Abstract

Since pedestrians are integral parts of urban traffic, understanding their road crossing behaviour is essential from traffic flow as well as for pedestrian safety perspective. Not much work has been reported in this area from low- and middle-income countries where high heterogeneity and lack of discipline make the traffic very different from those in high-income countries. Due to the lack of proper enforcement, vehicles do not yield for pedestrians. Also, in most cases, drivers and pedestrians do not have an adequate understanding of their right-of-way. These factors make the pedestrian crossing manoeuvre even worse at midblock crossings. The motivation behind this study is to understand the behaviour of pedestrians and approaching vehicles at mid-block crossings. An instrumented vehicle is used to collect data from the Kanpur city. Since LiDAR (Light Detection and Ranging) provides point clouds at high frequency, an algorithm is developed to identify and track vehicles and pedestrians. The two types of interactions focused in this study are car-pedestrian and motorized bike-pedestrian. The walking speed profile and trajectory of the pedestrians are analysed. The modified post-encroachment time (PET_m) and modified safety gap (SG_m) are introduced with the help of pedestrian's trajectory. The results depict that pedestrians are more willing to take a risk in front of motorized bikes as compared to cars. The speed profile of pedestrians remains unaffected when motorized bike approaches them. However, when interacting with cars, it was found that the pedestrians increase their speed in the first half and then decrease in the second half of the completion of the crossing. PET_m shows an inverse relationship with approaching the speed of the vehicle and the minimum accepted time gap by pedestrian increases with a decrease in the severity of the event during the midblock crossing.

Keywords: Pedestrian midblock crossing, Walking speed profile, Modified PET, Modified Safety gap, Pedestrian’s trajectory