

Audio inpainting in time-frequency domain with phase-aware prior

The so-called audio inpainting problem deals with estimating a missing portion of samples in the signal. Several methods for audio inpainting have been developed through decades. In contrast to this time-domain audio inpainting, the time-frequency variant of inpainting appeared in the literature, i.e. the case when the spectrogram columns are missing and should be filled in with reliable information.

We present a method of solving such time-frequency audio inpainting problem. Our approach relies on the recently presented phase-aware signal prior that exploits the instantaneous frequency. An optimization problem is formed and solved using the generalized Chambolle–Pock algorithm. Within iterations of the algorithm, instantaneous frequency is regularly updated. The proposed approach is compared objectively and subjectively with other inpainting methods: A deep-prior-based neural network, and the autoregression-based method called Janssen-TF. Our proposed method outperformed these methods in both the objective evaluation and the conducted listening test. In addition, this result is achieved with a computational demand significantly lower than with the competing methods.