Making Music Score with Deep Autoencoder

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Summary

Deep learning is based on neural network. It is consisting of input layer, hidden layer and output layer. As compared with normal neural network, deep learning has many hidden layers. It extends the range of expression. Deep learning is said that it is similar to human brain. In fact, deep learning achieved some revolutionary results. For example, the false recognition rate with deep learning in image recognition is smaller than human's rate [1]. From these achievements, deep learning is used for AI (Artificial Intelligence). The AI using deep learning is said to be the 3rd generation AI. We raise expectation for bringing AI to perfection. And then, needs for making AI are what deep learning can do.

In this study, we make music score from mp3. It is easy to play music from music score. However, it is difficult to make music score from music. The frequency is defined by every musical scale. Although, the actual frequency is poorly matched with defined. So it causes false recognition. We try this issue with deep learning because deep learning has general versatility.

Our main focus is unsupervised network. Generally, we should give network answers corresponding to input for adjusting weight. However, in other research, deep learning can understand features of input [2]. The method for unsupervised learning is autoencoder. Autoencoder needs only input data. Network can learns important informations and features from input with autoencoder. We input each musical scale's data to network that finishes learning and search one neuron that is most active by each musical scale's data. We judge musical scale from previous described neurons.

References

[1] Krizhevsky, Alex, Ilya Sutskever, and Geoffrey E. Hinton, "Imagenet classification with deep convolutional neural networks," Advances in neural information processing systems, pp. 1097-1105, 2012.

[2] Quoc V. Le, "Building high-level features using large scale unsupervised learning," 2013 IEEE international conference on acoustics, speech and signal processing, pp. 8595-8598, 2013.