Informatik-Oberseminar

Fachgruppe Informatik

Lehrstuhl für Informatik 6

RHEINISCH-WESTFÄLISCHE TECHNISCHE HOCHSCHULE AACHEN

EINLADUNG

Zeit: Montag, 18.07.2011, 13:00 Uhr

Ort: Seminarraum 5055, Ahornstr. 55

Referent: Dipl.-Informatiker Björn Hoffmeister

Titel: Bayes Risk Decoding and its Application to System Combination

Abstract:

The task of an automatic speech recognition (ASR) system is to convert an acoustic signal, which contains speech, to written text. The error of an ASR system is measured in the number of words in which the recognized and the spoken sentence differ. This work investigates and develops decoding and system combination approaches within the Bayes risk decoding framework with the objective of reducing the number of word errors.

The Bayes risk decoding framework yields the hypothesis with the least expected number of errors w.r.t. a specified loss function and given the true sentence posterior probabilities. In ASR the loss function of choice is the Levenshtein distance. However, in practice neither the true probabilities are known nor is the computation of the Bayes risk hypothesis with the Levenshtein distance as loss function computationally feasible.
Consequently, this work adresses two problems: first, how to compute an estimate for the sentence posterior probabilities given one or several ASR systems; second, how to approximate the computation of the Bayes risk hypothesis with the Levenshtein distance as loss function.

A common approach to reduce the complexity of the Bayes risk decoding is to replace the Levenshtein distance by a benign distance function. In this work the meaning of benign is formalized and a generic, efficient decoder for benign distance functions is developed. In a second step, the decoder is extended to a generic system combination technique. The class of Bayes risk decoders with benign distance functions include the common approaches of confusion network (CN) and minimum frame error (FE) decoding.
The properties of existing CN and min. FE decoders are discussed and variants of both approaches are motivated and developed.

For confusion networks an alternative system combination algorithm, called CNC, is known. I will show that the original CNC is a special case of the generic Bayes risk system combination technique.
Finally, an extension of the CNC approach is introduced, which aims at overcoming the limitations of the original algorithm.
In particular, the extended CNC can deal with unreliable system-dependent probability estimates.

Es laden ein: Die Dozenten der Informatik