

Title: Data Embedding in Speech and Audio Signals

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Abstract:

In this talk, a *robust* data-embedding technique that hides information *transparently* within a speech or audio signal is developed. The proposed data-embedding technique exploits the masking property of the human auditory system. The encoder partitions the signal in the frequency domain into subbands, and computes the data-embedding parameters for each subband from the auditory masking threshold function and a channel noise model. Data embedding is performed by modifying the Discrete Hartley Transform coefficients according to the principles of the Scalar Costa Scheme. The decoder uses an adaptive equalizer to cancel spectral channel distortion, and employs a maximum likelihood detector for the estimation of the data-embedding parameters. The data-embedding technique is demonstrated by embedding data in a (narrowband) speech signal transmitted over a *telephone* channel. The system achieves transparent data-embedding at the rate of 600 information bits/second with a very low bit-error-rate. A possible application of the embedded-data to enhance the quality of the narrowband speech is demonstrated.

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