Solving Partially Dynamic Vehicle Routing Problems using Intelligent Multiagent System

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Abstract

More recently, the availability of real-time traffic information has allowed their treatment and incorporation into route plan and execution. Thus the route processing provide more accurate data, including real time to support the dispatch and operation of vehicles. The emergence of mobile, embedded software components and devices with good and reliable communication performance and processing can help the driver to perform his assigned tasks and follow the paths in the best possible way. This article presents an actual computational model based on Intelligent Multiagent to deal with the Partially Dynamic Vehicle Routing Problem applied to services and products distribution in large metropolitan areas.The Intelligent Multiagents are software components with autonomy and cooperation to maintain the optimality of route plans over the unpredictability of the urban environment and urgent requests. The architecture of the Multiagent System is composed of a Central Supervisor Agent controlling several Executor Agents embedded in Mobile Apps, one for each route (vehicle/driver) and an Observer Agent (to observe traffic conditions of the urban network). After dispatching Executor Agents, new urgent requests are received by the Supervisor Agent that assigns each of them to the most suitable Executor Agent. In this case the Executor Agent deviates from its route, services the urgent request and in return, if necessary, reorder the remaining customers to ensure the optimality of the path. These autonomous agents interact with an urban environment represented by a real-time updated digital map obtained from the Google Maps APIs.

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