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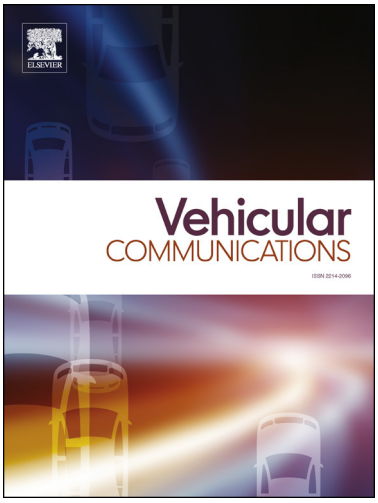

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A Cooperative Route Choice Approach via Virtual Vehicle in IoV

Tao Lei, Shangguang Wang, Jinglin Li, Fangchun Yang

State Key Laboratory of Networking and Switching Technology Beijing University of Posts and Telecommunications,
No.10 Xitucheng Road, Haidian District, Beijing, China

Abstract

Popular navigation services are used by drivers both to plan out routes and to optimally navigate real time road congestion in internet of vehicles (IoV). However, the navigation system (such as GPS navigation system) and apps (such as Waze) may not be possible for each individual user to avoid traffic without creating congestion on the clearer roads, and it might even be that such a recommendation leads to longer aggregate routes. To solve this dispersion, in this paper, we first apply a concept of virtual vehicle in IoV, which is an image of driver and vehicle. Then, we study a setting of non-atomic routing in a network of m parallel links with symmetry of information. While a virtual vehicle knows the cost function associated with links, they are known to the individual virtual vehicles choosing the link. The virtual vehicles adapt the cooperation approach via strategic concession game, trying to minimize the individual and total travel time. How much benefit of travel time by the virtual vehicles cooperating when vehicles follow the cooperation decisions? We study the concession ratio: the ratio between the concession equilibrium obtained from an individual optimum and the social optimum. We find that cooperation approach can reduce the efficiency loss com-pared to the non-cooperative Nash equilibrium. In particular, in the case of two links with affine cost functions, the concession ratio is at most

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Email address: {leitao; sgwang; jlli; fcyang}@bupt.edu.cn (Tao Lei, Shangguang Wang, Jinglin Li, Fangchun Yang)