

Scoring Music for Montage Movies

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Abstract—Music is an appreciation of the contents of the human heart, which is expressed in the form of sounds that are arranged in melody or rhythm and has beautiful elements or harmony. Today's music is not only a composition that is presented specifically for the sake of music itself, but music can collaborate with other visual arts such as movies. In the movie itself, there are various forms of editing techniques, for example, montage. In the montage, a shot is not only connected with other shots but must be reunited or made into conflict (the attraction of montage) to produce strong or deep meaning. The role of music/audio as a constructor of the atmosphere in a movie is called scoring. Scoring can also mean communication with the audience that supports the visual aspects presented in the movie so that the message from the movie can be delivered well, especially movies that use special editing techniques such as montage, which will be increasingly difficult to understand when not using right music elements. This research is expected to be a reference in understanding the technique of scoring music for ordinary people.

Keywords— *montage, movie, scoring music*

I. INTRODUCTION

Music in a movie has been presented since the first time the movie was screened on December 28, 1895, by Lumière (Auguste Marie Louis Nicolas and Louis Jean). Roger Manuel said, the era of silent movies was an era where music became a back sound on a movie for various reasons, including as a silencer for the noise of the projector during screenings, the legacy of the theatre tradition, and as the giver of "depth" or atmosphere builder of the silent movie [1].

In addition to communication media, movie is now also an entertainment facility that presents various emotional sensations to its audience [2]. According to Paransi, the virtuality of a movie presents a logical and patterned structure, which there is an "inner" structure in the form of plots/story line, as well as "outward" structure built by shot, scene, and sequence [1]. For the sake of achieving the virtuality of the movie, various editing techniques in a movie have now been carried out. One of them is montage.

Montage movie is a film editing technique that increases space, time, and information from a series of short films. The purpose of montage editing is to create deeper meaning or create a solution to a problem presented in the story. The thought of montage in the application of editing itself must pay attention to the continuity of images that are not related but can be a new meaning, such as $A + B = C$ [2].

Like movies in general, in a movie that uses the montage technique, not only the visual elements play an important role but the audio elements like back sound and sound effects are also crucial for the creation of atmosphere and character in the

movie [1]. This is done so that the sensations and emotions in a movie can be felt by the audience so that they can conclude the message of a movie. The storyline in a montage movie will be even more difficult to understand if it does not use the right audio element. Changes between shots combined to produce stronger or deeper meaning will be in vain because the audio aspect does not support the audience's understanding of the montage movie.

The activity of determining and placing audio aspects into a visual form is commonly called music scoring [3]. The music score is a way to make the scene of the movie more dramatic with a suitable tone placement technique so that it can provide the right nuance in the scenes on a movie.

Over time music used in movies not only uses real instruments, but also through digital processes. Artists use a software to make more complex music arrangements. A computer that includes this software can be referred to as digital audio workstation (DAW) [4]. The use of DAW software in the musical scoring process can certainly make it easier for people who do not have a musical background because they do not need to learn various types of musical instruments and advanced music theory.

II. LITERATURE REVIEW

A. Montage

Montage Sequence or often called montage is a series of shots that show a series of events from time to time [5]. In Mr. Montage's way of thinking, Sergei Eisenstein, he applied the theory of film editing as a clash between images and ideas. Film editing techniques that combine two or more shots to generate ideas or create a thought is called juxtaposition. A montage can be a juxtaposition of two shots, but generally refers to a juxtaposition of several shots that describe a stretched event or compressed time.

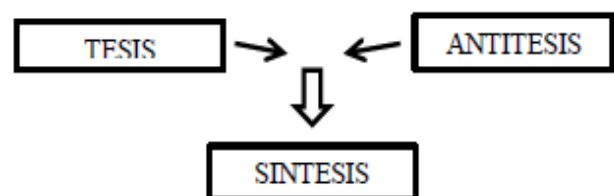


Fig. 1. Montage Concept of Sergei Eisenstein [2]

The dialectical principle used by Sergei was in accordance with the subjects connected to the problems or events of pre-revolution and revolution [2]. This thought was formed because the ideology adopted in the country of Sergei was

Marxism, especially the dialectic of materialism, from which the conflict theory emerged, where an idea (thesis) must be clashed with another idea (antithesis) to produce new thinking (synthesis). A shot should not only be connected with another shot but must be brought together or made into a conflict (montage attraction) in order to produce a stronger meaning as in Figure 1.

B. Music Theory

Music is a high-low arrangement of tones that go over time. This can be seen from the musical notation that describes a time in a horizontal direction, as well as high and low tones in a vertical direction [6]. In "The Merriam Webster Pocket Dictionary", a book written by Joseph states that music is the art of combining the notes so that they are fun, express feelings, or understandable. In general, music is a branch of abstract art in the form of sound and consists of elements such as rhythm, melody, harmony and tempo.

Rhythm is the length of time of a sound. Varied note (pitch) symbols illustrate the rhythm. Silence is also illustrated by symbols called rest (rest) as in Figure 2.

Furthermore melodies are a series of tones that complement the linear aspects of music [7]. Melodies are more comfortable to recognize than define. Like a sentence, the melody must be arranged to have a meaning.

Chord progressions (harmony) are a way of constructing chords and making these chords complement each other with one another [7]. Chords are a combination of three or more different tones which are played simultaneously. Harmony in music refers to the order in which chords are played in a song/musical work. In several different songs, it can be seen that there are various ways for composers to arrange chords to form a harmony.

Last is the tempo. The tempo is one of the important factors in making music. "Tempo" comes from Italian which means time. In music, tempo means the speed of a musical composition [8]. With the advent of the metronome, a mechanical device used to calculate time, now musicians can calculate how many beats per minute occur in music (BPM)

[8]. Here are some of the most common forms of tempo in BPM:

- Largo - very slow (40 - 58 BPM)
- Adagio - slow (60 - 76 BPM)
- Andante - speed like walking (80 - 106 BPM)
- Moderato - medium speed (108 - 118 BPM)
- Allegro - fast, cheerful (120 - 168 BPM)
- Presto - very fast (170 - 220 BPM)

C. Music Theory

Music scoring is a way to determine and put the audio aspect into a visual form. This is done so that the message in the scene of the film becomes more striking with the appropriate tone placement technique. Music scoring activities are not the same as making soundtracks because music scoring tends to be without lyrics [3].

Raggil Suliza found that music familiarity cannot sufficiently influence the consumers' intention to watch, instead of the music congruency can increase the intention to watch [9]. Using rhythm, tempo and melodic harmony or dissonant tone, music scoring conveys moods, emotions and characters in ways that dialogue cannot do [10].

Stuart Fischhoff, in his journal "The Evolution of Music in Film and Its Psychological Impact on Audiences" shows some practical rules in music scoring that have emerged over the years based on music psychology [11].

To show strong emotions in a scene, using louder music is the best way. If music only tells what is known from the action on the screen, it does not add anything emotionally [12]. Additional music is not needed in the scene.

The use of string instruments is very effective in dialogue because they are not against the voice of dialogue. If the sound effects are dominant in the scene (bells, trains, etc.), then the music must be soft enough to increase emotional, not to disturb the sound effects that existed [13].

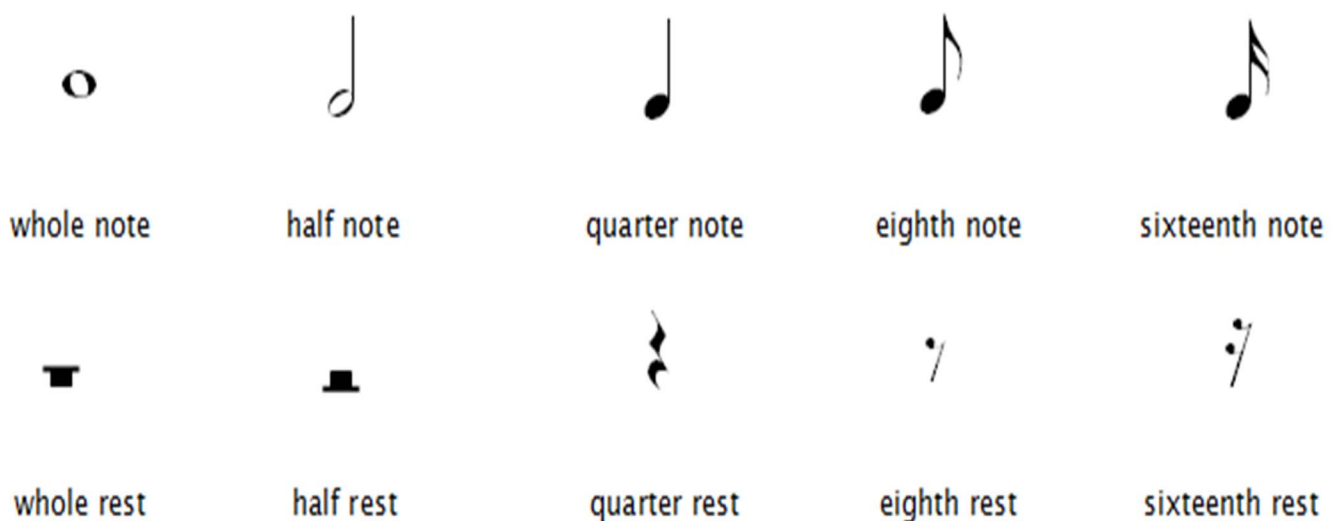


Fig. 2. Notes and Rests

III. METHODS

The method used in this paper is descriptive method. This method is intended to witness certain individual phenomena, situations, or groups that occur in the present. This descriptive method divided into four steps. The four steps as in Figure 3 consist of collecting data, designing, music making, then results and discussion.

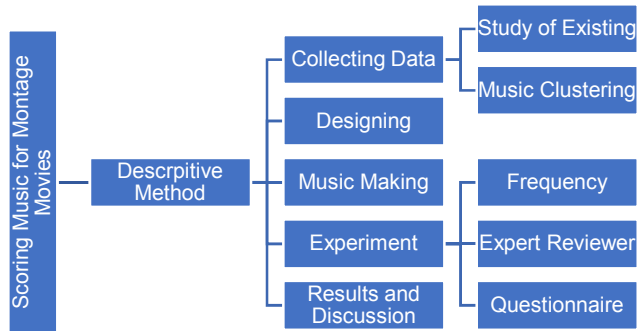





Fig. 3. One of the Scenes in Montage Movie

A. Study of Existing

The existing study is the process of gathering music references in movies which contain montage sequences. The results of this study are then divided into several music clusters. The following Table 1 is half of the result of an existing study.

TABLE I. EXAMPLE OF AN EXISTING STUDY

Movie Scene and Tempo	Instrument	Pros	Cons
 Up (2009) 07:17 – 11:30 <i>Moderato</i> (105 – 115 bpm)	Piano string, Violin, Cello, Harmonica	The music used is suitable for happy and sad scenes.	Too difficult if music is made using DAW because there are many instruments and melodic variations used.
 Wall-E (2008) 29:01 – 31:32 <i>Andante</i> (95 – 109 bpm)	Drum Kit, Double Bass, Violin, Maracaas, Choir, Piano, etc.	-Suitable for happy scenes. -Tempo used is very suitable with the theme of the film.	Too difficult if music is made using DAW because there are many instruments and melodic variations used.
 The Theory of Everything (2014) 1:55:05 – 1:56:40 <i>Andante</i> (81 – 100 bpm)	Piano String, Bass, Viola, Cello	-Suitable for sad scenes. -The tempo that is not too fast fits perfectly with the theme of the film.	- The chord progression in each instrument is quite difficult for beginners - Mixing orchestra-themed songs on DAW is still rare because it is generally done by recording.

B. Music Clustering

The existing study is the process of gathering music references in movies which contain montage sequences. The results of this study are then divided into several music clusters. The following Table 1 is half of the result of an existing study.

TABLE II. CLUSTER OF MUSIC

Number	Scenes	Instruments that are often used
1.	Sad	Piano, Bass String, Violin, Cello, Viola, etc.
2.	Happy	Piano, Violin, Bass, etc.
3.	Angry	Piano, Double Bass, Viola, Violin, Cello, etc.
4.	Tense	Piano string, Bass, Viola, Cello, etc.
5.	Flat / relaxed	A solo instrument such as acoustic guitar, piano, etc.

C. Music Concept Designing

The designing step is an advanced step after the data is collected. The concept of music is determined based on a shot list that refers to a cluster of music table that has been made previously. The following are presented Table 3 which shows half of the musical concept of the montage movie.

TABLE III. MUSICAL CONCEPT OF MONTAGE MOVIE

Time	Scene	Shot	Music	Instrument	Tempo
17"	Alya's Room	- Display a clock - Alya opened her eyes - Alya uses lipstick - Alya combs her hair in front of the mirror	Classic, Sound Effect	Piano, tickling clock	Andante
20"	Boss's Room	- Alya opened the door to the boss's study room - Arina and her boss are shaking hands - Showing Alya's eyes without blinking - Showing Arina's cynical smile - A hand lights a match	Sound Effect	Open door	
17"	Office	- Arina walked, looking from behind - Arina's flat face - Fire from matches - Showing Alya's eyes not blinking - Alya stands in a hallway - Hand paper wiping - Alya's feet hurried - Alya goes on - Fire from matches - Alya took pill medicine - Alya walked slowly in the dark hallway - Alya stops at a window	Classic, Sound Effect	Piano, violin, crackling fire, walking fast	Modero

D. Music Scoring

Music scoring for montage movie has a total of 22 tracks compiled consisting of instruments, effects of instruments, and sound effects. The instruments consist of 5 types: piano, strings, violin, cello, and choir. The main instrument of music scoring in this movie is the piano. The montage movie can be watched through intip.in/MontageMovie.

The following figure 5 shows the piano notation in the whole film and Figure 6 shows the strings notation in the whole film as well. Listen to the piano and strings each through intip.in/PPiano and intip.in/PStrings.



Fig. 4. One of the Scenes in Montage Movie

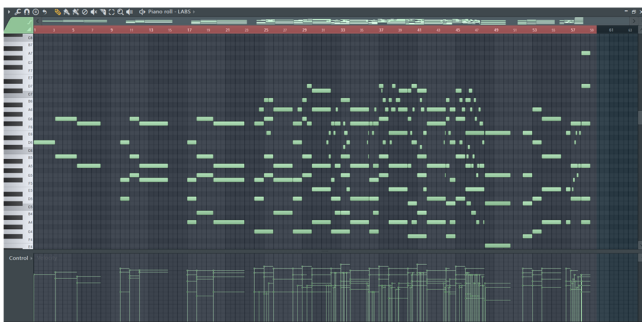


Fig. 5. One of the Scenes in Montage Movie

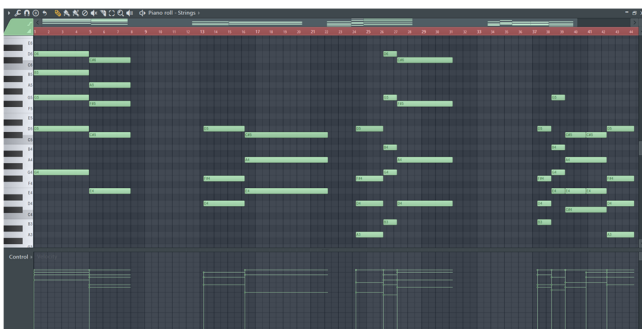


Fig. 6. String's Pattern

Strings are not always used in this movie but only appear at certain times as a form of emphasis on the scene that is happening. In addition to the deeper sound produced by the strings, solo violin and cello are added to each end of the strings. The violin and cello through as a solo string can be downloaded through intip.in/PSoloString. The following is Figure 7 which shows the notation of the violin and cello.

Finally, the choir is used throughout music as in figure 8 as ambience so the music is not too quiet when the piano stops playing. The choir through sound can be downloaded through intip.in/PChoir.

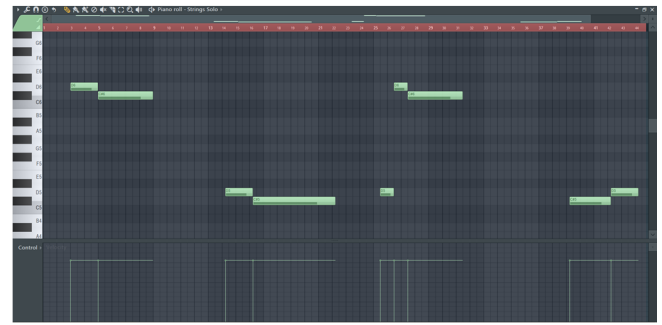


Fig. 7. String's Pattern



Fig. 8. Choir's Pattern

Figure 9 shows the whole composition of the instruments used in the montage movie. In this montage movie the tempo used is 110 BPM. This is because the montage movie does not experience changes in complex storylines. The music is minimalist but still effective in creating the atmosphere. The whole music composition in the montage movie can be downloaded through intip.in/MontageMovieMusic.

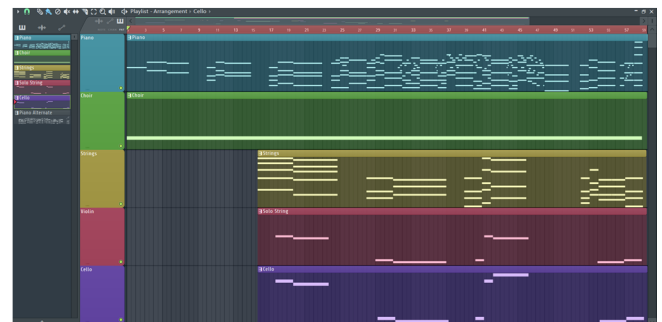


Fig. 9. Playlist

E. Audio Mixing

Audio mixing is the process of all instruments combined into one, then set the necessary parameters in such a way that the mixture of sound between tracks can produce harmony. The audio mixing process includes volume setting, panning, equalizer, and adding effects needed in each track.

At the beginning of making music when composing a piano roll notation, at the bottom, there is one feature on the piano roll called control. Inside there is one parameter namely velocity. This velocity setting adjusts the sound frequency produced in each notation on the piano roll [14]. The velocity setting can be seen as shown in Figure 10 below.

The settings on the velocity aim to give harmony to the instrument so that the various instruments do not stand out and overlap. Therefore, the velocity on each instrument needs to

be adjusted so that the mixing of the music can be more harmonious [15].

Figure 11 shows a mixer on FL Studio 20. The mixer feature is used to control all instruments. So after each instrument has its velocity set in the piano roll and has been arranged in the playlist, the next mixing step is setting through the mixer. The purpose of using a mixer is setting the volume of each instrument, panning an instrument, and giving effect to the instrument.

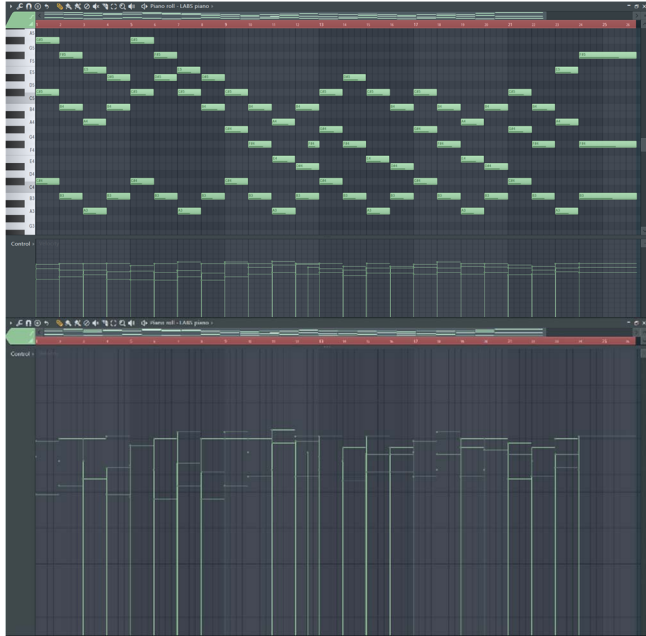


Fig. 10. Velocity

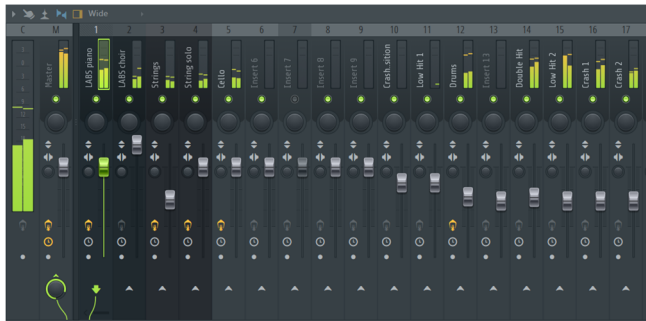


Fig. 11. Mixer

F. Audio Mixing

In this Montage Movie, the sound effect that is used as a whole is a sound effect that is recorded directly on the spot and then added to the playlist as a sound effect.

G. Frequency

Figure 12 below shows a free software called Audacity. Audacity is a sound effects software that is open source / free to use. This application built with the WxWidgets library so that it can run on various operating systems. In Audacity, we can analyze each instrument's frequency in the music that has been made using plot spectrum feature, so that it can be known that the right frequency is used for music scoring.

H. Expert Reviewer

An expert review is a person who works in the field of music composing, like people who understand or can play a

musical instrument. In this case, expert reviewer amounted to two-person whom each has a background of knowledge about music.

The first expert reviewer was named Masdito Bachtiar, a 28-years-old man who has been in the world of music producing for more than 10 years. Masdito currently works as a music composer at Mojiken Studio, an indie game manufacturing industry. He also worked as a freelance composer labelled Ittou's Soundworks.

Then the second expert reviewer was Zuhul Maulana Firdaus, a 19-years-old student. Zuhul has known the world of music producing using FL Studio since junior high school. Starting from the EDM community at JITC Surabaya, Zuhul met Masdito who later invited him to join Ittou's Soundworks.

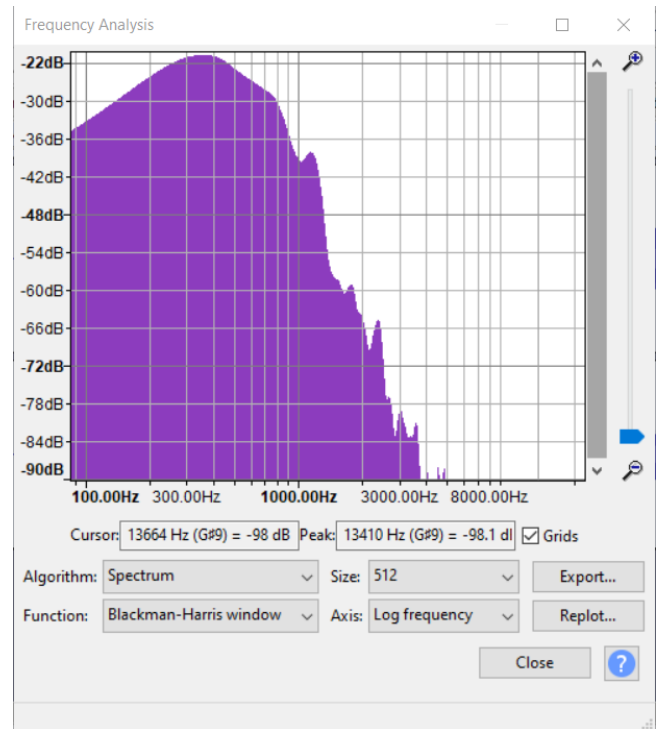


Fig. 12. Spek Spectrum Analyzer

I. Questionnaire

Questionnaire method used to retrieve data about the response of the audience to audio in general or subjectively. Questionnaire respondent amount of 20 people with an age range 20-22 years old.

IV. RESULTS

After all the process of music scoring have done, we have obtained the results of the experiments that have carried out. There were three experiments conducted, the first one is getting the frequencies that used in the music scoring process, second is getting the review of experts, and the last is getting the review of audience by making movie screening and asking the audience to answer the questionnaire list.

A. Frequency

Can be seen in figure 13 that each instrument on the music score has a different level (dB) in each frequency. The highest range of level is dominated by the piano as the main instrument with the highest level value -25dB and frequency value 5000-7000 Hz. Then there is violin which has the lowest

range of level value -160 dB with frequency value throughout the music that is 20-25 kHz.

The range of audible sound is approximately 10 octaves around 20 Hz to somewhere between 16,000 and 20,000 Hz [12]. The sensitivity is low at the extremes but becomes much more sensitive above 128 Hz up to about 4,000 Hz when it again becomes rapidly less sensitive.

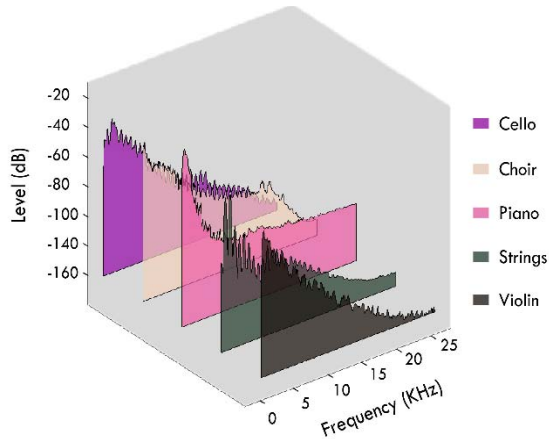


Fig. 13. Instrument Frequency

B. Expert Review

Here are the question and the answer points after the expert review process:

1) *Overall Opinion About Audio in Montage Movie:* The overall audio results in this montage movie as a whole are quite good and can create an atmosphere for the audience, but have disadvantages of less dynamic music.

2) *The Existence of Noise in Audio that is Presented for Montage Movie:* The two expert reviewers agreed with the statement that they did not hear any noise in the audio because digital music would not have noise, except if the author deliberately gave the instrument noise.

3) *The Presence of Jumping in Audio that is Presented for Montage Movie:* There is no jumping in every scene; only the music presented is less dynamic and seems monotonous.

4) *Audio and Visual Suitability in Montage Movie:* Some of the factors that make audio less suitable are less varied music, both the chord progression and the melody.

5) *Criticisms and Suggestions for The Music Scoring Research:* Masdito revealed that the piano used needs to be played more dynamic. In addition to playing arpeggio and also proper chord progression, voicing may also be one of the keys. Voicing is a tone selection on the piano. For example, a tense scene using a low C tone, then for happy scenes can use a high C tone. The 88 keys on the piano need to be explored more so that the music score can build an atmosphere that is visually relevant to the film. Zuhail also revealed that actually for music scoring, the most essential thing is to understand music theory first, then learn orchestration techniques for music in films. Finally, to be able to adjust the music made with visuals in the film, it can be started with lots of listening to songs/music scores for Hollywood films or other films.

6) *The Expert Reviewer's Willingness to Recommend to Others to Watch The Montage Movie:* According to Masdito,

this Montage Movie is actually enough to describe bullying and has also managed to convey a positive message. However, Masdito was not willing to recommend other people to watch this film because the music presented was still not acceptable for the general public. Whereas according to Zuhail, he was willing to recommend other people to watch Montage Movie but not to be enjoyed by the general public, but for experts in the music field to be analyzed as an evaluation material for future music scoring work.

C. Questionnaire

Figure 14 shows the results of respondent's answers to music in Montage Movie. For overall of the music, majority of respondents think that music in montage movie has built an atmosphere and that is good. For suggestions from respondents, audio is less able to increase the flow/emotion, less detailed sound effects, and audio and visual are less suitable.

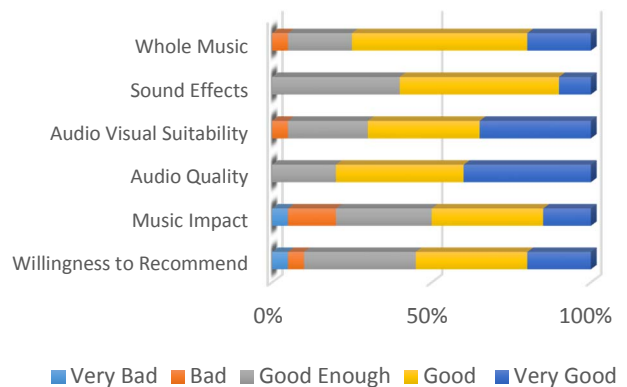


Fig. 14. Questionnaire Result

V. CONCLUSION

Based on the research and the experiments that have implemented, we concluded that: (1) This research conducted by the author who does not have a background in music field, so the results of this study are expected to be a reference for studies on how to score a movie for ordinary people. (2) The majority of expert reviewers think that the audio presented in the Montage Movie is quite interesting, although there are still some shortcomings such as piano play that is less dynamic and monotonous. The two expert reviewers also think that no noise was found in the instrument or the sound effects were presented, and the audio in the Montage Movie was sufficient in accordance with the visuals presented. (3) The majority of respondents think that the overall audio presented in the Montage Movie is in accordance with the visuals presented and also has good quality. The majority of respondents also thought that the audio was able to make them more interested in seeing the Montage Movie. (4) There are still some drawbacks to this research. There are some suggestions from expert reviewers and respondents such as the piano that is used needs to be played more dynamically, audio that is less able to increase the storyline/emotions, less detailed sound effects, and the audio and visual that does not match.

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