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Topic of Research: Interference Management In Device To Device Enabled 5G Network.

Findings

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The forthcoming generation of wireless communication are promising to provide many fold data transmission rate and high system capacity. Device-to-device (D2D) communication has been the most encouraging technology in the wireless communication era. Interference becomes the major issue when the D2D network is operated in underlay mode in which D2D users reuse the frequency spectrum of the cellular users. Reusing of frequency spectrum would definitely improve the spectrum efficiency but at the expense of interference.

In this thesis we first considered the cross-tier interference of the cell. Interference mitigation achieved using the mode selection and proper resource allocation. In this context, we have introduced an innovative resource allocation scheme called mode selection and resource allocation algorithm (MSRA). The algorithm has been designed using successive iteration method. Resource allocations of D2D user are performed by the consideration of proportional fairness scheme. D2D device are reusing the uplink frequency spectrum of the

cellular network in which the aggressor is a cellular transmitter and the victim is a D2D user. Simulations have been performed for various D2D and Cellular users. Using proper allocation of the radio resources with the mode selection scheme we have achieved the results significantly better than the standard scheme used in cellular networks.

We have introduced a semi-distributed method for the allocation of resources simultaneously with the quantization of power. We have proposed two separate algorithms for power quantization and resource allocation. We have shown that the simulation results give improved performance over the conventional scheme like coalitional game algorithm and K-Means Algorithm. Theoretical analysis of the proposed scheme has been carried out further by considering the parameters like signalling overhead, number of users, complexity and convergence. Performance analysis of proposed scheme has been done in terms of overall system sum rate, average SINR, system efficiency and allocated power to the users.

We have considered an interference limited area (ILA) approach to mitigate the co-tier interference between the devices. In proposed scheme we have designed an algorithm for resource allocation simultaneously with consideration of ILA. We have shown that using proposed work we can achieve improved sum rate and throughput of the cellular network. The performance analysis of proposed work has been carried out and the results have shown the improved performance than the conventional scheme used.

We have given a fast convergence resource allocation scheme for mobile users. The conclusion of the work and future scope has been given afterward. This thesis has provided four major contributions to the interference management issue. The schemes proposed in this thesis can be used for the improvement of the performance of wireless cellular networks in future era.