Distributed Reinforcement Learning for Enhancing Throughput and Fairness of Multichannel Access Systems

Muhammad Sohaib, Sang-Woon Jeon
Hanyang University

요 약
We consider a multichannel random access system in which each user, arriving in the system randomly and remaining activated for a certain duration, accesses a single channel at each time slot to communicate with an access point. Under such dynamic network environment, we propose a distributed multichannel access protocol based on multi-agent reinforcement learning (RL) to improve both throughput and fairness between active users. We perform extensive simulations on realistic traffic environments and demonstrate that the proposed online learning improves both throughput and fairness compared to the conventional RL approaches and centralized scheduling policies.

Fig. 1: Average per-user throughputs.

Fig. 1 plots average per-user throughput of the proposed scheme along with two centralized schedulers. As seen in the figure, the proposed scheme provides both throughput and fairness improvement and outperforms both centralized schedulers.

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참고문헌