

Investigating the Vehicle-Bicyclists Conflicts using LIDAR Sensor Technology at Signalized Intersections

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Abstract : Light Detection and Ranging (LiDAR) sensors are capable of recording traffic data including the number of passing vehicles and bicyclists, the speed of vehicles and bicyclists, and the number of conflicts among both road users. In order to collect real-time traffic data and investigate the safety of different road users, a LiDAR sensor was installed at Cold Spring Ln - Hillen Rd intersection in Baltimore City. The frequency and severity of collected real-time conflicts were analyzed and the results highlighted that 122 conflicts were recorded over a 10-month time interval from May 2022 to February 2023. By using an innovative image-processing algorithm, a new safety Measure of Effectiveness (MOE) was proposed to recognize the critical zones for bicyclists entering each zone. Considering the trajectory of conflicts, the results of the analysis demonstrated that conflicts in the northern approach (zone N) are more frequent and severe. Additionally, sunny weather is more likely to cause severe vehicle-bike conflicts.

Keywords : LiDAR sensor, post encroachment time threshold (PET), vehicle-bike conflicts, a measure of effectiveness (MOE), weather condition

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