Fast Classification Learning with Neural Networks and Conceptors for Speech Recognition and Car Driving Maneuvers

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Abstract. Recurrent neural networks are a powerful means in diverse applications. We show that, together with so-called conceptors, they also allow fast learning, in contrast to other deep learning methods. In addition, a relatively small number of examples suffices to train neural networks with high accuracy. We demonstrate this with two applications, namely speech recognition and detecting car driving maneuvers. We improve the state of the art by application-specific preparation techniques: For speech recognition, we use mel frequency cepstral coefficients leading to a compact representation of the frequency spectra, and detecting car driving maneuvers can be done without the commonly used polynomial interpolation, as our evaluation suggests.