Abstract

In this paper an original method for integrating Artificial Neural Networks (ANN) with Hidden Markov Models (HMM) is proposed. ANNs are suitable to perform phonetic classification, whereas HMMs have been proven successful at modeling the temporal structure of the speech signal. In the approach described here, the ANN outputs constitute the sequence of observation vectors for the HMM. An algorithm is proposed for *global* optimization of all the parameters. An incremental design method is described in which specialized networks are integrated to the recognition system in order to improve its performance. Results on speaker-independent recognition experiments using this integrated ANN-HMM system on the TIMIT continuous speech database are reported.

Global Optimization of a Neural Network - Hidden Markov Model Hybrid

Yoshua Bengio, Renato De Mori,
Giovanni Flammia, Ralf Kompe

TR-SOCS-90.22
December 1990

McGill University School of Computer Science,
3480 University street, H3A2A7, Montreal, Qc., Canada

phone: (514)-398-7072
e-mail: yoshua@cs.mcgill.ca