Nirupam Gupta

Postdoctoral Scientist
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Education

Ph.D. in Mechanical Engineering, *2018*
University of Maryland - College Park.
Dissertation: Privacy in Distributed Multi-Agent Collaboration: Consensus and Optimization.
Advisor: Nikhil Chopra.

B.Tech. in Electrical Engineering, *2013*
Indian Institute of Technology - Delhi.
Thesis: Automatic Cardiac View Classification of Echocardiogram.

Employment History

Postdoc *2021 - present*
Distributed Computing Laboratory, IC EPFL.
Sponsor: Rachid Guerraoui.

Postdoc *2019 - 2021*
Department of Computer Science, Georgetown University.
Sponsor: Nitin H. Vaidya.

Teaching Faculty *Spring Semester 2020*
Department of Computer Science, Georgetown University.

Voluntary Services

1. Reviewer for IEEE journals; Transactions on Automatic Control (TAC), Transactions on Control of Networked Systems (TCNS), Control Systems Letters (L-CSS), Transactions on Signal Processing (TSIP), since 2016.
2. Reviewer for the Elsevier journal Automatica, since 2017.
3. Program committee member -
    - Dependable and Secure Machine Learning (DSML) workshop at the 49th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN) 2020.

Research Interests

Resilience and privacy in distributed machine learning and optimization.

Journal Publications

1. **Iterative Pre-Conditioning for Expediting the Distributed Gradient-Descent Method: The Case of Linear Least-Squares Problem**
   Kushal Chakrabarti, NG, and Nikhil Chopra. (*to appear*) *IFAC Automatica 2022.*

2. **Robustness of Iteratively Pre-Conditioned Gradient-Descent Method: The Case of Distributed Linear Regression Problem**
   Kushal Chakrabarti, NG, and Nikhil Chopra. *IEEE Control Systems Letters (L-CSS) 2021.*

3. **Preserving Statistical Privacy in Distributed Optimization**
   NG, Shripad Gade, Nikhil Chopra, and Nitin H. Vaidya. *IEEE L-CSS 2021.*

4. **On Content Modification Attacks in Bilateral Teleoperation Systems**
   Yimeng Dong, NG, and Nikhil Chopra. *IEEE Transactions on Control Systems and Technology 2018.*

5. **Content Modification Attacks on Consensus Seeking Multi-Agent System with Double-Integrator Dynamics**
   Yimeng Dong, NG, and Nikhil Chopra. *AIP Chaos - Journal of Nonlinear Science 2016.*

Conference Proceedings

1. **Redundancy in Cost Functions for Byzantine Fault-Tolerant Federated Learning**
   Shuo Liu, NG, and Nitin H. Vaidya. *Workshop on Systems Challenges in Reliable and Secure Federated Learning (co-located with the 28th ACM SOSP 2021).*

2. **Byzantine Fault-Tolerant Distributed Machine Learning with Norm-Based Comparative Gradient Elimination**
   NG, Shuo Liu, and Nitin H. Vaidya. *The 51st Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN-W) 2021.*

3. **Accelerating Distributed SGD for Linear Regression using Iterative Pre-Conditioning**
   Kushal Chakrabarti, NG, and Nikhil Chopra. *Proceedings of the 3rd Conference on Learning for Dynamics and Control 2021 (L4DC'21).*

4. **Byzantine Fault-Tolerance in Decentralized Optimization under 2f-Redundancy**
   NG, Thinh T. Doan, and Nitin H. Vaidya. *The 2021 American Control Conference (ACC'21).*

5. **Differential Privacy and Byzantine Resilience in SGD: Do They Add Up?**
   Rachid Guerraoui, NG, Rafaël Pinot, Sébastien Rouault, and John Stephan.* *The ACM Symposium on Principles of Distributed Computing 2021 (PODC'21).*

6. **Approximate Byzantine Fault-Tolerance in Distributed Optimization**
   Shuo Liu, NG, and Nitin H. Vaidya. *ACM PODC'21.*

7. **Preserving Statistical Privacy in Distributed Optimization**
   NG, Shripad Gade, Nikhil Chopra, and Nitin H. Vaidya. *The 59th IEEE Conference on Decision and Control (CDC) 2020.*

8. **Fault-Tolerance in Distributed Optimization: The Case of Redundancy**
   NG, and Nitin H. Vaidya. *ACM PODC'20.*

9. **Iterative Pre-Conditioning to Expedite the Gradient-Descent Method**
   Kushal Chakraborty, NG, and Nikhil Chopra. *The 2020 ACC.*

10. **On Distributed Solution of Ill-Conditioned System of Linear Equations under Communication Delays**
    Kushal Chakraborty, NG, and Nikhil Chopra. *The Dec'19 Indian Control Conference.*

11. **Byzantine Fault-Tolerant Parallelized Stochastic Gradient Descent for Linear Regression**
    NG, and Nitin Vaidya. *The 2019 Allerton Conference at UIUC.*

12. **Statistical Privacy in Distributed Average Consensus: Bounded Real Inputs**
    NG, Jonathan Katz, and Nikhil Chopra. *The 2019 ACC.*

13. **Model-Based Encryption: Privacy of States in Networked Control Systems**
    NG, and Nikhil Chopra. *The 2018 Allerton Conference at UIUC.*

14. **Privacy in Distributed Average Consensus**
    NG, Jonathan Katz, and Nikhil Chopra. *The 2017 World Congress of IFAC.*

15. **Robustness of distributive double-integrator consensus to loss of graph connectivity**
    N. G., Yimeng Dong, and Nikhil Chopra. *The 2017 ACC.*

16. **Confidentiality in Distributed Average Information Consensus**
    NG, and Nikhil Chopra. *The IEEE 55th CDC 2016.*

17. **On Content Modification Attacks in Bilateral Teleoperation Systems**
    Yimeng Dong, NG, and Nikhil Chopra. *The 2016 ACC.*

18. **Stability analysis of a two-channel feedback networked control system**
    NG, and Nikhil Chopra. *The 2016 Indian Control Conference.*

Scholastic Achievements

- Merit Scholarship at the Indian Institute of Technology Delhi, academic year 2009 - 10.
- India CBSE (Central Board of Secondary Education) scholarship from 2009 - 13.
- All India Rank (AIR) 190 *(out of 380,000)* in IIT-JEE (Joint Entrance Examination) 2009.
- AIR 130 *(out of 960,000)* in AIEEE (All India Engineering Entrance Examination) 2009.

References

Rachid Guerraoui
Full Professor, School of Computer and Communication Sciences
École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland
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Nitin H. Vaidya
Professor, Department of Computer Science (McDevitt Chair)
Georgetown University, Washington D.C., USA
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Nikhil Chopra
Associate Professor, Department of Mechanical Engineering
University of Maryland, College Park, Maryland, USA
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