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Title:

Super-resolution of sound source radiation using microphone arrays and artificial intelligence

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Abstract:

To empirically estimate the radiation of sound sources, a measurement with microphone arrays is required. These are used to solve an inverse problem that provides the radiation characteristics of the source. The resolution of this estimation is a function of the number of microphones used and their position due to spatial aliasing. To improve the radiation resolution for the same number of microphones compared to standard methods (Tikhonov and Lasso), we propose a method based on normalizing flows that uses neural networks to learn empirical priors from the radiation data. The method then uses these learned priors to regularize the inverse source identification problem. We simulate the effects of different microphone arrays on the accuracy of the method and finally evaluate the method using a real measurement.