Use of automated video analysis for the evaluation of bicycle movement and interaction

Abstract:

With the purpose of developing valid models of microscopic bicycle behavior, a large quantity of video data is collected at three busy urban intersections in Munich, Germany. Due to the volume of data, the manual processing of this data is infeasible and an automated or semi-automated analysis method must be implemented. An open source software, “Traffic Intelligence”, is used and extended to analyze the collected video data with regard to research questions concerning the tactical behavior of bicyclists. In a first step, the feature detection parameters, the tracking parameters and the object grouping parameters are calibrated, making it possible to accurately track and group the objects at intersections used by large volumes of motor vehicles, bicycles and pedestrians. The resulting parameters for the three intersections are presented. A methodology for the classification of road users as cars, bicycles or pedestrians is presented and evaluated. This is achieved by making hypotheses about which features belong to cars, or bicycles and pedestrians, and using grouping parameters specified for that road user group to cluster the features into objects. These objects are then classified based
on their dynamic characteristics. A classification structure for the maneuvers of different road users is presented and future applications are discussed.


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