Ant colony optimization for vehicle traffic systems: applications and challenges

ABSTRACT

Ant-based algorithms simulate the cooperative behaviour of real ants in finding food resources. A significant number of studies have focused on the self-organised behaviour of ants in the natural environment to develop effective systems for dynamic problems. Ant-based systems have special properties such as scalability, adaptability, and dynamicity, which are the main requirements for solving vehicle traffic congestion problem. Thus, ant-based algorithms are now being adopted by vehicle traffic systems VTSs to guide vehicles to less congested paths. However, literature shows that comprehensive reviews are lacking in this field. The main contribution of this paper is the review and classification of the most relevant systems based on novel taxonomy. A survey that includes statistical analyses on ant-based VTS was conducted to identify the limitations and evaluation process of VTS. This paper concludes by proposing a general framework in applying ant colony optimisation to VTS.