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Acoustic Source Localization in Strong Reverberant Environment by Parametric Bayesian Dictionary Learning

Lu Wang, Yanshan Liu, Lifan Zhao, Qiang Wang, Xiangyang Zeng, Kean Chen

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Highlights

- A parametric Bayesian dictionary learning approach is proposed for source localization problem under unknown strong reverberate environment. In particular, a parametric dictionary is constructed by discretizing the inner space of the enclosure, which formulates the reverberations as part of the signal model. Thereafter, the problem of localization can be considered as the sparse signal recovery and dictionary learning problem.
- In contrast to the conventional sparsity based source localization techniques, the dictionary is constructed in a parametric manner and will be updated during estimation in the proposed approach. Since unknown reverberations can be automatically estimated from the measurements by the proposed method, they can be appropriately exploited to enhance the accuracy of source localization.
- Since the proposed algorithm is constructed in a Bayesian framework, the proposed algorithm can able to obtain the capability of distinguishing highly correlated atoms in a dictionary, flexibility of modelling and capability of providing statistical information.
- Our simulated results have shown that the proposed algorithm can achieve high source localization accuracy, low sidelobes and high robustness for multiple sources with low computational complexity in strong reverberant environments compared with other state-of-the-art methods.

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