Data Article

Probabilistic model data of spatial-dependent crashes for ranking risk of road segments

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A B S T R A C T

This article presents the databases analyzed and used to evaluate the risk of segment-based roads resulting from traffic crashes for three main motorways in UK from 2010 to 2014. The raw database is collection to many partial data for variables related to compute the crashes rates for each segment. These data were used to develop and select the best Bayesian probabilistic model presented in our research article (Kadhem et al., 2018) [1]. The data provided in this article would be an important source for studies that require evaluating statistical models and also to improve and develop the plans of traffic safety.

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The databases presented in this article were used to develop and select an optimal probability model, suggested by Kadhem et al., 2018 [1], to determine the states of traffic road riskiness in three motorways in the UK which are: the motorway M5 with 52 sections road, motorway M6 with 90 sections and motorway M42 with 21 sections. The raw data files (reads in Excel format) were presented in Tables 1–3, respectively, which are deposited at in Supplementary data. The data reported in this data in brief article (spreadsheets in Supplementary data) were used to develop and select the optimal probability model, suggested by Kadhem et al., 2018 [1], to determine the states of riskiness. The occurred crashes count were recorded as a point process for each segment of road, and those occurring more likely near junctions, over a five-year period from year 2010–2014 in three motorways in the UK which are: the motorway M5 with 52 sections road, M6 with 90 and motorway M42 with 21 sections. Generally, the raw data of each motorway (spreadsheets in Supplementary data) comes from two sources. The data of first sources, obtained from the Department for Transport as an Open Government Archive (OGA) [2], is related to the traffic safety characteristics which are: segment label, crash location, Coordinate Point (CP), Length of segment (L), Annual Average Daily Traffic flow (AADT). While, the data of first sources, which are the crashes count (y), obtained from the road traffic counts archive [3].

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2. Experimental design, materials and methods

The processing process of raw data is done through two stages. In the first stage, we compute the expected crash rates (as shown in seventh column of spreadsheets in Supplementary data) which is based on the data of road traffic counts y [3] listed in the sixth column of spreadsheets in Supplementary data. In the second stage, we obtain the spatial-based classification probabilities of the hidden states from our model, as shown in the last columns of each motorway in spreadsheets in Supplementary data, based on traffic characteristics given columns from 1 to 6 in spreadsheets in Supplementary data. The Figs. (1)–(3) show the spatial-based classification probabilities of the hidden states for each motorway which were plotted and mapped using the Arc Geographic Information System (ArcGIS) [4].
Fig. 1. The spatial probabilities mapped at segment level for the M5 motorway.
Fig. 2. The spatial probabilities mapped at segment level for the M6 motorway.
Fig. 3. The spatial probabilities mapped at segment level for the M42 motorway.
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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.dib.2019.104966.

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