Roadway Contextual Risk Assessment Using Dynamic Traffic Conditions Data Obtained from Autonomous Vehicles

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ABSTRACT

Traditional road safety assessment methodologies do not recognize the driving environment's fast-changing dynamics that influence the contextual complexity and, ultimately, its risk. This paper proposes a method to use diverse open-source sensor data (LiDAR) collected by Waymo autonomous vehicles to estimate the road environment's complexity considering dynamic traffic conditions. The proposed Contextual Risk Factor (CRF) model estimates the driving scene's complexity using the density and proximity of the objects around the vehicle. The data was analyzed frame-by-frame, and contextual risk categories of high, medium, and low were assigned. The results revealed the objects in the scene well represent the contextual complexity. However, what the driver sees in front of them and within their forward reaction space is not directly representative of the complexity of the scene and vice versa.