

Causal binary mask estimation for speech enhancement using sparsity constraints - DTU Orbit (08/11/2017)

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While most single-channel noise reduction algorithms fail to improve speech intelligibility, the ideal binary mask (IBM) has demonstrated substantial intelligibility improvements for both normal- and impaired-hearing listeners. However, this approach exploits oracle knowledge of the target and interferer signals to preserve only the time-frequency regions that are target-dominated. Single-channel noise suppression algorithms trying to approximate the IBM using locally estimated signal-to-noise ratios without oracle knowledge have had limited success. Thought of in another way, the IBM exploits the disjoint placement of the target and interferer in time and frequency to create a time-frequency signal representation that is more sparse (i.e., has fewer non-zeros). In recent work (submitted to ICASSP 2013) we have introduced a novel time-frequency masking algorithm based on a sparse approximation algorithm from the signal processing literature. However, the algorithm employs a non-causal estimator. The present work introduces an improved de-noising algorithm that uses more realistic frame-based (causal) computations to estimate a binary mask.

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