A Piano Ballad Arrangement System

Purpose of the System
Our aim is to generate a piano performance score in a ballad style from an existing piano performance score.
Our system has two functions; automatic arrangement and manual arrangement function.

Input MIDI
The MIDI file must be separated into two tracks for the right hand and left hand parts.

How to Use
Figure 1 shows the main screen. A user manually applies a BAR for each bar by clicking cells in the editing area. Our system allows the user to apply multiple BARs to each bar. Please refer to the BAR as it corresponds to table 1 from top to bottom.
Then, a ballad-style MIDI file is generated by pushing the generation button (8).
The play tempo is set to two-thirds the tempo of the original song.

Fig 1. Main screen

Table 1. Barrad Arrangement Rules (BARs)

	Input	Output	Additional explanation
1	Chord on the first beat	Broken chord type 1 consisting of quarter notes	If the chord consists of five or more notes, this rule does not apply. The notes after the second beat are invalid.
2	Chord on the first beat	Broken chord type 1 consisting of eighth notes	If the chord consists of nine or more notes, this rule does not apply. The notes after the second beat are invalid.
3	Chord on the first beat	Broken chord type 1 consisting of half notes	If the chord consists three or more notes, this rule does not apply. The notes after the second beat are invalid.
4	Chord on the first beat	Whole note chord	The notes after the second beat are invalid.
5	Chord on the first and third beats	Half note chords	If there is a second or fourth chord, it will be valid.
6	Four consecutive sixteenth notes	Quarter notes	The second and subsequent sixteenth notes are invalid.
7	Eight consecutive sixteenth notes	Half note	The second and subsequent sixteenth notes are invalid.
8	Two consecutive eighth notes	Quarter note	The second and subsequent eighth notes are invalid.
9	Four consecutive eighth notes	Half note	The second and subsequent eighth notes are invalid.
10	Every note	Higher-octave notes	The right hand part as well as the left hand part will be an octave higher.
11	Broken chord type 1 or 2	Broken chord with a fifth note	A fifth note is added to the last note of the broken chord.
12	All notes	Each note with fifth notes	
13	All notes	Each note with one-octave notes	
14	Broken chord type 1 or 2	Broken chord type 1 or 2 with a ninth note	A note that is two degrees higher than the root of a broken chord is inserted, located between the root and the next note. This rule is not applied to a chord.
15	Broken chord type 1 or 2	Open voicing chord	The second lowest note of the broken chord is removed. Then, a note that is one octave higher than the deleted note is added to the end of the broken chord. This rule is not applied to a chord.
16	Chord	Close voicing chord	Each note of the chord is transposed into the octave closer to the root note. This rule is not applied to a broken chord.
17	Broken chord type 1 or 2	Close voicing chord	Each note of the chord is transposed into the octave closer to the root note. This rule is not applied to a chord.
18	Chord or broken chord (type 1 or 2)	Notes without the second lowest note	The second lowest note is removed.
19	First note	Broken chord consisting of eighth notes and a chord of the whole note	This rule is applied to the last bar. The broken chord type 1 is composed of eighth notes from the first note.

The automatic arrangement button (5) allows the user to make a ballad arrangement automatically.

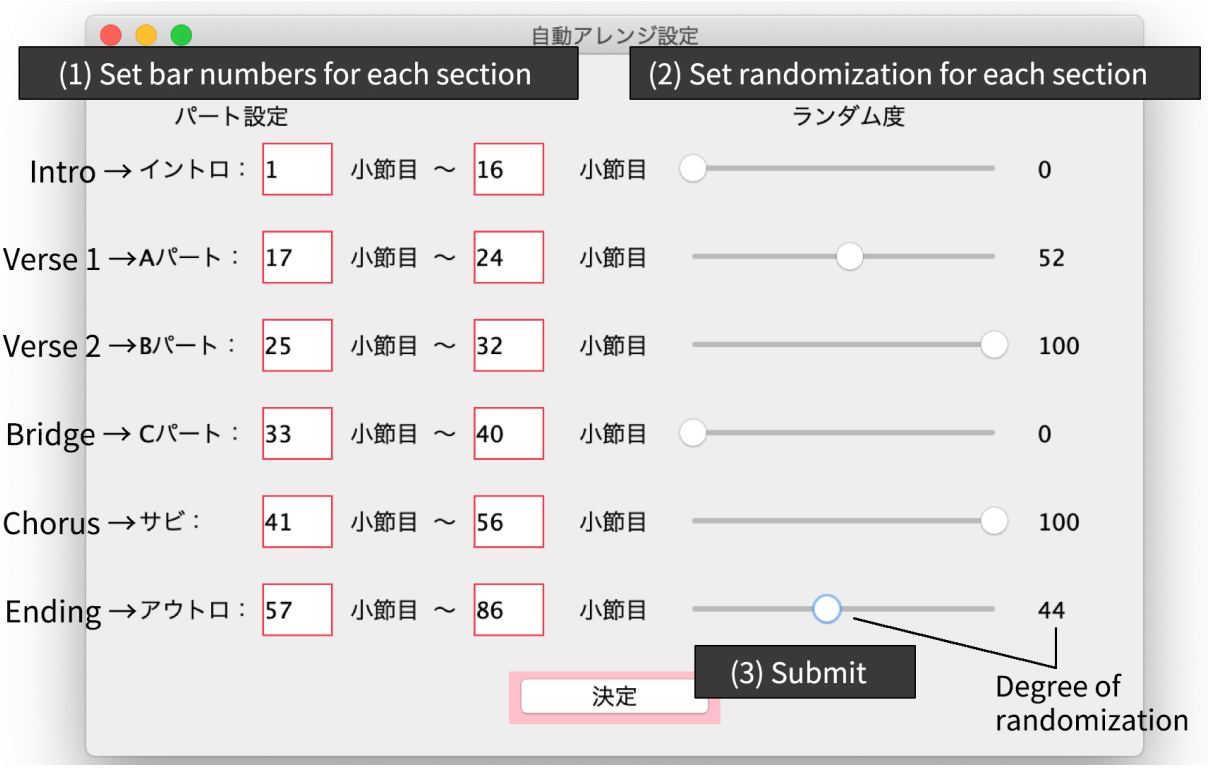

Fig. 2 Automatic arrangement settings.

After entering the start bar and end bar for each intro, verse, bridge, chorus, and ending section (1), the user sets the randomization for each section (2).
Randomization indicates the number of bars to which BAR is randomly applied. The higher the scale, the more randomly the rule is applied to many bars. More than one rule can be applied to each bar, but only one rule is applied to a rule that cannot be duplicated.

If the randomization degree is zero, the predefined rules are applied to each bar, depending on the section. Specifically, the intro is 3 and 10, verse 1 is 4 and 10, verse 2 is 2, 10 and 13, the bridge is 4 and 10, the chorus is 2, 10, 11 and 13, and the ending is 5 and 10.
When the user has finished choosing their settings, they start an automatic arrangement by pressing the submit button (3).