



About the relation between severity and frequency of traffic conflicts and accidents: A case study based on real-world data

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Understanding the relationship between traffic conflict severity and frequency is essential for enhancing road safety measures and implementing effective traffic management strategies. We aim to extend existing research by providing a case study about the comparison of the severity and frequency of traffic conflicts occurring at the same location. The theoretical background of our study stems from the conceptual framework [1], which visualizes the relationship between traffic conflicts and accidents in the form of a pyramid as depicted in Figure 1.

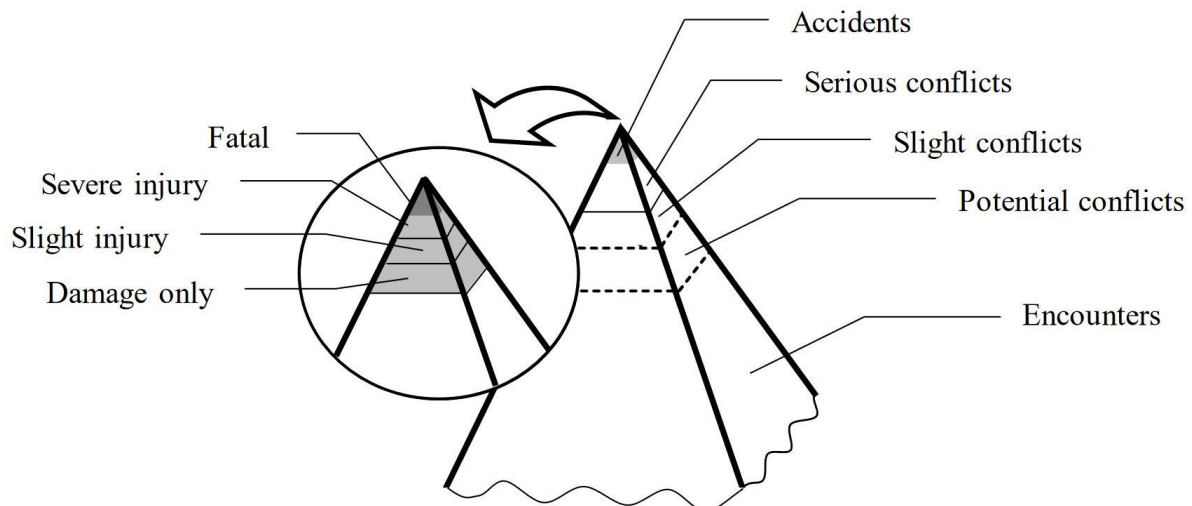


Figure 1: Pyramid of traffic safety [2] (adopted from [1]).

While this framework provides valuable insights, there remains a research gap of studies that empirically validate and quantify this relationship [2]. Thus, our study seeks to address this gap by utilizing long-term observational data and accident reports collected from a high-traffic urban intersection.

Our research methodology involves the comprehensive analysis of trajectory data obtained from extensive camera-based observations conducted over multiple months. The data collection is done at AIM Research Intersection [3] in Braunschweig, Germany. Trajectory data of motorized and non-motorized road users is perceived and analyzed automatically. Specifically, we focus on a scenario involving unprotected left turns crossing oncoming traffic, a common



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traffic maneuver associated with a risk of accidents and conflicts. By leveraging advanced data analytics techniques, we aim to identify patterns that are relevant to the conflict.

Our results indicate a relationship between the severity and frequency of traffic conflicts. While the number of accidents detected is low, the frequency of conflicts and encounters is notably higher. This disparity underscores the importance of refining and standardizing automated conflict detection methods to accurately capture the spectrum of traffic events. Thus, we highlight the need for ongoing research to explore alternative methodologies for conflict detection.

In conclusion, our study contributes to the growing body of literature on traffic safety by validating the relationship between severity and frequency of traffic events. The publication will give concrete numbers and show explicit traffic events for the different categories along the pyramid model in a chosen period. Overall, our study confirms the hypothesis that accidents are less frequent than conflicts and encounters, suggesting potential implications for traffic safety interventions and policy development.

References

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