Sequence Based Deep Neural Networks for Channel Estimation in Vehicular Communication Systems

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Abstract. Channel estimation is a critical component of vehicular communications systems, especially in high-mobility scenarios. The IEEE 802.11p standard uses preamble-based channel estimation, which is not sufficient in these situations. Recent work has proposed using deep neural networks for channel estimation in IEEE 802.11p. While these methods improved on earlier baselines they still can perform poorly, especially in very high mobility scenarios. This study proposes a novel approach that uses two independent LSTM cells in parallel and averages their outputs to update cell states. The proposed approach improves normalised mean square error, surpassing existing deep learning approaches in very high mobility scenarios.

Keywords: Channel estimation · deep learning · dual-cell LSTM · IEEE 802.11p · vehicular channels.