

Some Recent Advances in Speech Recognition with Potential Applications in Other Statistical Pattern Recognition Areas

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Abstract

In this talk, we will review some recent developments in the area of statistical speech recognition, and which could also be potentially useful to other statistical pattern recognition applications. Among other issues, we will discuss the use of new forms of expert mixtures, for example based on the minimization of the product of error probabilities. This rule, sometimes referred to as “product-of-errors rule” has recently been used quite successfully in multi-channel (multi-modal) processing. In speech recognition, this rule was also used to implement automatically noise robust speech recognition approaches (based on frequency subband processing), which do not require noise adaptation or explicit noise models. In a related framework, we will also introduce the theory of “missing data”, yielding significantly improved noise robustness in the case of classification of multi-dimensional feature vectors prone to noise in some (unknown) components. Finally, as a further generalization, we will also discuss a new hidden Markov model (HMM), referred to as HMM2, where the HMM emission probabilities are themselves estimated state-dependent (feature based, secondary) HMMs.