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Editorial

Vehicular Delay Tolerant and Sensor Networks: Protocols and Applications

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Over the past decade, an extensive research has been carried out on delay tolerant networks (DTNs) and car 2 car communications (C2CC). An application of the DTNs is an environment where there is no direct connection between the nodes with intermittent connectivity, long delays, topology changes, higher bit error rates, and so forth. On the other hand, C2CC allows vehicles to exchange data among themselves autonomously. Both these technologies aim to improve the road safety and traffic flows. Other examples of these networks are interplanetary networks for deep space communications, sensor networks for ecological monitoring, parking assistance, ad hoc networks to disseminate information in roadway environments, disaster recovery, and so forth. Nowadays, a special extension of DTNs, called vehicular DTN (VDTN), has been the focus of researchers. This technology allows the cars and some fixed supporting nodes to communicate, hence opening doors to a number of applications. However, due to the dynamic nature of these networks, new research on architectures, models, and protocols need to be developed.

This special issue provides recent studies of protocols and applications for vehicular delay tolerant and sensor networks, thus featuring current and future research waypoints and milestones in the field of vehicular communications.

H. Kang et al. in the paper titled "Routing Protocols for Vehicular Delay Tolerant Networks: A Survey" provide a detailed survey of recent developments in vehicular DTNs with more emphases on routing. In addition, the authors also present the comparative analysis of selected vehicular DTN (VDTNs) routing protocols with respect to unique metrics such as implementation, infrastructure assisted or not, and more. In the end, a list of open challenges and future directions aids further research interest for existing routing constraints in VDTNs.

In the paper titled "On Dynamic Video Source Decision in VANETs: An On-Demand Clustering Approach" by L. Zhu et al., a video source decision scheme is presented for video delivery over VANETs. A content-aware clustering approach is used and the overlay tree is constructed according to the XOR function to reveal the relationship between supply and demand. Node fairness is ensured using communication between the cluster head and RSU.

In "GRCBox: Extending Smartphone Connectivity in Vehicular Networks," S. M. Tornell et al. present the GRCBox architecture, which allows smartphones to be completely integrated in vehicular network (VN) environments. The GRCBox architecture is composed of a low-cost hardware module that is installed in the vehicle and a set of libraries that allow developers to use it. The GRCBox architecture will be released under an open-source license in near future and will be providing test-bed environment for future enhancements.

H. Wang et al. proposed a content-based mobile tendency geocast routing protocol (CMTG) for urban vehicular networks in the paper titled "CMTG: A Content-Based Mobile

Tendency Geocast Routing Protocol in Urban Vehicular Networks." Mostly a vehicle movement is used as a metric to determine whether the vehicle is moving towards the source location of message or not and then compares the tendency with the message's preferred tendency to determine whether to accept or forward the message. To eliminate the overhead of maintaining the geographic multicast areas, a message is disseminated using different propagation characteristics of the vehicles.

A real-world testbed for vehicular delay-tolerant networks (VDTNs) created by M. C. G. Paula et al. is presented in the paper titled "Performance Evaluation of a Real Vehicular Delay-Tolerant Network Testbed." This testbed demonstrates the real deployment of VDTN architecture and evaluates the network performance with a safety application and a traffic jam system. The main concepts of the VDTN architecture; IP over VDTN approach; and out-of-band signaling with the separation between control and data planes are verified and validated.

X. Wang et al. proposed a novel link duration prediction (LDP) model for VANETs leveraging the distribution of relative speed instead of instantaneous velocity in the paper titled "Practical Link Duration Prediction Model in Vehicular Ad Hoc Networks." Intervehicle distance and the impact of traffic light are also considered in predicting the link duration. This model designs a practical solution so that a vehicle can dynamically estimate the link lifetimes between itself and any connected vehicles.

In the paper entitled "Modeling Enhancements in Routing Protocols under Mobility and Scalability Constraints in VANETs," N. Javaid et al. proposed three major categories for the selected vehicular routing protocols. The former two propositions include MAC layer framework for IEEE 802.11p and network layer framework for calculating the energy cost, whereas the later contribution tackles delay in VANETs by making enhancements in the selected routing protocols. Additionally, simulations provide a quantitative analysis for existing routing solutions for vehicular communications.

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