

人工智慧作曲

Artificial Intelligence for Music Composition

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Artificial intelligence (AI) has been applied successfully to solve many engineering problems. However, various issues arise when AI was further utilized to deliver creativity, especially in the artistic disciplines. Automatic music composition is an interesting but very challenging topic in AI research because many factors, such as tonality and harmony, must be considered for composing music. In this project, we design an evolutionary system that integrates music theory for automatic music composition. The proposed system consists of two stages: (1) the evolutionary melody composer and (2) the heuristic-based harmonizer. First, the evolutionary melody composer applies genetic algorithm (GA) to compose melodies that comply with the user-defined music characteristics. Second, the heuristic-based harmonizer then generates a suitable chord progression for the GA-composed melody. Knowledge and theory related to voice leading, consonance, and cadence are considered in both stages to ensure the quality of resultant music. The system serves as an efficient tool for the users to generate satisfactory music. It can also facilitate the practical applications where diverse music compositions are desired. Some resultant compositions have been presented in the NTHU library and C-LAB Diversonics events.

Keyword: Evolutionary computation, genetic algorithm, automatic music generation.

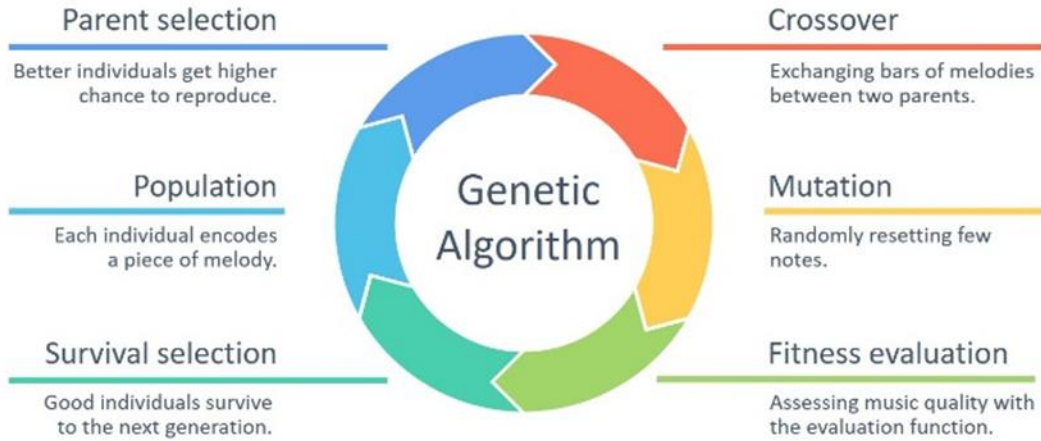


Figure 1. Evolutionary process of GA for composing music

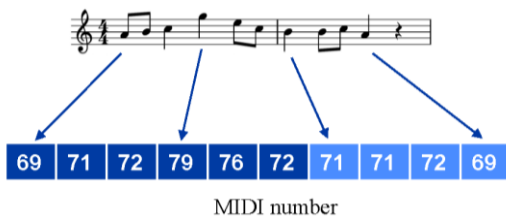


Figure 2. Chromosome representation

No.	Rule description
1	A hop bigger than perfect 5 th .
2	A hop of dissonance (augmented 4 th or minor 7 th).
3	Multiple repetition of monotone.
4	Melody direction of each measure.
5	Melody note of each measure in keeping with chord.

Figure 3. Melody evaluation rules

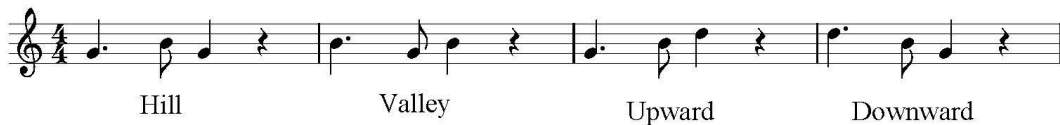


Figure 4. Four user-specified melody shapes for composition

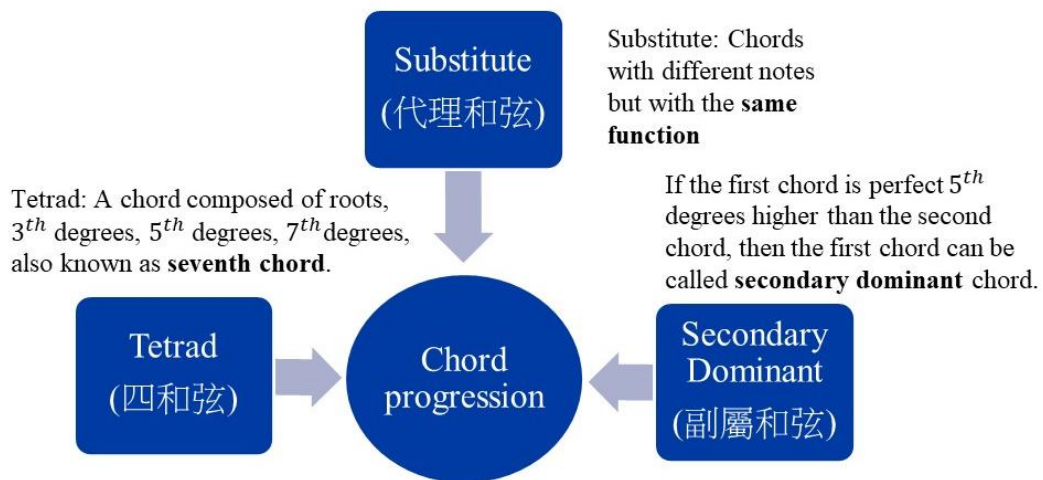


Figure 5. Composition based on the user-specified chord progression