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

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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
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