

Ph.D. or Post-doc position in Speech Recognition K.U.Leuven - ESAT, Belgium

Feature Space Constraints for Acoustic Modeling of under-resourced languages Test Case: South African languages

Job description

It is well known that the dimensionality of feature vectors used in state-of-the-art speech recognition systems (typically in the range 30-40) is much larger than the intrinsic dimensionality of speech which is estimated to be 7-10 only. Efforts to make the intrinsic dimensionality smaller have been largely futile as the constraints are too complex for our by and large linear techniques. This inefficiency in basic representation is the main reason why speech recognition systems contain so many hundreds of thousands parameters that are largely redundant and why we need such large corpora to train these parameters. While very large corpora are available for the major languages, this is not the case for smaller languages, making them “under-resourced”. This redundancy is also a major cause for lack of robustness in general.

The objective of this project is to apply novel mathematical techniques (e.g. spectral clustering) that can capture constraints - not in the feature space - but in the model space, i.e. in the underlying HMM parameters. Such constraints will lead to lesser requirements on the size of the training databases and should increase robustness in all situations where we don't have large corpora available, such as speaker adaptation, accent adaptation or modeling of under-resourced languages. In this project two test cases of under-resourced languages will be studied: i) “Afrikaans”, for which data from Dutch and Flemish can be reused; ii) languages from the Bantu family as spoken in South Africa for which we can only bootstrap from a wide set of rather unrelated languages.

Project Partners

This project will be run in collaboration with Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa.

Qualifications

Candidates ideally have a university degree in engineering, computer science or applied mathematics. Skills and experience in any of the following areas are welcomed:

- speech recognition and speech modeling
- strong background in linear algebra and/or statistical parameter estimation
- some familiarity with Dutch or Afrikaans
- computational skills (MATLAB, C, UNIX, Python)

Position

Within this project there is funding for either a 4yr Ph.D. scholarship or a 2 yr junior post-doc. In the case of a post-doc significant relevant experience would be requested.

Applications

Interested applicants send their CV to Prof. Dirk Van Compernelle [compi@esat.kuleuven.be]