Defense Announcement

Mean Field Game Theory for Future Heterogeneous and Hierarchical Communication Networks

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The current communication network infrastructures are approaching their limits due to increasing data traffic, more frequent network usage, and rising number of devices. Hence, in this dissertation, a mean field game (MFG) approach has been proposed to model networks designed for ultra-dense applications. The first part deals with modeling of user behavior through belief and opinion evolution in social networks, which is essential in improving the services provided by network providers. A multiple-population MFG approach is proposed to depict the behavior of social network users in a multiple-group setting. The second part investigates an effective and efficient method for computation offloading in mobile edge computing networks (MECN). A mean-field-type game (MFTG) approach is proposed as computation offloading algorithms to decrease latency and energy consumption. Finally, a dynamic hierarchical framework for resource allocation in network virtualization is proposed. The results of this work provide evidence that MFG is an important and beneficial tool for future communication networks.