National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: A Lightweight QoS-Aware Resource Allocation Method for NR-V2X Networks.
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Venue	: EC303, Seminar Room
Date and Time	: 20 Jan 2025 (05.40PM)
Abstract	: Vehicle-to-Everything (V2X) communication, which includes Vehicle-to-Infrastructure (V2I), Vehicle-to-Vehicle (V2V), and Vehicle-to-Pedestrian (V2P) networks, is gaining significant attention due to the rise of connected and autonomous vehicles. V2X systems require diverse Quality of Service (QoS) provisions, with V2V communication demanding stricter latency and reliability compared to V2I. The 5G New Radio-V2X (NR-V2X) standard addresses these needs using multi-numerology Orthogonal Frequency Division Multiple Access (OFDMA), which allows for flexible allocation of radio resources. However, V2I and V2V users sharing the same radio resources leads to interference, necessitating efficient power and resource allocation. In this work, we propose a novel resource allocation and sharing algorithm for 5G-based V2X systems. Our approach first groups Resource Blocks (RBs) into Resource Chunks (RCs) and allocates them to V2I users using the Gale-Shapley stable matching algorithm. Power is then allocated to RCs to facilitate efficient resource sharing between V2I and V2V users through a bisection search method. Finally, the Gale-Shapley algorithm is used to pair V2I and V2V users, maintaining low computational complexity while ensuring high performance. Simulation results demonstrate that our proposed Gale-Shapley Resource Allocation with Gale-Shapley Sharing (GSRAGS) achieves competitive performance with lower complexity compared to existing works while effectively meeting the QoS demands of V2X communication systems.