

ISE 575 Paper Review

Topic : Music Generation form Statistical Models

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Author introduces statistical method to compose and generate music separately. For this, he/she exemplifies context models and complex statistical models such as Hidden Markov model, Stochastic sampling model and Random walk etc. These are originally engineering based algorithms, but it was well adapted to music generation in so many cases before.

Music Generation and creating a new piece is a sampling from extant pieces by the statistical models. In music generation, there is no difference between analytic and synthetic models. Concretely, several methods for sampling “intra opus” pattern repetition could be good examples of music generation. Those methods looks so straight forward and no effort needed to make a brand new piece. However, author wants to emphasis that creativity came from how well adapt extant art works by sampling pieces from complex statistical models.

Music grammar and linguistics have been developed in the same ways and same periods. That’s because analytic models are similar to form. For example, HMM was developed in 1960s, which upgraded not only speech recognition system. In other words, speech recognition system is one of analytic way to develop the linguistics models. Analytic studies such as music prediction, phrase structure analysis, and music classification have been improved simultaneously.

Statistical models basically abstract some features of music according to the predefined standard empirically. That means music generation by the statistical models cannot help but being subjective in some sense that selecting the parameters. In my opinion, that is inevitable short comings in statistical model.

Context model is fast, predictable, straight forward to make a new music and applicable to real-time music generation, but it has limited input training data, which means the output products also have limited variations.

Random walk uses complex statistical model, history based model. Hidden markov model explains the state transition under probability basis. Author introduces two examples of stochastic sampling, such as Gibbs sampling Metropolis sampling. Gibbs sampling is the special case of Metropolis. At last, there is a pattern-based sampling which uses “intra opus” repetition with a complex statistical model. This model can generate cohesive music. However, it does not give the start and end of music, continuation music.

Statistical models look fancy because they have easy, straightforward, predictable, real-time properties. Even though these advantages, I don’t guarantee music from these algorithms could be more melodious than classics, such as Mozart, Beethoven’s music. It will take some time for people to change music standard of melodious sound and noise. However, music by mathematical algorithm is a very brand new and promising academic area in the sense that it has not been explored much so far than any other academies.