

Master's Thesis

Evaluation of Distributed Resource Allocation using Multi-Agent Reinforcement Learning for 5G V2X Communication

High mobility of vehicles which leads to varying environment and the demanding QoS requirements of V2X applications challenge the usage of conventional resource allocation methods which are mostly designed for static or low-mobility environment assumptions [3]. This motivates to research on novel approaches for resource allocations in V2X communication. Recently, machine learning approaches for resource management in V2X have been exploited to promise better performance than traditional approaches. In [3] different applications to learn the dynamics of vehicular networks and make informed decisions to optimize network performance are discussed. The authors implement reinforcement learning approach in managing network resources as an alternative to the optimization approach. Also, the survey [4] suggests the use of intelligent resource management techniques to deal with the complexity and dynamicity of the vehicular network. A decentralized resource allocation mechanism for V2V based on deep reinforcement learning is developed in [5]. In [6] the authors exploit deep neural network for learning the vehicles' transmit patterns to predict future channel activity in space and time based on ITS-G5. The paper [7] also uses deep reinforcement learning to jointly optimize network resource allocation, caching and edge computing for connected cars.

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