

Links Between Markov Models and Multilayer Perceptrons

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Abstract: Hidden Markov models are widely used for automatic speech recognition. They inherently incorporate the sequential character of the speech signal and are statistically trained. However, the a-priori choice of the model topology limits their flexibility. Another drawback of these models is their weak discriminating power. Multilayer perceptrons are now promising tools in the connectionist approach for classification problems and have already been successfully tested on speech recognition problems. However, the sequential nature of the speech signal remains difficult to handle in that kind of machine. In this paper, a discriminant hidden Markov model is defined and it is shown how a particular multilayer perceptron with contextual and extra feedback input units can be considered as a general form of such Markov models.