6 explains the attack, sustain, and release levels of the bansi instrument. The level of persistence of bansi sound in one period, commonly known as release time. From Figure 6, it can be seen that the release from this bansi is 0 ms. The color produced by the spectrogram shows the sound waves are not interrupted or reduced since the bansi sound sounds in one period. Bansi is a wind instrument that played by blowing it. Although the bansi instruments used in Minang songs are not played with acoustic instruments, the VST Plugins used are identical to the original instruments.

Based on the data obtained in the Figure 4, Figure 5 and Figure 6 , it can be concluded that the bansi used in today's Minang song arrangements is an instrument with an excellent quality sound/timbre. This can be seen from the pristine quality of the spectrogram in Figure 5. The curvature of the spectrogram is very stable, and there are not many visible indentations at the tops of the curves. The stable curve shape and minimal presence of noisy signals demonstrate the excellent quality of timbre in the audio/waveform of contemporary Minang pop songs. In the curve shown in Figure 5, only the fundamental frequency and overtone series are prominently visible. Other frequencies are not visible at all or have very low amplitudes In addition, this Bansi timbre has a smooth and soft nature because the few number of OS and coupled with the presence of an OS at a frequency lower than the fundamental frequency, which will form a thicker and softer timbre.

Conclusions

Timbre's analysis of contemporary Minang pop song material aims to provide us with the latest references on developing song arrangements that are increasingly developing towards more creative and innovative ones. From the data and analysis in this paper, it can be concluded that the melodic Timbre of today's Minang pop song arrangements

has experienced significant development. This cannot be separated from the advancement of recording studio technology, which provides many alternatives for producers and arrangers in innovating in their latest works.

After analysing some of the song materials, it was found that three timbres showed their dominance, namely Acoustic Guitar, Bansi, and Overdrive Guitar. The three instruments always appear in every Minang pop song arrangement currently circulating. Acoustic Guitar and bansi always appear in the Intro, Interlude, and Coda, while the overdriven Guitar appears as a melodic filler at the song's change of phrase/period. Acoustic Guitar in Minang songs today comes from acoustic Guitar, bansi comes from VST Instrument Sampletank2, and Overdrive Guitar comes from VST Instrument real Eight Guitar. Even though they come from electric instruments, it can be said that these three melodic timbres have their characteristics, thus giving a new identity to today's Minang song arrangements.

With the increasing number of novelties that appear at this time in the pop music industry, it is hoped that Minang pop music can survive and grow so that it can continue to compete in broader and more competitive markets.

Acknowledgement

The authors would like to express Lembaga Penelitian dan Pengabdian Masyarakat Universitas Negeri Padang for funding this work with the contract number: 716/UN/35.13/LT/2022. We also thank Vandy Satria from Indoswara Music for providing the data.

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