

ARTICLE 19 AMENDMENTS – REPLACEMENT SHEET

1. A method of presenting a visualization of a piece of music on a display screen as the music is being played, the method comprising:

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- (a) establishing a mapping system, by
- i. selecting at least five audio cues from a set of audio cues, wherein each audio cue represents a distinct acoustic element of the piece of music, and the selected audio cues are optimized with respect to the complexity of the piece of music and the size and the resolution of the display screen, and wherein the set of audio cues comprise: a group of simultaneously played notes (chords), intervals, note sequences, note, pitch, amplitude, rhythm, timbre, N-instrument, time of note onset, note duration, amplitude decay of a note during its duration, strum, tremolo, attack of a note, strum or chord, glissando, affect, ambience, sibilance, tension, overall volume, chord progression, vibrato, melody line, harmony line, and percussion line, note modifiers, modifiers of strums and chords, and transitional notes; and
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- ii. assigning a different visual cue to represent each selected audio cue in a manner that provides one-to-one correspondence between each selected audio cue and each visual cue;
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- (b) extracting the selected audio cues from the piece of music as it is being played, and converting the extracted audio cues to the corresponding visual cues in the mapping system; and
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- (c) displaying a time-streaming sequence of the visual cues on the display screen as the piece of music is being played, so that one or more persons sees the corresponding visual cues at the same time that they hear the piece of music.
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2. The method of claim 1, wherein (b) comprises sequential analysis of a series of successive overlapping time samples of the piece of music.

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3. The method of claim 1, wherein (a) comprises establishing more than one mapping system, and (b) comprises selecting a preferred mapping system prior to converting the extracted audio cues to the corresponding visual cues.

4. The method of claim 3, wherein the mapping system is selected by a person
5 listening to the piece of music.

5. The method of claim 3, wherein the mapping system is selected automatically.

6. The method of claim 1, wherein the one-to-one correspondence further comprises:

- 10 (i) orthogonal correspondence between any two orthogonally related audio cues and the two corresponding visual cues wherein the two corresponding visual cues are also orthogonally related to each other; and
- (ii) ordinal correspondence for an audio cue as applied to any two notes so that the ordinal relationship between the audio cues for the two notes is preserved in the relationship between the two corresponding visual cues for
15 the two notes.

7. The method of claim 1, wherein the number of audio cues to be identified, monitored, and visualized is in the range of 8 to 30.

8. The method of claim 1, wherein the number of audio cues to be identified, monitored, and visualized is in the range of 6 to 15.

20 9. The method of claim 1, further including signal cancellation based on a previously analyzed time segment of music.

10. A system for visualizing a piece of music on a display screen as the music is being played, wherein the system comprises:

- (a) a music source;
- 25 (b) a display screen;
- (c) a memory; and

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(d) a processor, wherein the processor is configured to execute instructions stored in the memory, and wherein the instructions comprise instructions for: establishing a mapping system, by:

- 5
- i. selecting at least five audio cues from a set of audio cues, wherein each audio cue represents a distinct acoustic element of the piece of music, and the selected audio cues are optimized with respect to the complexity of the piece of music and the size and the resolution of the display screen, and wherein the set of audio cues comprise: a group of
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- simultaneously played notes (chords), intervals, note sequences, note, pitch, amplitude, rhythm, timbre, N-instrument, time of note onset, note duration, amplitude decay of a note during its duration, strum, tremolo, attack of a note, strum or chord, glissando, affect, ambience, sibilance, tension, overall volume, chord progression, vibrato, melody line, harmony line, and percussion line, note modifiers, modifiers of strums
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- and chords, and transitional notes; and
- ii. assigning a different visual cue to represent each selected audio cue in a manner that provides one-to-one correspondence between each selected audio cue and each visual cue;

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extracting the selected audio cues from the piece of music as it is being played, and converting the extracted audio cues to the corresponding visual cues in the mapping system; and

displaying a time-streaming sequence of the visual cues on the display screen as the piece of music is being played, so that one or more persons sees the corresponding visual cues at the same time that they hear the piece of music.

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11. The system of claim 10, wherein the music source supplies the piece of music as a musical data file.

12. The system of claim 10, wherein the music source comprises a stream from a live performance.

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13. The method of claim 1, wherein the piece of music comprises a time-streaming music source and the mapping system is applied in real-time.

14. The method of claim 1, wherein the streaming music source comprises music from a live performance or music from a recorded music playback device.

5 15. A computer readable medium encoded with instructions for visualizing a piece of music on a display screen as the music is being played, wherein the instructions comprise instructions for:

establishing a mapping system, by:

- 10 i. selecting at least five audio cues from a set of audio cues, wherein each audio cue represents a distinct acoustic element of the piece of music, and the selected audio cues are optimized with respect to the complexity of the piece of music and the size and the resolution of the display screen, and wherein the set of audio cues comprise: a group of simultaneously played notes (chords), intervals, note sequences, note, pitch, amplitude, rhythm, timbre, N-instrument, time of note onset, note duration, amplitude decay of a note during its duration, strum, tremolo, attack of a note, strum or chord, glissando, affect, ambience, sibilance, tension, overall volume, chord progression, vibrato, melody line, harmony line, and percussion line, note modifiers, modifiers of strums and chords, and transitional notes; and
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- 20 ii. assigning a different visual cue to represent each selected audio cue in a manner that provides one-to-one correspondence between each selected audio cue and each visual cue;

25 extracting the selected audio cues from the piece of music as it is being played, and converting the extracted audio cues to the corresponding visual cues in the mapping system; and

30 displaying a time-streaming sequence of the visual cues on the display screen as the piece of music is being played, so that one or more persons sees the corresponding visual cues at the same time that they hear the piece of music.