

You are invited to attend a lecture by
Orit Fellah *

On:

Low Bit-Rate Speech Coding Using a Long Term Model

Low Bit-Rate Speech Coders, at rates below 4KHz, receive much attention lately. There is a growing interest in such coders, mainly for cellular telecommunication applications. Existing low bit-rate coders, such as LPC10, CELP, MELP and PWI (Prototype Waveform Interpolation), are based on models that assume speech stationarity, and therefore use short analysis frames (20-40ms).

In this work, we present a low bit-rate speech coder, based on a long-term model for voiced speech introduced by Stettiner and Malah. The long term model allows evolution of the pitch period and pitch waveform and therefore facilitates longer analysis frames (100-150ms). In the proposed coder, we utilize long analysis frames for efficient coding of voiced speech segments at low bit-rate. For such segments, a mapping function which maps the pitch track into a fixed pitch value (called inverse warping function in the long-term model) is first extracted and coded. Then, this mapping function is used to convert the input speech signal into a constant-pitch signal which further undergoes an LPC analysis. The prediction residual (excitation) signal is divided into pitch-cycle waveforms, called prototype waveforms. In contrast to the PWI method, which codes one prototype waveform for each frame and then interpolates between coded prototype waveforms, we introduce a new method, in which all the prototype waveforms in a segment are kept, and the prototype waveform evolution is coded (in the frequency domain) instead of the prototype waveforms themselves. For unvoiced speech segments, standard LPC10 coding is used.

In the talk, the proposed long-term model based coder will be presented, its features will be described and its performance will be demonstrated.

* M.Sc. work under the supervision of Prof. David Malah

The lecture will take place on
Tuesday, 1.8.2000 at 11:30
in Room 1061
Electrical Eng. Building
Technion City