

ADAPTIVE VEHICLE TO VEHICLE HETEROGENEOUS TRANSMISSION IN COOPERATIVE COGNITIVE NETWORK VANETS

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ABSTRACT. *The vehicle-to-vehicle (V2V) communication system is an active radio broadcast system to receive information of disseminated road congestion and accident in real-time situation. V2V and vehicle-to-infrastructure (V2I) communication are developed based on the IEEE 802.11p technology, ad hoc principles, and wireless multi-hop techniques using geographical positions. Cognitive radio (CR) system can dynamically access any available resources in radio spectrum in an opportunistic fashion, which not only significantly improved the spectrum utilization, but also better satisfied the user service requirements. In this paper, the simulation results indicate that, when vehicles are unable to communicate directly with other available network nodes, infrastructure or vehicles, relaying information is crucial in such perceiving environment.*

Keywords: V2V, V2I, Cognitive radio, IEEE 802.11p

1. **Introduction.** Newer technologies such as MIMO systems are starting to increase the number of bits per second per hertz of bandwidth through spatial multiplexing and improve the robustness/range of the wireless link for a given data rate through space-time coding and beam forming. However, all these improvements come at the cost of multiple RF front ends at both the transmitter and the receiver. Cooperative communication techniques described in this article are fundamentally different in the relaying nodes technology which can forward information fully or in part.

Cooperative techniques are done by utilizing the broadcast nature of wireless signals by observing that a source signal which can be overheard at neighbor nodes is intended to be transmitted to a particular destination. These neighbor nodes are called relays, partners or helpers, process the overheard signals and transmit towards the destination [1]. Position and traffic information is needed by drivers to select an optimal entertainment information which is welcomed by passengers to enjoy the travel [2].

Vehicular communication can provide great benefits to all road users and achieve where a major step toward safer, cleaner and smarter roads [16]. Vehicular communication has been known with specific characteristics and requirements: intermittent access to a communication infrastructure, self-organization, high node mobility, scalability with a number of nodes ranging from sparse to dense scenarios, information dissemination in geographical regions, reliable data transmission with short delay and fairness in resource usage.

CR is a special type of software defined radio which is able to estimate the communication parameters and can intelligently adapt itself to the environment. In order to achieve the desired objective (i.e., to maximize throughput and channel utilization), intelligent