

Improving communication in noise: Some recent developments

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ABSTRACT

Recent research into methods for improving speech perception in environmental noise has centered on ideal time-frequency segregation (ITFS), which involves analyzing successive short intervals of a time history containing noise and speech into contiguous frequency sub-bands. The signal in each sub-band is accepted or rejected depending on the presumed dominance of noise (by a "binary mask"), and the resulting sub-band signals are then recombined. An alternative to the binary mask involves forming the intensity modulation spectrum (IMS) as a means for estimating the speech signal to noise ratios (SNRs). These form the gains of the sub-band signals, which are then recombined as before. Experiments suggest that ITFS improves speech understanding for persons with normal hearing and hearing loss while, in contrast, commercial application of IMS to hearing aids has produced conflicting results. These and related techniques for improving speech SNR are now being investigated for cochlea implants and hearing protectors. Users of the latter also benefit from techniques for improving the audibility and localization of warning sounds, which typically involve binaural listening and broadband alarm signals.