Dresden University of Technology

ComNets
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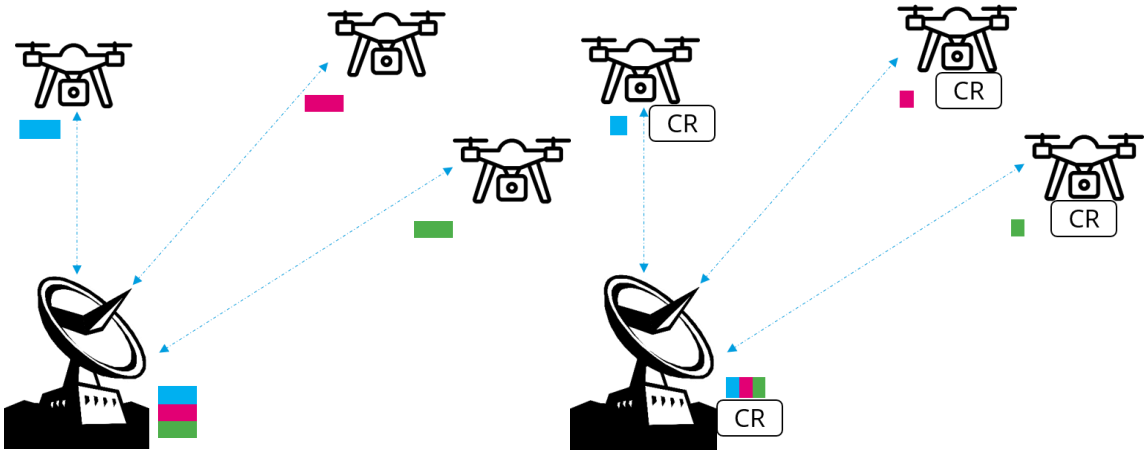
Title

Common Randomness generation strategies in future communication systems

Description:



Common randomness as a resource is gaining immense benefits in wireless communication. Some examples include improved security and trustworthiness. More novel applications include identification codes and integrated sensing and communications. However, there are several challenges in implementing common randomness generation in 5G/6G communication: namely

- Communication overhead: Communication required to synchronize two wireless devices must be minimal to preserve bandwidth
    - Question: How do I synchronize (in time) two devices to start generating common randomness?
- Time required to observe common source: Lengthy time required to observe common source and generate randomness
    - Question: How can I reduce lengthy time required to generate common randomness?
- Ease of implementation: Several pseudo-random number generator are computationally faster
    - Question: What can I do to generate common randomness faster?
- Reconciliation Strategies: Reconciliation overhead must be minimal to reserve communication of actual data
    - Question: How to ensure random variables are indeed common without consuming too much data in the process?

Tasks:

- Understanding of key legacy communication systems:
    - E.g., 4G/LTE, 5G, WiFi, pick any
- Understanding of Common Randomness generation
- Obtain(Recommended)/Implement the portion on MATLAB or Python
- Implement changes
- Plot the results

Keywords:

Common Randomness, channel reciprocity based common randomness, physical layer secret key generation, 5G/6G
Language: English
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