Active Speech Modifications

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In many intelligibility studies it was demonstrated that the speaking style, referred to as *clear speech*, is significantly more intelligible than conversational (or casual) speech for both normal-hearing and hearing-impaired listeners (e.g. elderly persons and linguistically inexperienced listeners like non-native (L2) speakers and children). Also in a two-way conversation in which one person is affected by an adverse listening condition and one not (e.g. between one person speaking to another via telephone where the other is in a noisy club, or in a cafeteria, in the street etc.) the person who is not affected still manages to make adaptations (in acoustic-phonetic and linguistic levels) that are quite specifically adapted to counteract the specific communication barrier that the other person is experiencing. These adaptations show that clear speech is not defined in a uniform way but that there are different styles of clear speech depending on the adverse condition the speech is heard in. In this context, *Active Speech Modifications* refer to the speaking-style adaptations or strategies a speaker apply in order to maximize the communication effectiveness.

Identification and effective manipulations of the most prominent acoustic-phonetic characteristics of different styles of clear speech will allow the development of new, signal based, active speech modification algorithms, improving therefore speech intelligibility in many situations such as in the design of hearing aids, telephony, and other speech signal processing technologies and applications (i.e., speech synthesis, recognition, enhancement, etc).

The purpose of this project is to use modern speech analysis and reconstruction algorithms to:

1. identify which acoustic-phonetic characteristics are prominent in each of 3 different styles of clear speech (e.g. babble-countering clear speech, vocoder-countering clear speech, L2-'countering' clear speech) and when in time they are realized.
2. model at least some of these aspects so that they can be applied automatically (e.g. prosodic changes, changes in amplitude spectrum, modulation frequencies etc.) on speech.
3. run a series of 'proof of concept' perception experiments to see if the 'specifically-enhanced' speech is better perceived in the 'matched' adverse condition than other types of clear speech (there is evidence that this is the case with the naturally-enhanced speech).

For the purpose of the project we will use already developed relevant corpora (although we might need to create new).

The candidate participants in this project are expected to have background in any of the following areas: phonetics, speech signal processing, perception, and hearing.