Using a neural network

Depending on melodic profile

Study of composition support system

Watanabe Takaya   (1610221)

Graduate School of Advanced Science and Technology,
Japan Advanced Institute of Science and Technology

In recent years, the automatic composition system has attracted attention as a means to easily create music regardless of the composition skill. With the spread of computers, there is a demand that more users want different songs depending on the purpose in various situations. Although there is a necessity to compose music such as creating BGM that can be used on the game, users who do not have advanced knowledge of the music tell the composition system the details of the songs actually expected by the user, and music that the user satisfies It is extremely rare for you to get it. Also, it seems that such users may have rough images of songs such as "Increase the pitch here" or "Make it faster sooner". In order for a user without composition skill to compose music, it is necessary to have a system that composes music from rough images of songs even if it can not be expressed in units of musical notes.

In this research, we use a melody existing on the existing musical score to construct a system that can compose like existing musical score even for users without knowledge of composition. In this time we will use melody expressions called melodic outlines that roughly track and show the melody. The melody outline is a set of lines representing rough melodies by consecutive notes on the score by curves and straight lines. Previous studies Expression used in research of composition support system using melody general form . In addition, in the melody outline extraction method for melody editing not based on the preceding research note, a result obtained by learning from the musical score a musically appropriate musical note sequence for HMM (hidden Marko model) in addition to the melody outline Although it presumes, there was a case that harmony was not considered in the method of its previous research.

As a method to solve this problem, we construct a system that outputs a part of the melody of the

actual score from the melody outline by using a neural network that can learn and estimate the time series of data. The neural network learns with prepared input data and teacher data Neural network that has finished learning performs output that is paired with that input at the time of learning when known data is input. Also, if unknown data is input, we will do better than expected in the learned output. However, in this study the melodic outline and melody are not necessarily given in pairs. It is similar to DiscoGAN in recent research. This allows you to output teacher data that captures the special features of the input data without the input data and pair teacher data. This model uses two generators (generators) and two discriminators (hereinafter referred to as Discriminators). In the case of generator AB, BA, Discriminator A, B, Generator AB estimates the melody by inputting the melody outline in the present research system.Generator BA inputs the melody and Discriminator B generates the melody Of discriminator B. Is the melody outline estimated from Generator AB? Preliminary prepared melody produced by producer AB is passed to generator AB, and melody general shape The learning is done so that it is close to the melody general shape input to the generator AB. Also produced by Generator AB Melody is passed to Discriminator B Evaluating melody on the existing musical score or being evaluated Mr. Generator AB to Discriminator B as if it is melody on the score Let me learn. Also, estimate the melody outline from generator BA which inputs the melody of the existing score and convert it to re-melody to generator AB. Learning so that the estimated melody approaches, the melody general shape estimated by the generator BA is passed to Discriminator A and let it be discriminated. Learn the Generator BA to make a decision to be a melody outline prepared by this discriminator A. By processing this series, Generator AB estimates the melody outline prepared more probably, so that the melody is closer to the melody on the better score from the melody outline shape .Discriminator A specializes in discriminating whether melody outline is generated, Discriminator B specializes in discriminating whether the melody is generated or not from generator melody in Generator AB I think that we can estimate a melodic melody.

In this research, we aim to estimate the melody which sees the special points of the melody general form appropriately. Also, we verify the effective method for neural network to estimate melody from melodic outline.

In addition, although DiscoGAN is disassembled in image generation as generation method, it is not used much in time series data processing. In this research, we use C - RNN - GAN to convert it to an image but use time - series data. In this method, time series data is generated by combining LSTM which obtains processing of time series data in GAN. In this research, it is examined whether melody can be estimated from melodic outline for dataset that combination of DiscoGAN and C-RNN-GAN does not explicitly show melody outline and melody pair which are time series data .