## Domain : Natural Language, Speech and Audio Processing

Domain extra : corpus linguistics, automatic speech processing, machine learning, signal processing
**Year :** 2010
**Starting :** 2010
**Status :** open

## Subject :   Accent simultation and modelisation using automatic speech processing

**Thesis advisor :** Martine Adda-Decker

<u>Co-advisors</u> Philippe Boula de Mareüil, LIMSI-CNRS, work related to accent simulation

Collaborations ( - )

**Abstract** (max : 1000 chars) :
*Accent* is generally defined as a set of some typical pronunciation traits. These traits, when perceived, contribute to classify the speech either as non standard, or as coming from a specific (regional, sociological) variety. The issue of foreign and regional accent modeling has been raised some years ago with the goal of improving pronunciation models for automatic speech recognition systems. Recently two PhD theses carried out at LIMSI focused on accent identification and classification. It has been shown that accent classification is a very difficult task, both for humans as well as for automatic classifiers. Many facets of what makes an *accent* remain still to be uncovered and the proposed subject aims at contributing to this aim.
What about simulated accents ? What if speakers exaggerate pronunciation traits to mimic some other speaker or some non-standard variety ? Speakers may be more or less gifted to play with accents, mimic various accents and even different voices. This raises important issues with respect to fundamental questions concerning the nature of accents and the characterisation of human voices. On an application side, automatic detection of accent simulation will contribute to security applications such as impostor detection. In this thesis, the candidate will collect accented speech with exaggerated pronunciation traits produced by human impostors, define a set of acoustic features describing these traits, and elaborate simulated accent models. These models will then be used to synthesize controlled accented speech.

<u>Context</u> (Current state of the art in the domain - max : 1000 chars) :
Impostor detection is a very active area in the field of automatic speaker recognition. Applied methods include GMMs (gaussian mixture models), HMMs (Hidden Markov Models), SVMs (Support Vector Machines). Acoustic features typically correspond to MFCCs (mel frequency cepstrum coefficients) and MFCC derivatives. Automatic accent identification is a relatively recent issue within the field of automatic language recognition. However the question of accent impostors has, to the best of our knowledge, not been addressed yet.

<u>Objectives</u>(Scientific objectives - max : 1000 chars) :
Improve our knowledge/understanding of accent (perception/pruduction) using automatic speech processing methods.

<u>Work program</u>(Main expected steps - max : 1000 chars) :
Data collection of accented speakers and accent impostors. Definition of acoustic/prosodic/pronounciation features. Speech synthesis of controlled accent stimuli. Automatic classification and perceptual experiments involve natural accent impostor stimuli as well as synthetic accent-graded stimuli.

Extra information (Extra information like a link to a full description of the subject - max : 500 chars) :
Prerequisite (Expected background) :
**Expected funding :** institutional funding
Status of funding : expected
Candidates (informations on potential candidates - max : 500 chars) : –

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