Age of Information-based Multi-Hop Communication using GNU Radio & Software-defined Radios

Age of Information (AoI) is defined as the elapsed time since the generation of the most recent packet. It has been used as a cross-layer metric in remote monitoring and controlling scenarios.

AoI-aware networking & protocol design requires the modification within the communication stack. To that end, our department has set up a testbed that consists of multiple software-defined radios (SDRs) programmed in GNU Radio. This enables us to develop our own solutions, e.g., MAC protocol, routing algorithms etc. to improve e.g. AoI performance at the application layer.

This tasks of this project will consist of:

- Working with the existing setup, that consists of multiple SDRs programmed with GNU Radio / C++
- Scheduling of flows over multi-hop paths between the source and the destination pairs
- Performance analysis and comparison of experimental results to analytical ones from the literature

Prerequisites

The project requires:

- Solid C/C++ knowledge and low-level programming
- Python skills are beneficial
- Solid fundamental knowledge in wireless communications
- Having worked with practical implementations of wireless communication devices is a great benefit, such as SDRs or sensor motes (some examples are Telosb Motes, Zolertia Re-motes, ...)

Advisors

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