

# Algorithms for the Enhancement of Noisy Speech

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With the advent and wide dissemination of mobile communications, speech processing systems must be made robust with respect to environmental noise. In fact, in noisy environments the performance of speech coders or speech recognition systems is significantly degraded. As a result, speech quality, speech intelligibility, or recognition rate requirements cannot be met. However, improvements are obtained when the speech processing system is combined with a speech enhancement preprocessor.

In this talk I will present algorithms for noise reduction which are based on statistics and optimal estimation techniques. The focus will be on estimation procedures for the spectral coefficients of the clean speech signal and on the estimation of the power spectral density of the background noise. As an example, I will present quality and intelligibility results for the MELPe speech coder. This coder is the Future NATO Narrowband Voice Coder and includes an optional noise reduction preprocessor.

Furthermore, I will outline multi-microphone solutions and extensions which exploit properties of the human auditory system. The performance of these algorithms will be demonstrated with audio samples.

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