Editorial

Road safety data considerations

Road safety is currently recognized as a major global epidemic (WHO), and a large amount of research on safety data analysis is being aimed at it, e.g. the UNECE SAFEFITS model (UNECE, 2018), and the SAFETYNET (Commandeur et al., 2013) and DACOTA (Dupont et al., 2014) European research projects. Several innovative methods, concepts and applications are being proposed and applied, driving policy, along with other, well-established techniques. Clearly, the success of these developments is ultimately governed by the quality of the underlying data. While data issues are relevant in all aspects of science, the very nature of road safety introduces additional complications.

For example, safety data availability and reliability vary considerably across regions, countries, but also cities, depending on a variety of factors, including funding levels, data collection and organizational infrastructures, administrative priorities and political will. Road safety analysis requires, in addition to crash data, the respective data on risk exposure and performance indicators (Antoniou and Yannis, 2013), which are also often less available, reliable and comparable. Therefore, even if the respective authorities make considerable improvements in collecting road safety-related data, the overall analysis might still suffer, if exposure data and other suitable explanatory variables are not adequately collected. Furthermore, the wide variety of factors affecting traffic safety (e.g. factors relating to infrastructure and the environment, the vehicle and of course (all) road users) makes the use of more advanced analysis techniques necessary, in order to account for the interactions and often hierarchical nature of the safety data. The diversity of data collection practices and regulations across jurisdictions hamper the development of seamless, detailed and reliable formal road safety data-bases. On the other hand, the emerging availability of large amounts of publicly available data (opportunistic, crowd-sourced, international organizations databases, etc.) creates an opportunity to complement existing data-bases. Needless to say, different regions face unique challenges in road safety data collection, which makes the investigation of the model adaptations/ transformation to different quality and quantity of data of particular interest. This Special Issue aims to add to the literature of road safety data collection and analysis, by addressing several of these issues. It combines a set of 17 papers that address issues related to road safety data and methods that can be applied at all stages of data handling (collection, processing and analysis).

Imprialou and Quddus (2018) present a critical review of crash data quality for road safety research. Furthermore, the authors provide research directions for the future improvement of crash data collection. Schlögl and Stötz (2018) provide a review of road safety data, focusing on the issues and uncertainties associated with them.

Dimitriou et al. (2018) explore the macroscopic properties and temporal stability of road safety statistics, using data from 121 countries. The authors utilize a number of advanced statistical techniques and develop structural equation models for multiple time points (2010 and 2013). Huang et al. (2018) use a rich dataset over almost 30 years and 195 countries to present an analysis of the availability and consistency of data for road traffic fatalities. Ahmed et al. (2018) provide a literature review of errors in accident data, as well as their causes and methods of resolving them. Montella et al. (2018) present a novel approach to data collection, processing and analysis, aiming at reducing errors and improving the quality and consistency of field crash data collection.

Perez et al. (2018) treat the issue of using hospital data to estimate serious road safety-related injuries. Medury et al. (2018) investigate the underreporting of pedestrian and bicycle crashes in university campuses. The authors take advantage of emerging crowd-sourced data.

Black and Villarini (2018) investigate the effects of methodological decisions on weather-related crash analysis and conclude that relative risk estimates based solely on crash reports differ significantly from those that include weather data.

Harirforoush and Bellalite (2018) propose a two-step approach for the determination of hot-spots, based on a spatial analysis (using network kernel density estimation) and a network screening method using the critical crash rate. Theofilatos et al. (2018) investigate the contribution of traffic information on crash occurrence, leveraging state-of-the-art statistical techniques, recognizing the rarity of road crashes. Hyun et al. (2018) explore the crash risk of vehicle interactions with trucks, while Boakye et al. (2018) explore the factors that influence the (non-)use of seat-belts of front-seat passengers at night.

Given the low number of crashes in most networks, a lot of researchers turn their attention towards the development of surrogate safety measures. Stipancic et al. (2018) extract maneuver information from a large data-base of smartphone data and explore their usability as surrogate safety measures. The authors were able to correlate these data both with crash occurrence and severity (though the latter link was not always statistically significant). Naude et al. (2018) also use vehicle dynamics data to identify and analyze potential crashes. Furthermore, Lee et al. (2018) explore different specifications for surrogate measures for pedestrians at intersections.

Recognizing both the increasing significance, but also the difficulties associated with dealing with bicycle data, Fournier et al. (2018) develop methods to investigate bicycle exposure in crash rates.

Finally, Wang et al. (2018) explore the occurrence of secondary accidents (if, where and when they may occur).

Clearly, road safety data analysis is a big and important topic. This special issue comprises a number of interesting and relevant contributions, which advance the state of the art. Naturally, at the same time, new research questions arise, opening new research topics.

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