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AVIS DE SOUTENANCE DE THESE

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Campus de Rennes – Petit amphithéâtre

ITS-based Decision Making Mechanism for Opportunistic Networking in Heterogeneous Network Environment

Résumé :

Demand from different actors for extended connectivity have pushed vehicle manufacturers to invest in embedded communication solutions, which paves the way towards Cooperative Intelligent Transportation Systems (C-ITS). Cooperative vehicles enable an ecosystem of services around them. Due to the heterogeneousness of such services and their specific requirements, for ubiquitous connectivity it is necessary to combine existing wireless technologies. In this context, a Decision Maker (DM) is needed to manage all available access networks simultaneously.

Based on the Intelligent Transportation Systems (ITS) architecture proposed by International Organization for Standardization (ISO), we proposed the Ant-based Decision Maker for Opportunistic Networking (AD4ON), a modular DM capable to choose the best available access network for each data flow in an heterogeneous and dynamic network environment. The proposed architecture manages requirements and preferences from different actors (e.g., applications, users, administrators and regulators), and it takes into account the short-term prevision about the network environment in order to better satisfy the actors requirements.

Simulations have demonstrate that the AD4ON outperforms current benchmark algorithms like the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), by increasing decision's stability, reducing the "ping-pong" effect and maximizing flow's satisfaction. Moreover, we demonstrate by simulation that taking into account the short-term prevision, the AD4ON can optimize the algorithm reaction time, enabling flows to take better advantage of new networks as soon as they become available.

Mots-clés : ITS, Opportunistic networking, Heterogeneous Networking, Vehicular communication

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