

## Slice Bispectrogram Analysis-Based Classification of Environmental Sounds Using Convolutional Neural Network

**Authors :** Katsumi Hirata

**Abstract :** Certain systems can function well only if they recognize the sound environment as humans do. In this research, we focus on sound classification by adopting a convolutional neural network and aim to develop a method that automatically classifies various environmental sounds. Although the neural network is a powerful technique, the performance depends on the type of input data. Therefore, we propose an approach via a slice bispectrogram, which is a third-order spectrogram and is a slice version of the amplitude for the short-time bispectrum. This paper explains the slice bispectrogram and discusses the effectiveness of the derived method by evaluating the experimental results using the ESC-50 sound dataset. As a result, the proposed scheme gives high accuracy and stability. Furthermore, some relationship between the accuracy and non-Gaussianity of sound signals was confirmed.

**Keywords :** environmental sound, bispectrum, spectrogram, slice bispectrogram, convolutional neural network

**Conference Title :** ICISIP 2020 : International Conference on Intelligent Signal and Information Processing

**Conference Location :** Singapore, Singapore

**Conference Dates :** January 09-10, 2020