

Computer Graphical Score and Music Education: Application to Music Animation Machine MIDI Player

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Abstract. This paper shows how a graphical score has greater effect on music education than the traditional score in general courses at a university level. Generally students have difficulty in understanding music scores, thus music courses as a general selective at the university level need to provide them efficient ways to understand music. In this regard, a computer graphical score using a MIDI player is a very effective way to make students understand music structure and movement fast and accurately overcoming limitations in music class through only listening audio. Thus, this paper investigates how this computer technique can be used for music classes and discusses various cases a MIDI player plays a role in music education.

Keywords: Music programs, Music Animation Machine, MIDI Player, Graphical score, Music Education.

1 Introduction

This paper focuses on the fact that, since polyphonic (polyphony) started in western musical history, it is difficult for students whose major is music to analyze and follow songs by only using music listening and traditional scores. Therefore, it is very interesting that a recent computer application, Music Animation Machine MIDI player (hereafter MAM player) can be a effective tool for students by playing music through audio and visual monitor. MAM player is a freeware program made by Stephen Malinowski, and it has been uploaded to 'musanim.com'. This program can convert sounds to many kinds of visual graphics for people to follow songs easily, and it can play only midi files. This paper investigates how this computer technique can be used for music classes and discusses various cases a MIDI player plays a role in music education.

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The remainder of this paper is organized as follows: Section 2 presents explanation about visual effect models of ‘MAM player’. Section 3 shows the examples using MAM player. In section 4, conclusions are discussed.

2 Literature Review and Visual Pattern of MIDI Player

Traditional music education focuses on individual practice assisted by an instructor. [1]. Due to time and financial constraints most students only have one lesson per week [2]. Some interfaces such as Vuzik can be used for creating and visualizing music through painting gestures on a large interactive surface [3]. MIROR, music notation is used as the trace of both the user and the system activity, produced from MIDI instruments [4]. In the basic bar-graph of Music Animation Machine [5, 6], each note is represented by a bar with its length corresponding to the exact duration as performed as shown in Figure 1. Music Animation Machine MIDI Player is a graphical score converter computer program, which can open midi file and shows the graphical score like pictures below and the graphics from outputs form MIDI player is very simple to be used for beginner's music classes. Here are pictures which has visual effect expressed to graphical score in playing music. For example, top left-hand corner in Figure 1 shows the basic bar-graph.

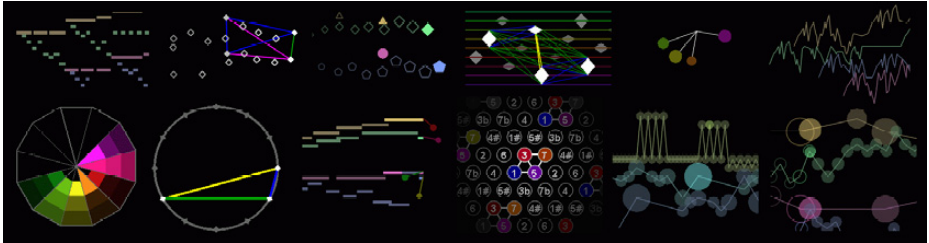


Fig. 1. Different graphical modules available on MIDI Player

3 Application Examples of Music Animation Machine MIDI Player

3.1 The Music before the 16th

In the western musical history, catholic traditional music, Gregorian chant (Fig. 2) is easy to be followed by general score, because it is a simple song using monophony and accapella.



Fig. 2. General score: Gregorian chant(mono voice style)

The image shows a musical score for three voices in Josquin des Prez's style. It consists of three staves: two treble clefs (Soprano and Alto) and one bass clef (Tenor). The lyrics are written below the staves. Two red boxes highlight polyphonic patterns where the voices imitate each other. A blue double-headed arrow points to a specific melodic line in the Tenor staff. The lyrics include: "il nous plus en de moi te non? non Ce pour" and "vient point nous en de moi te non non Ce pour".

Fig. 3. General score: Josquin des Prez(3voices style)

Figure 3 shows polyphony pattern, which is difficult for beginner to follow. In musical history, the outstanding skill, Melody Imitation made by Josquin des Prez of Flandre school has been used to make many songs polyphony. After then, it is very hard to teach and follow polyphony songs by using general score.

3.2 The Music after the 16th with Animated Graphical Score

In listening classical music, especially symphony is the core to understand the constitution of song, but its limitation is in difficulty to follow the constitution of songs by using general score. However, using a graphical score, songs show simple visual forms effectively. So, beginners can easily follow music by using a graphical score. Figure 4 shows how Ludwig van Beethoven's Fifth Symphony, first movement, can be represented by animated graphical score.



Fig. 4. Beethoven's Fifth Symphony with animated graphical score

Principles of sectional structure, particularly in sonata form, were firmly established in the late 18th century. Phrase structure was characteristically clear with well-defined cadences, and phrases were shorter (most commonly four measures) than in the Baroque. Especially, in studying Classical Music, students can understand the songs which has the style like Choral (all the parts in song are start and finish in the

same time), which is different from the past forms, Melody Imitation and Basso Continuo Style.

Figure 5 shows Fryderyk Franciszek Chopin's 'Fantasie-Impromptu', op. 66 with animated graphical score. In Romanticism Music, songs have a point which can effectively transfer the emotional mind. To maximize emotional expression, Romanticism composers used Tempo Rubato which often stops metronome from tic-toc. Especially, Chopin used Tempo Rubato so many times, and his graphical score shows the timely distances from circle and linear graph. Romantic texture, as in classical music, were still basically homophonic. Counterpoint, when used, was of secondary importance. in terms of sonority, 19th-century music was notable for a marked increase of sound.

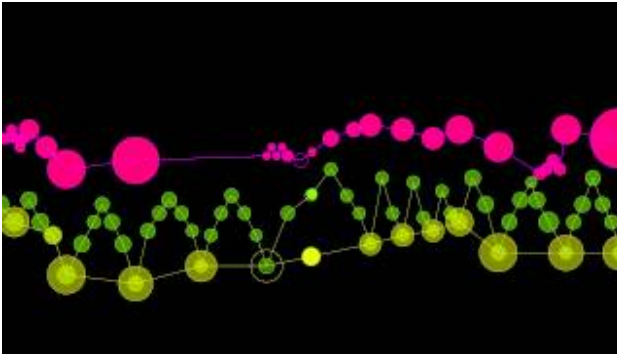


Fig. 5. Chopin's Fantasie-Impromptu with animated graphical score

Figure 6 shows Claude Debussy 'Arabesque' with animated graphical score. Impressionism music shows a point which are using new 'Impressionism 5 notes scale' different from 7 notes scale.

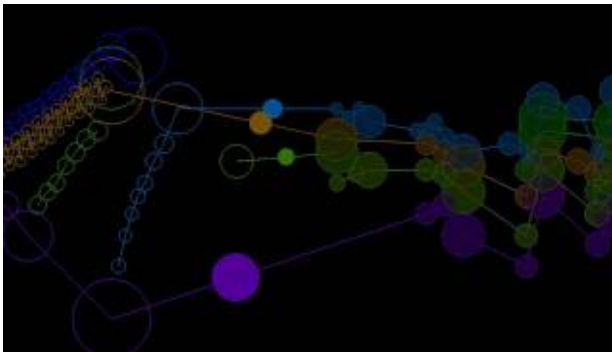


Fig. 6. Debussy's Arabesque with animated graphical score

The program can show the point by graph which shows the adding by many sounds. The first important trend toward 20th-century modernism in music was impressionism. In the hands of Claude Debussy, it paralleled movements in French painting, sculpture, and poetry.

Figure 7 shows Igor Stravinsky's 'The Rite of Spring' with animated graphical score. In Stravinsky's 'The Rite of Spring', Graphical Score shows well many harmonies including discordant sounds and drum sounds which have explosive energy. Neoclassicism is a very extensive and pervasive trend. Beginning about 1920, it continues to be a dominant trend today. In a general sense it implies a return to pre-romantic ideals of objectivity and clarity of texture, but it is not confined to 18th-century classicism.



Fig. 7. Stravinsky's The Rite of Spring with animated graphical score

3.3 Result and Discussion

Table 1 summarizes some results and implications drawn by applying to computer graphical score according to various types of music. As shown in table 1, how graphical score can overcome limitations in existing music class and shows solutions for future music class. Knowing constitution of classical music make it easy to listen songs. Graphical score's visual effect can help many people who did not studied, majoring in music, to understand the constitution and characteristic of songs. This visual graphical score with MIDI player is a very effective tool for some music class, especially in such as a music listening class.

Table 1. Types of Music and Findings

Music types and Characteristics	Problem: in existing education	Solutions: The Effect of Graphical Score, and each Implication.
Monophony music(Gregorian chant)	Not difficult to be followed.	Not essential to be used by Visual effect and Graphical score.
Polyphony music	Difficult for beginners to follow plural sounds.	Essential to be used by Visual effect and Graphical score.

Table 1. (continued)

Understanding Symphonic constitution Beethoven's Fifth Symphony	Difficult to understand constitution of symphonies in Sonata form just in listening.	Graphical Score is helpful for people to understand the sonata form.
Understanding Tempo rubato: Chopin 'Fantasie-Impromptu'	Difficult for beginners to understand rhythmical differences just in listening.	Expressing the Tempo rubato well, Romanticism songs by circle and linear graphs.
Debussy's Impressionism music. Claude Debussy 'Arabesque'	Difficult for beginners to follow Impressionistic melody just in listening.	Graphical Score shows Impressionistic melody effectively which has been free from vertical and horizontal melody.
Igor Stravinsky's 'The Rite of Spring'	Difficult to follow discordant sounds by general score.	Graphical score shows the cut-offs by discordant sounds well.

4 Conclusion

Each famous composers represents unique characteristics according to musical ages. Therefore, playing music through the only radio machine is not effective to teach people not having professional knowledge. Music Animation Machine MIDI Player which has fused acoustic and visual points has creative item that people can approach to this program easily and raise themselves to the professional level. The program could be applauded for the point that it gives professional group delicate analytical skills. It is a surprising 'innovation' to be able to use a MAM program in Listening Music Class. It is a good point that the MAM program can convert musical constitution to visual graphic, and help people follow music. MAM program solves problem that analogue listening without professional knowledge can't be made easily, therefore, it made basis to enjoy complex classical music songs.

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