Shuo Liu

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Research experiences

- **Graduate research assistant: Resilient distributed optimization**
  Advisor: Dr. Nitin Vaidya (Georgetown University) *Sep. 2019 - Present*
  - Studying resilient distributed optimization algorithms and other related questions. Publications [1,2,3,4] and other pre-prints.
  - Implemented a Resilient fault-tolerant simulatior for experimental purpose using *PyTorch*.
- **Graduate research assistant: Massive Data Institute at Georgetown University**
  Advisor: Dr. Lisa Singh (Georgetown University) *Mar. 2018 - May 2019*
  - Worked on *webfootprint*, a social media privacy project. The project intended to develop an application that simulates several methods of social media privacy attacks, helping users checking if they are leaking personal information across social medias. Part of the project published as [5]
  - **Main work:** Fixed and implemented new parts of an application using *Java*, *Python*, and *PostgreSQL*. Investigated other possible privacy attacks.

Publications

- **Conference and workshop papers**

[1] **Shuo Liu**, Nirupam Gupta, and Nitin H Vaidya. Impact of Redundancy on Resilience in Distributed Optimization and Learning. In *24rd International Conference on Distributed Computing and Networking (ICDCN 2023)*, 2023. (Best paper at ICDCN 2023)

[2] **Shuo Liu**, Nirupam Gupta, and Nitin H Vaidya. Redundancy in cost functions for Byzantine fault-tolerant federated learning. In *Workshop on Systems Challenges in Reliable and Secure Federated Learning*, 2021.

[3] **Shuo Liu**, Nirupam Gupta, and Nitin H Vaidya. Approximate Byzantine fault-tolerance in distributed optimization. In *Proceedings of the 2021 ACM Symposium on Principles of Distributed Computing (PODC'21)*, 2021. DOI: 10.1145/3465084.3467902.

[4] Nirupam Gupta, **Shuo Liu**, and Nitin H Vaidya. Byzantine fault-tolerant distributed machine learning with norm-based comparative gradient elimination. In *2021 51th Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN-W)*, 2021.

[5] **Shuo Liu**, Lisa Singh, and Kevin Tian. Information exposure from relationalbackground knowledge on social media. In *2020 IEEE International Conferenceon Data Science and Advanced Analytics (DSAA)*, 2020. DOI: 10.1109/DSAA49011.2020.00041.

- **Pre-prints**

[6] **Shuo Liu**, Nitin H Vaidya. Byzantine Fault-Tolerant Distributed Set Intersection with Redundancy. *arXiv preprint arXiv:2402.08809*, 2022.

[7] **Shuo Liu**, Nitin H Vaidya. Byzantine Fault-Tolerant Min-Max Optimization. *arXiv preprint arXiv:2205.14881*, 2022.

[8] **Shuo Liu**. A Survey on Fault-tolerance in Distributed Optimization and Machine Learning. *arXiv preprint arXiv:2106.08545*, 2021.

[9] **Shuo Liu**, Nirupam Gupta, and Nitin H Vaidya. Approximate Byzantine fault-tolerance in distributed optimization. *arXiv preprint arXiv:2101.09337*, 2021.

[10] Nirupam Gupta, **Shuo Liu**, and Nitin H Vaidya. Byzantine fault-tolerant distributed machine learning using stochastic gradient descent (SGD) and norm-based comparative gradient elimination (CGE). *arXiv preprint arXiv:2008.04699*, 2020.