

Noise management features of the open speech platform

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Abstract:

In this contribution, we present the noise management features of the Open Speech Platform (OSP) for hearing aid (HA) research. OSP includes basic HA modules (i) subband decomposition, (ii) wide dynamic range compression and (iii) adaptive feedback cancellation; a baseline single-channel speech enhancement (SE) based on Wiener filtering for noise subtraction. We extended OSP noise management to include a generalized sidelobe cancellation (GSC) beamforming between left and right channels, followed by the SE. Time is the scarcest resource, followed by central processing unit (CPU) resources in commercial HAs. With the proposed GSC + SE approach, we were both time and CPU limited. Release 2019a of OSP has 5.6 ms end-to-end latency and GSC requires an additional 5 ms, putting us above the 10 ms requirement. The wearable device of OSP has 4 cores, C0 – C3. C0 is used for all non-realtime tasks such as kernel, embedded web server, etc. and remaining cores are used for realtime tasks. Naive realization of GSC results in one or more cores not meeting the realtime constraints, resulting in audible artifacts. We present optimizations to meet time and CPU budgets; and preliminary objective and subjective results of the proposed system.