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## Understanding Driver-Pedestrian Interactions to Predict Driver Yielding Using Data-Driven Methods: Field Experiments in Minnesota

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### Abstract

When a pedestrian approaches an intersection, there are several possible outcomes concerning the reaction of approaching drivers. Specifically, the main possibilities are that the driver yields to the pedestrian or the pedestrian are forced to yield to the driver and wait until a sufficient gap appears. Many factors influence the outcome of the driver-pedestrian interaction, including traffic volume, vehicle speed, and the built environment, among others. Video data were collected from 18 different intersections in Minnesota to better understand this interaction and what factors lead to a more likely driver-yielding outcome. Individual pedestrian-driver interactions are observed, and the factors present in each interaction are identified. The collected data is published at [https://github.com/tianyi17/pedestrian\\_yielding\\_data\\_MN](https://github.com/tianyi17/pedestrian_yielding_data_MN).

We construct machine learning models such as logistic regression to predict driver yielding based on factors identified in the collected video data. We identify and quantify significant features such as intersection characteristics like the presence of restaurants/bars, the width of the major road, the number of pedestrians attempting to cross, and the vehicle speed. Employing this model, we can guide the design of new intersections or the modification of existing intersections to maximize the probability that the driver will yield and increase the overall safety of pedestrians.