

# Accepted Manuscript

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PII: S1084-8045(18)30158-9

DOI: [10.1016/j.jnca.2018.05.002](https://doi.org/10.1016/j.jnca.2018.05.002)

Reference: YJNCA 2134

To appear in: *Journal of Network and Computer Applications*

Received Date: 15 October 2017

Revised Date: 24 March 2018

Accepted Date: 6 May 2018

Please cite this article as: Lin, C.-C., Chin, H.-H., Chen, W.-B., Balancing latency and cost in software-defined vehicular networks using genetic algorithm, *Journal of Network and Computer Applications* (2018), doi: 10.1016/j.jnca.2018.05.002.

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# Balancing Latency and Cost in Software-Defined Vehicular Networks Using Genetic Algorithm

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## Abstract

Software-defined vehicular network (SDVN) effectively improves programmability and flexibility of VANET through software-defined network (SDN) features. To address the latency problem, the previous work considered that vehicles access the IP network through either cellular links or ad hoc links of vehicular networks in an SDVN, in which the SDN controller can rebate the bandwidth of cellular links allocated to vehicles to reduce latency, but the cost of renting the rebated bandwidth is paid by the network provider. Then, it proposed a two-stage game to optimize the rebating strategy to balance the latency requirement and the cost. However, optimization of each of the two stages may influence optimization of the other stage. As a consequence, this work proposes an improved genetic algorithm (IGA) to optimize the rebating stage in a single stage, which includes a dynamic mutation adjustment scheme to ensure solution diversity, and keep the best chromosome so far to avoid solution damage owing to the dynamic mutation. Through simulation, the number of packets transmitted through cellular lines is positively correlated with the rebate ratio and the other parameters. In addition, the proposed IGA can significantly improve performance of searching solutions, and obtain better results than the previous work.

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