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Mirco Ravanelli, Maurizio Omologo

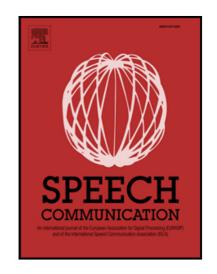
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Automatic context window composition for distant speech recognition

Mirco Ravanelli, Maurizio Omologo Fondazione Bruno Kessler, Trento, Italy

Abstract

Distant speech recognition is being revolutionized by deep learning, that has contributed to significantly outperform previous HMM-GMM systems. A key aspect behind the rapid rise and success of DNNs is their ability to better manage large time contexts. With this regard, asymmetric context windows that embed more past than future frames have been recently used with feedforward neural networks. This context configuration turns out to be useful not only to address low-latency speech recognition, but also to boost the recognition performance under reverberant conditions.

This paper investigates on the mechanisms occurring inside DNNs, which lead to an effective application of asymmetric contexts. In particular, we propose a novel method for automatic context window composition based on a gradient analysis. The experiments, performed with different acoustic environments, features, DNN architectures, microphone settings, and recognition tasks show that our simple and efficient strategy leads to a less redundant frame configuration, which makes DNN training more effective in reverberant scenarios.

Keywords: Distant Speech Recognition, Deep Learning, Context Window, Reverberation

1. Introduction

Distant Speech Recognition (DSR) represents a fundamental technology towards flexible human-machine interfaces. There are indeed various real-life situations where DSR is more natural, convenient and attractive than traditional

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