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An Automatic Music Arranger for Solo Guitar based on Audio Signal Processing and Evolutionary Algorithms

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Abstract

Music is composed to be played on an instrument or a group of instruments. Many musicians attempt to interpret music composed by others with their own instruments. These interpretations are often called cover versions. If a song needs to be played on an instrument that it was not specifically written for, it must go through some alterations due to the limitations of the target instrument or the player. This process is called arrangement. The guitar is a very versatile, yet a very limiting instrument, that needs arranging for most of the music to be played on it. The arrangement task is a very tedious and a difficult task for intermediate and beginner players, therefore they rely mostly on arrangements made by others till they gain enough experience. These arrangements can be found online in the form of guitar tablature, a notation specific for stringed instruments. Players can't always find the arrangements of music they are looking for from online repositories. As a solution to this problem, the proposed system attempts to automate the task of creating basic solo guitar arrangements of songs given in audio format, and present the arrangements to the users in the form of guitar tablature. The problem was decomposed into several components, namely note extraction, note arrangement and note placement. Note extraction and note arrangement aspects were combined and audio signal processing algorithms were used to extract important note events from audio files. Note placement problem was classified as an optimization problem and an evolutionary algorithmic approach was used to find the optimal placement of notes. The solution does not attempt to be creative as a human arranger, but creates basic arrangements on which the players can further improvise with their own essence of playing.

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H.5.5: Sound and Music Computing

G.1.6: Optimization

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