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Editorial

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Editorial

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This is the second part of the *Infrastructure Asset Management* themed issue on highway infrastructure decision-making: challenges and opportunities. The first part focused on infrastructure investment evaluation involving costs and sustainability, and this part covers topics related to monitoring of infrastructure operations and condition.

The first paper (Salas Jones *et al.*, 2018) addresses some limitations of existing methodologies that do not adequately account for the impact of unexpected events on traffic flow. To address this, the authors use Twitter data to predict the occurrence time and severity of traffic-impacting events, and demonstrate application of their proposed method using a case study in UK's West Midlands region. They apply natural language-processing methods to retrieve information related to traffic events in the study area and used five machine learning algorithms – ridge regression classification, naive Bayes, *k*-nearest neighbour, multilayer perceptron and support vector machines – to place the retrieved information into two classes: traffic related and non-traffic related. They identify ridge regression classification as the most superior technique for this purpose.

In the second paper (Bechtel *et al.*, 2018), the authors acquire anonymous probe-vehicle data collected from commercial and private cell phones, global positioning system devices and vehicles' on-board computers. They use this data to evaluate congestion conditions, in terms of a congestion metric, at thousands of roadway bridges in New Jersey, USA. The authors compare the developed metric with the functionally obsolete performance designation defined by the US National Bridge Inventory, and ascertain that the developed metric is a superior indicator of functional performance (specifically, congestion) of the region's transportation system. The authors also advocate for future research work to examine the tradeoff between congestion mitigation and the costs of such mitigation.

The third article (Brennan *et al.*, 2018) uses temporally-defined probe vehicle speed data to evaluate roadway congestion along fixed-location, variable-length highway segments, which they

termed 'traffic message channels' (TMCs). In a departure from previous schools of thought that defined congestion as an increase in travel time, the authors define congestion in terms of the relative increase in travel time duly accounting for the variation in TMC lengths. The authors then group concurrent TMCs with statistically similar levels of congestion into corridors, to facilitate comparison of congestion across different highway segments. The authors call for further research to evaluate the consistency of the corridor groups at different seasons and times of day.

The fourth article (Taylor *et al.*, 2018) presents a monitoring framework for a bridge deck network using two alternative long-term strategies: a condition-based strategy that involves non-destructive testing (NDT) and repair, and a time-based programmatic strategy that involves repairs at specific time intervals without condition monitoring. They determine the life-cycle cost of each strategy as the sum of repair and monitoring costs, and confirm the superior long-term cost-effectiveness of the NDT-related strategy.

This set of papers is a reminder of the need for regular monitoring of the operational and physical condition of highway infrastructure. It is only through effective monitoring that appropriate and cost-effective interventions can be identified and implemented, and this can have far-reaching consequences in terms of the life-cycle costs and benefits of the infrastructure to the agency, users, and the community.

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