Category: Basic research

Title: Analysis of distributed consensus-based algorithms for data aggregation
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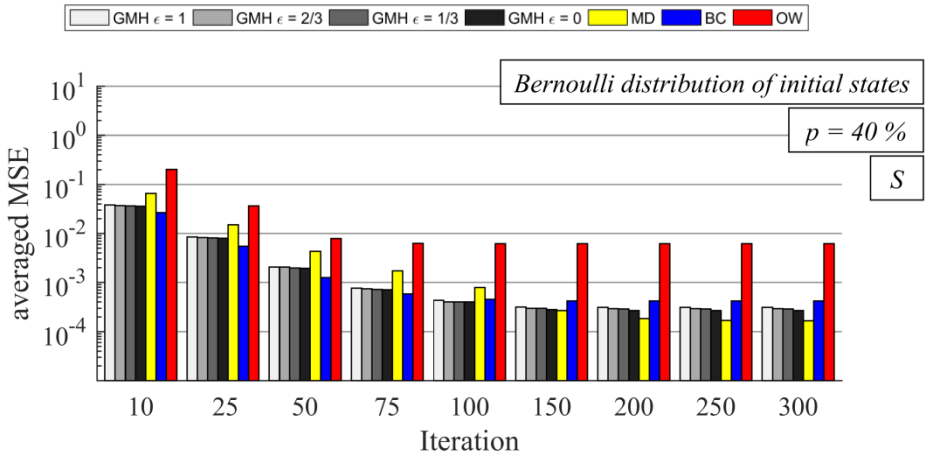
Projects: VEGA 2/0155/19

Annotation:
The goal of the presented research is to develop distributed consensus-based algorithms for data aggregation and to analyze their applicability to real-world sensor systems. In our research, we focus our attention on an analysis of the robustness of the analyzed algorithms to potential threats and quantization noise, a performance analysis, the impact of mobility on the estimation precision, the applicability to real-world systems, etc. We also analyze the robustness of the Metropolis-Hastings algorithms to link failures and compare it with other algorithms. The algorithm in general outperforms the analyzed concurrent approaches.



Comparison of GMH with varied mixing parameters with MD, BC, and OW for the link failure probability equal to 40%

Scientific publications:

1. KENYERES, Martin - KENYERES, Jozef. Multi-sensor data fusion by average consensus algorithm with fully-distributed stopping criterion: comparative study of weight designs. In UPB Scientific Bulletin Series C: Electrical Engineering and Computer Science, 2019, vol. 81, no. 2, p. 27-42. ISSN 2286-3540. Type: **ADMB**
2. KENYERES, Martin - KENYERES, Jozef - BUDINSKÁ, Ivana. Vulnerability of average consensus algorithm: impact of stochastic communication breakdowns on generalized Metropolis-Hastings weight design. In SAMI 2019 : IEEE 17th World Symposium on Applied Machine Intelligence and Informatics. - New York : IEEE, 2019, art. no. 8782748, p. 37-42. ISBN 978-1-7281-0249-8.(SAMI 2019 : IEEE 17th World Symposium on Applied Machine Intelligence and Informatics). Type: **ADMB**
3. KENYERES, Martin - KENYERES, Jozef - BUDINSKÁ, Ivana. Distributed linear summing in wireless sensor networks. In SAMI 2019 : IEEE 17th World Symposium on Applied Machine Intelligence and Informatics. - New York : IEEE, 2019, art. no. 8782782, p. 23-27. ISBN 978-1-7281-0249-8.(SAMI 2019 : IEEE 17th World Symposium on Applied Machine Intelligence and Informatics). Type: **ADMB**

4. KENYERES, Martin - KENYERES, Jozef. On average consensus algorithm over mobile wireless sensor networks modelled as stationary Markovian evolving graphs. In 18th International Conference on Smart Technologies : EUROCON 2019. - New York : IEEE, 2019, art. no. 8861839. ISBN 978-1-5386-9301-8.(EUROCON 2019 : 18th International Conference on Smart Technologies). Type: **ADMB**
5. KENYERES, Martin - KENYERES, Jozef. Applicability of generalized Metropolis-Hastings algorithm in wireless sensor networks. In 18th International Conference on Smart Technologies : EUROCON 2019. - New York : IEEE, 2019, art. no. 8861554. ISBN 978-1-5386-9301-8.(EUROCON 2019 : 18th International Conference on Smart Technologies). Type: **ADMB**
6. KENYERES, Martin - KENYERES, Jozef. On comparative study of deterministic linear consensus-based algorithms for distributed summing. In 24th International Conference on Applied Electronics : AE 2019. - Pilsen, Czech Republic : University of West Bohemia in Pilsen, IEEE, 2019, art. no. 8867038, p. 89-95. ISBN 978-80-261-0813-9. ISSN 1803-7232. Type: **ADMB**
7. KENYERES, Martin - KENYERES, Jozef. Distributed network size estimation executed by average consensus bounded by stopping criterion for wireless sensor networks. In 24th International Conference on Applied Electronics : AE 2019. - Pilsen, Czech Republic : University of West Bohemia in Pilsen, IEEE, 2019, art. no. 8867009, p. 83-88. ISBN 978-80-261-0813-9. ISSN 1803-7232. Type: **ADMB**