Abstract:

Set-based predictions can ensure the safety of planned motions, since they provide a bounded region which includes all possible future states of nondeterministic models of other traffic participants. However, while autonomous vehicles are tested in urban environments, a set-based prediction tailored to pedestrians does not exist yet. This paper addresses this problem and presents an approach for set-based predictions of pedestrians using reachability analysis. We obtain tight over-approximations of pedestrians’ reachable occupancy by incorporating the dynamics of pedestrians, contextual information, and traffic rules. In addition, since pedestrians often disregard traffic rules, our constraints automatically adapt so that such behaviors are included in the prediction. Using datasets of recorded pedestrians, we validate our proposed method and demonstrate its use for evasive maneuver planning of automated vehicles.

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