Reliability Modeling on Drivers' Decision during Yellow Phase

Authors : Sabyasachi Biswas, Indrajit Ghosh

Abstract : The random and heterogeneous behavior of vehicles in India puts up a greater challenge for researchers. Stop-and-go modeling at signalized intersections under heterogeneous traffic conditions has remained one of the most sought-after fields. Vehicles are often caught up in the dilemma zone and are unable to take quick decisions whether to stop or cross the intersection. This hampers the traffic movement and may lead to accidents. The purpose of this work is to develop a stop and go prediction model that depicts the drivers' decision during the yellow time at signalised intersections. To accomplish this, certain traffic parameters were taken into account to develop surrogate model. This research investigated the Stop and Go behavior of the drivers by collecting data from 4-signalized intersections located in two major Indian cities. Model was developed to predict the drivers' decision making during the yellow phase of the traffic signal. The parameters used for modeling included distance to stop line, time to stop line, speed, and length of the vehicle. A Kriging base surrogate model has been developed to investigate the drivers' decision-making behavior in amber phase. It is observed that the proposed approach yields a highly accurate result (97.4 percent) by Gaussian function. It was observed that the accuracy for the crossing probability was 95.45, 90.9 and 86.36.11 percent respectively as predicted by the Kriging models with Gaussian, Exponential and Linear functions.

Keywords : decision-making decision, dilemma zone, surrogate model, Kriging
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