Defense Announcement

Contract Theory Framework for Wireless Networking

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With the rapid development of the modern communication networks, the problem we need to solve is no longer a pure engineering issue. In various heterogeneous network scenarios, there are service providers in need of performing economic analysis on how to ensure third parties' cooperation or attract end-users. In the other way round, third parties or end-users need to evaluate the economic benefits of cooperating or using the services from different service providers. Overall, the current wireless networks are facing a problem in which there is a tight coupling of industry-specific technologies and non-technology related network externalities.

Contract theory, the 2014 Nobel Prize of economic science, has been widely used in industries, from banking to telecommunications. Particularly, contract theory is an efficient tool in dealing with asymmetric information between employer/seller(s) and employee/buyer(s) by introducing cooperation. In wireless networks, the employer/seller(s) and employee/buyer(s) can be of different roles depending on the scenario under consideration. Thus, there is a great potential to utilize the ideas, methods, and models of contract theory to design efficient wireless network mechanisms.

Given this background, this dissertation provides a theoretical research between wireless communications, networking, and economics. Especially, different contract theory models have been applied in various wireless networks scenarios.