Development of Melody and Drum Pattern Composition Algorithm Using Deep Learning

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ABSTRACT

Deep learning algorithms have been proven to outperform existing algorithms in many fields including image analysis, speech recognition and so on. Various models like CNN or RNN, and various optimizers have been developed steadily for better learning. Along with the development of models and optimizers, the issue of how deep learning techniques can be applied to other fields is also important. Deep learning has already shown great potential in many applications such as medical, finance, etc.

In this talk, we will discuss how deep learning techniques can be applied to the field of music composition. In particular, we aim to produce a MIDI file, a standard specification for sharing and transmitting performance data of electronic musical instruments. Since each musical component in a MIDI data can be separated, it is easy to work with when we feed the data to train the deep learning network.

Long short-term memory (LSTM), a deep learning model for creating a melody whose length is not fixed, is a model for handling time series data. In order to make a decent melody, it is important to set appropriate constraints. We will show that by using LSTM model with appropriate constraints, we can create well-suited melodies for a given chord progression.

Unlike the melody, in the case of a drum, a main drum pattern is repeated throughout the song, and the method for making a pattern of a predetermined length is not limited to LSTM. In particular, we will discuss how to create a drum pattern using a generative adversarial network (GAN).

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