Predicting and improving intelligibility of speech in noise

Problem:
- Classical models (STI, SII) fail in correctly predicting intelligibility of (non-linear) processed noisy speech
- Current (single microphone) noise-reduction algorithms fail in improving intelligibility

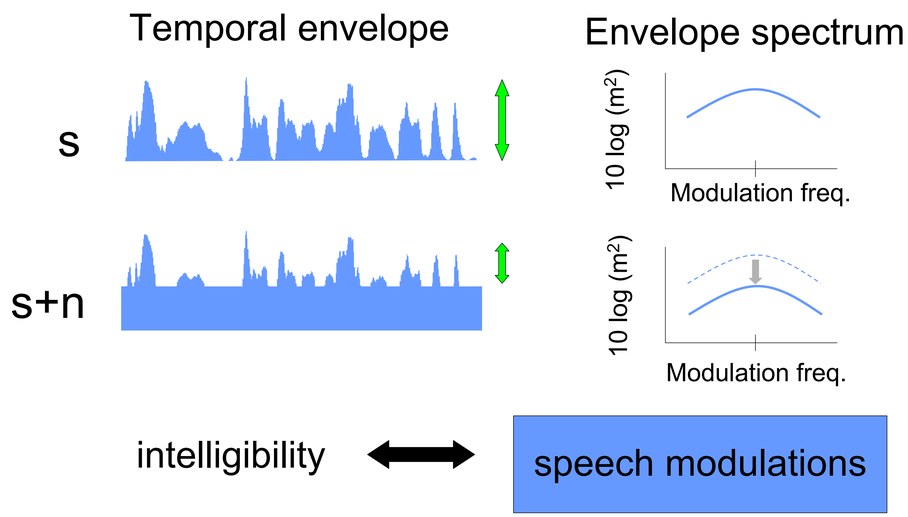
Message:
- New concept of signal-to-noise ratio in the modulation domain $(S/N)_{mod}$ applies to processed speech
- New noise reduction algorithm based on this concept succeeds in improving intelligibility

Speechlab BV

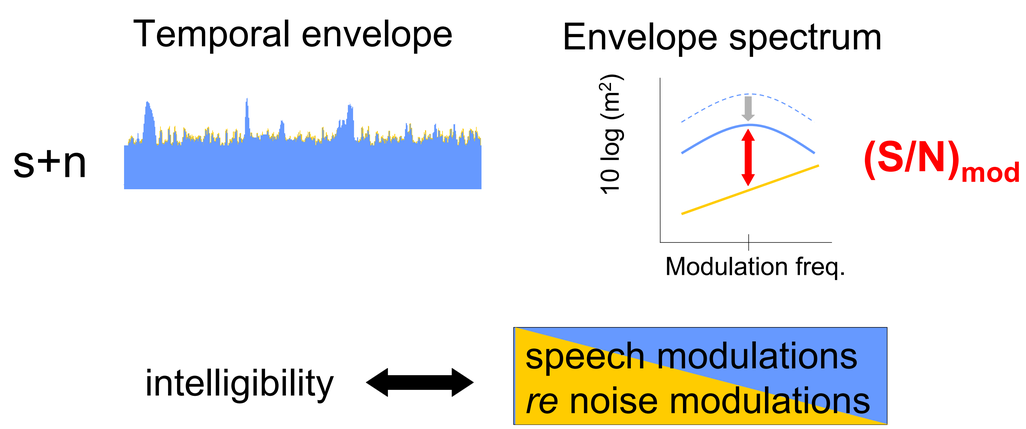
Dr. Finn Dubbelboer
Dr. Johannes Lyzenga
Rolf Jan Rutten, MSc
Prof. Dr. Tammo Houtgast

Theory

• Classical model (STI)



• New concept $(S/N)_{mod}$

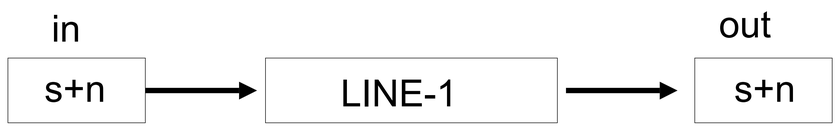


Applications

• New intelligibility predictor after any type of processing

$\Delta S/N_{mod}$
- >0 : intelligibility improved
- =0 : intelligibility equal
- <0 : intelligibility worse

• New noise reduction scheme for improving intelligibility (LINE-1)



$\Delta(S/N)_{mod}$ >0 : intelligibility improved

(experiment hi: + 2dB; nh: +1 dB)

Reference: Dubbelboer, F., and Houtgast, T. (2008). "The concept of signal-to-noise ratio in the modulation domain and speech intelligibility," J. Acoust. Soc. Am. 124, 3937-3946.

Contact: finndubbelboer@planet.nl