

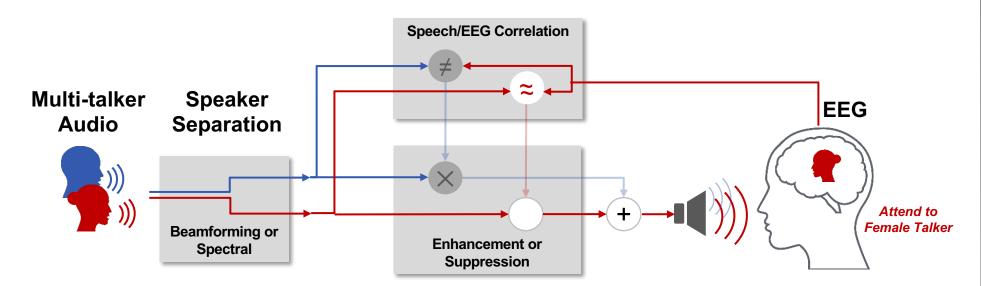
Hearing is Critical to Operational Performance

- Nearly 1.1 million Veterans compensated for hearing loss in 2016
- Hearing in noisy environments is particularly challenging for current hearing aid technology and can be cognitively fatiguing
- We introduce a vision for cognitively aware "hearable" technology

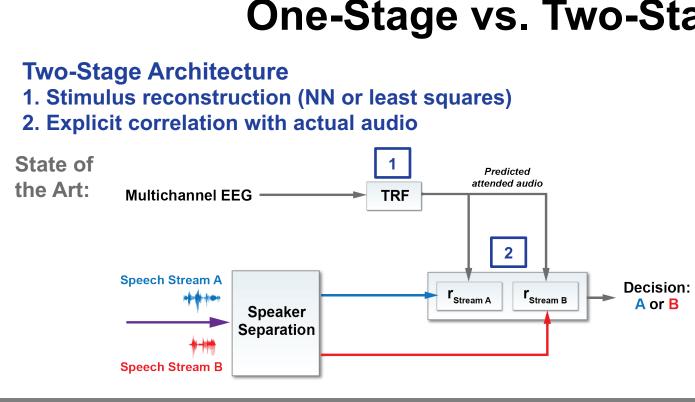


Noise Protection — Health Monitoring — Hearing Enhancement

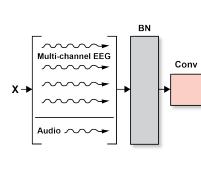
System-Level Design for Cognitive Hearing Enhancement



- Audio is separated into audio streams using spatial and spectral cues
- Separated audio streams are processed concurrently with recorded EEG to determine the listener's desired audio stream







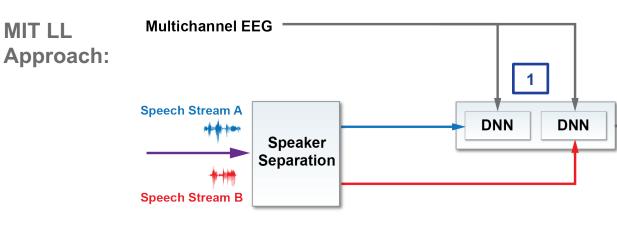


Christopher Smalt, Christopher.Smalt@ll.mit.edu

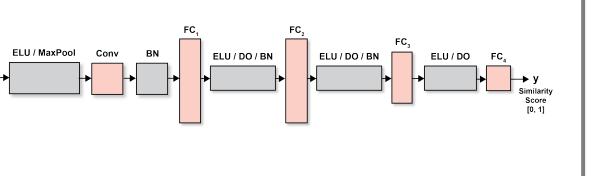
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One-Stage vs. Two-Stage Decoding Architecture

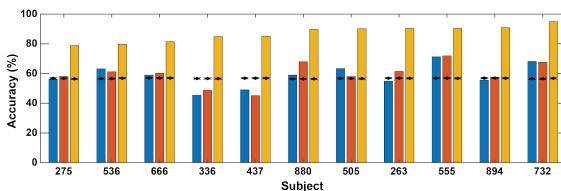
One-Stage Architecture 1. DNN implicitly computes similarity



One-Stage Attention-Decoding with a DNN



Attention Decoding Performance



Cognitively Controlled Hearing Aid Prototype

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