Recognition & Evaluation of Additional Traffic Signs on the example of '80 km/h when wet'

Abstract:

Common Traffic Sign Recognition (TSR) systems usually neglect additional traffic signs and do not evaluate those signs. This is a problem because such additional signs can provide important information for the current driving situation and the validity of the main traffic sign. In this paper, we propose a TSR system being able to recognize and evaluate additional signs, proven on the example of the traffic sign combination '80 km/h when wet'. The TSR task is separated in the detection of the traffic signs and the subsequent classification of the signs with their possible additional signs. A validation accuracy of 98% for the classification of the speed limit sign 80 km/h and 96% for the classification of the additional sign when wet has been achieved. According to the traffic rules, the additional sign 'when wet' restricts the speed limit sign '80 km/h' to be only valid if the road is wet. For evaluating the sign combination correctly, a Road Condition Classification system is needed. We also compare several methods based on convolutional neural networks to detect the road condition (wet or dry), which reaches a validation accuracy above 93% and thereby outperforms current state-of-the-art.