Modelling Pedestrian Crossing Behavior through Social Force Model

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Abstract

Social force model (SFM), a microscopic model, is an effective method in modeling pedestrian walking behavior. Social force model assumes that the walking behavior of pedestrian is influenced by a series of forces. Modeling Pedestrian-vehicular interactions using social forces model is in very nascent stage especially for mixed traffic conditions. Very few studies have modeled signalized crosswalk with permitted left turning vehicles which interact with pedestrians. Authors also have not found any social force models for midblock crossings which is a very important pedestrian facility from safety point of view. Hence there is a need for vehicular social force model and gap acceptance model which will help in modeling crosswalks. The objective of this study is to create a pedestrian-vehicular Social force model which can simulate pedestrians as well as vehicles and their interactions for intersection as well as midblock crossings with modifications to represent mixed traffic conditions. The proposed model has a pedestrian SFM component, Vehicular SFM component Pedestrian Gap acceptance model which is introduced. Also, the Pedestrian-Vehicular force is modified by adding a new factor to model the difference in forces exerted by different type of vehicles.

Keywords: Social force model, Intersections, Midblock Crossings, Mixed Traffic conditions

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