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Accurate Parameter Estimation for an Articulatory Speech Synthesizer with an Improved Neural Network Mapping

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Abstract: Neural network (NN) applications have recently been employed to extract the parameters of an articulatory speech synthesizer from a given speech signal. Results from these attempts showed that a single NN is insufficient to cover all of the possible configurations uniquely. Moreover, apart from their computational advantages, NN mapping is so far not superior to the other mapping techniques [1]. Thus there is a clear need to improve NN solution to the inverse problem. Results from our earlier experiments with an articulatory speech synthesizer have shown that the statistical characteristic of the articulatory target pattern vectors can be exploited for an improvement in the estimation performance of a Multi-Layer Perceptron (MLP) NN [2]. In this paper, the effect of the modification to the distribution characteristic of the acoustic input pattern vectors will be investigated. The theoretical background for the effect of the input distribution characteristics on neural learning has been detailed elsewhere [3]. Empirical results for a more correct estimation of articulatory speech synthesizer parameters through exploiting the behavior of the Back Propagation (BP) algorithm are focused on here.

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