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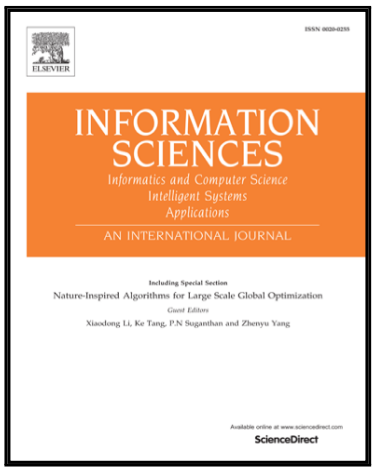

An Approach Driven by Mobile Agents for Data Management in Vehicular Networks

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PII: S0020-0255(16)31696-6
DOI: 10.1016/j.ins.2016.11.007
Reference: INS 12614

To appear in: *Information Sciences*

Received date: 4 March 2016
Revised date: 9 October 2016
Accepted date: 16 November 2016

Please cite this article as: Oscar Urra, Sergio Ilarri, Raquel Trillo-Lado, An Approach Driven by Mobile Agents for Data Management in Vehicular Networks, *Information Sciences* (2016), doi: 10.1016/j.ins.2016.11.007

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ACCEPTED MANUSCRIPT

An Approach Driven by Mobile Agents for Data Management in Vehicular Networks

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Abstract

In the last years, and thanks to improvements on computing and communications technologies, wireless networks formed by vehicles (called vehicular networks) have emerged as a key topic of interest. In these networks, the vehicles can exchange data by using short-range radio signals in order to get useful information related to traffic conditions, road safety, and other aspects. The availability of different types of sensors can be exploited by the vehicles to measure many parameters from their surroundings. These data can then be shared with other drivers who, on the other side, could also explicitly submit queries to retrieve information available in the network. This can be a challenging task, since the data is scattered among the vehicles belonging to the network and the communication links among them have usually a short life due to their constant movement.

In this paper, we use mobile agent technology to help to accomplish these tasks, since mobile agents have a number of features that are very well suited for mobile environments, such as autonomy, mobility, and intelligence. Specifically, we analyze the benefits that mobile agents can bring to vehicular networks and the potential difficulties for their adoption. Moreover, we describe a query processing approach based on the use of mobile agents. We focus on range queries that retrieve interesting information from the vehicles located within a geographic area, and perform an extensive experimental evaluation that shows the feasibility and the interest of the proposal.

Key words: vehicular ad hoc networks, mobile agents, data management, query processing

1. Introduction

Nowadays, acquiring computer and communication devices at a low cost has become easier. These devices exhibit noteworthy features, such as a small size, low power consumption, ease of programming, and affordable price; popular examples are the Raspberry Pi [37] and Arduino [14] devices. These devices can be used in mobile scenarios to

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