Nirupam Gupta

Postdoctoral Scientist
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Education

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

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

Employment History

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

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

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

Summer Intern Summer 2011, and 2012
Analog Division, Texas Instruments India.

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, N.G., and Nikhil Chopra. (*to appear*) *Automatica 2022.*

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

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

4. **On Content Modification Attacks in Bilateral Teleoperation Systems**
   Yimeng Dong, N.G., 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, N.G., 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, N.G., 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**
   N.G., 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, N.G., 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**
   N.G., 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, N.G., 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, N.G., and Nitin H. Vaidya. *PODC'21.*

7. **Preserving Statistical Privacy in Distributed Optimization**
   N.G., 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**
   N.G., and Nitin H. Vaidya. *PODC'20.*

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

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

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

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

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

14. **Privacy in Distributed Average Consensus**
    N.G., 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**
    N.G., and Nikhil Chopra. *The IEEE 55th CDC 2016.*

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

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

Scholastic Achievements

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

Programming Skills

C, C++, Java, Python, Ruby, Shell scripting
PyTorch, MATLAB, CORE

References

Rachid Guerraoui
Full Professor, School of Computer and Communication Sciences
École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland
rachid.guerraoui@epfl.ch

Nitin H. Vaidya
Professor, Department of Computer Science (McDevitt Chair)
Georgetown University, Washington D.C., USA
nitin.vaidya@georgetown.edu

Nikhil Chopra
Associate Professor, Department of Mechanical Engineering
University of Maryland, College Park, Maryland, USA
nchopra@umd.com