

Hoole, Akustik Übung Quelle-Filter-Trennung

After logging on to the matlab account:
cd akustikfort/sourcefiltergame
praat

Source-filter games: Hybrid speakers

For this exercise sounds of two different speakers have to be loaded.
The exercise will be more interesting if you can use two speakers who clearly differ in vocal tract length, or F0, or at least in the intonation contour of their utterances.
The exercise will also work best if the utterances used are completely voiced and have a similar temporal structure.
The following sounds are ready for use:

ja_m.wav	“Ja”, male speaker, rising intonation
nein_m.wav	“Nein”, male speaker, falling intonation
ja_w.wav	“Ja”, female speaker, falling intonation
nein_w.wav	“Nein”, female speaker, rising intonation

(If you want to try this exercise with sounds that you have recorded yourself then refer to the additional preliminary steps below before continuing with “Main steps”)

Main steps

For each sound do
Formants and LPC > To LPC (autocorrelation)
Choose a prediction order of 12 (based on rule of thumb of (2 x number of formants) + 2)
(We expect about 5 formants in the frequency range up to 11025/2 (samplerate/2))

Select the sound AND the corresponding LPC object and then select
Filter (inverse)

Rename the new sound object by adding ‘_source’ to its name.

Listen to it. You should hear the intonation contour, but no sounds should be identifiable.

Now select the source of Speaker 1 and the LPC object of Speaker 2, and then choose
‘Filter’ (check the ‘Use LPC gain’ box)

Rename the new sound to something like ‘source1_filter2’.

Repeat for the other combination (source2_filter1).

For these two hybrid speakers, the identity of the speech sounds spoken will be determined by the speaker providing the filter function, and the F0 and intonation contour will be determined by the speaker providing the source function.

Additional preliminary steps for new sounds

For both sounds do

Convert > Resample > New sampling frequency (Hz) = 11025

(This is just to ensure both sounds have the same sample rate, and is sufficient if we are only

using vocalic sounds.)

For both sounds do

Modify > Subtract mean

and

Modify > Scale peak (0.99)

(This ensures that the sound level of both sounds is comparable)

For each sound use

Convert > Extract part

to extract a portion of the same length from each signal, e.g half a second at the centre of each utterance

i.e set 'time range' to start and end of the portion to be extracted (use the edit window to figure out appropriate values for each sound). The setting for 'window' should be 'rectangular'.

Then proceed with "Main Steps" above.