OBL 4101 – Project on voice coder (vocoder)

This document summarizes the explanations on the project, the expected work and advices given**.**

General explanations

A voice coder also called vocoder is a system used to "code" voice artificially. The phase vocoder will mainly modify the phase of the signals, and "coding" here means "modification" and not data ou computer coding.

You will discover 3 types of voice modifications during this project:

- First, modify the speed of the voice without changing its pitch. The pitch is related to the fundamental frequency of the voice and corresponds to the level (high or low voice). The sound of the voice is the same but the words will be pronounced more slowly or faster.
- Second, modify the pitch of the voice without changing the speed.
- Third, apply an effect to transform the voice as if it comes from a robot ("robotisation")

The main program "Vocodeur.m" is given including clues to solve these 3 aspects. You will modify parameters and complete the code to observe the signals of interest, to test on new voice signals of your choice, etc…

Work to be done

A) In Matlab

1. Complete the program (Vocodeur.m) to obtain the 3 above mentioned effects on the voice:
    a. Modify the speed without changing the pitch
    b. Modify the pitch without changing the speed
    c. Transform the voice by robotisation
2. Create the program of interpolation in frequency domain (TFCT_Interp.m). This program will be useful for both modifications (speed and pitch)
3. Realise the robotisation program based on the model given (Rob.m)

B) The report

1. It must be as detailed as possible: introduction, results, explanations on the results, conclusion… Someone outside the lecture should understand in general terms what was done, why and how.

2. So you must explain with scientific arguments how you obtained your results, the principle of the algorithms used (if possible based on flowcharts) – we do not need lines of code in the report, as the programs developed in the project will be given separately in the compressed requested file

C) Work personalization

You should get familiar with the project ideas and concepts. The minimum is to do the 3 previous effects on the voice (speed / pitch /robot). Then you can propose other applications, new effects on the voice, graphic interface to see the results, new sounds like your own voice recording….

You can work on the audio files available or you can produce/collect your sounds (to be given in the compressed file then)

D) Work reporting

1. The report (as mentioned above)
2. All the Matlab programs used to do the work, including the audio files
3. You will create a compressed file named : Student1_Student2_GroupX.zip corresponding to the student's names + their group number
4. This compressed file will contain all the requested documents (report + your own Matlab codes/programs + audio files used)

Work sequences and organisation (personal work in Lab sessions)

The 3 lab sessions appearing as "PERS" or TPs (2hours each) are included in the 30 hours of the course (it is not supplementary work). You will work in total autonomy (even if you can see the name of a professor), but you can help each other.

As there are too many groups in parallel, to keep equal treatment between the groups, no professors will come to help during these sessions of the project. But Prof Madaoui or myself can answer to the questions (either directly in our office – 6455 or 6454 or fixing an appointment by email – it is better to give explanations face to face than by email).

If you want to go further, and to make a complete and nice report, it will probably require time outside the Lab sessions. It is normal as you do not have exam here, it replaces the preparation/review of the exam when there is one.