EE679 Computing Assignment 4 Due: Oct 31, 2013

As in the previous assignment, consider the speech signal in "machali.wav" (sampled at 8 kHz) Consider the following signal segments in the final word "pani": (1) /a/ (first half); (2) /n/; (3) /I/; and (4) /s/ in the word "uska". Use PRAAT to extract the above segments to separate .wav files for further analyses as below.

1. Obtain the real cepstrum from a 30 ms segment for each of the phones.
2. Use cepstral filtering to obtain the vocal tract magnitude response (dB) in each case. Consider the first 13/26/40 coefficients and comment on the differences in the estimated spectral envelope. Estimate the pitch from the real cepstrum.
3. Compare the spectral envelope estimated using 13 cepstral coefficients with the corresponding LP model (p=10) magnitude spectrum obtained in the previous assignment by superposing both on the Fourier magnitude spectrum of the same signal segment.
4. Next consider the synthetic signal generated from LP coefficients and pulse train in your previous assignment for the segment /a/. Repeat the parts 1, 2 and 3 with this synthetic signal.
5. Repeat 1,2,3 on /s/ sampled at 16 kHz using LP order = 18.

Optional task

Prepare an experimental set-up to demonstrate an auditory phenomenon. One example: Play a loud, fixed tone (e.g. 1200 Hz). Next generate a simultaneous quiet tone at various frequencies below and above the loud tone. Record the masking effect by listening.

Prepare a single pdf with methods, results, discussion. Along with your code, submit a single zipped folder.