

Seminar

Age of Information in Random Access Channels

Communication networks have seen tremendous growth in recent years and have enabled the integration of intelligence into various systems such as cyber-physical systems, the Internet of Things, smart cities, and healthcare systems. However, state-of-the-art communication strategies often do not perform satisfactorily for time-sensitive applications, and the delay increases significantly as the capacity of the system is approached, leading to an increase in the age of information (Aol). Aol measures the freshness of information at the receiver side, and it is of great importance in applications where timely information is crucial, such as in monitoring the status of a system or communication for estimation and control. Various studies have been conducted to minimize Aol, including packet management policies and scheduling algorithms.

This configuration is especially applicable in situations where decentralized sensors in wireless networks are used to observe and control remote processes. By designing prioritization policies for accessing the communication channel, the Aol can be reduced.

The student's task is to read the reference [1] and understand the proposed algorithms for decentralized age-based transmission policies.

[1]X. Chen, K. Gatsis, H. Hassani and SS Bidokhti, "Age of Information in Random Access Channels," in IEEE Transactions on Information Theory, vol. 68, no. 10, pp. 6548-6568, Oct. 2022, doi: 10.1109/TIT.2022.3180965. [<https://ieeexplore.ieee.org/abstract/document/9791264>]

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