

Ashwin Verma

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EDUCATION

University of California San Diego

2018–2024

PhD Candidate, Electrical and Computer Engineering

Current GPA: 3.972/4.0

Advisor: Prof. Behrouz Touri

Indian Institute of Technology Kanpur

2013–2018

B.Tech, Electrical Engineering

GPA: 9.00/10

M.Tech, Advisor: Prof. Rakesh K. Bansal

GPA: 9.38/10

COURSEWORK

Courses: Convex Optimization, Applied Stochastic Processes, Control Theory, Linear Algebra, Advanced Topics in Stochastic Processes, Information Theory, Network Information Theory, Data Structures and Algorithm Digital Signal Processing, Detection and Estimation Theory, Algebraic and Probabilistic Coding, Communication Theory, Wireless Communication, Representation and Analysis of Random Signals, Probability and Statistics, Differential Equations, Real Analysis, Fundamentals of Computing

RESEARCH INTERESTS

Machine Learning, Distributed Optimization, Stochastic Processes, Linear Algebra, Statistics, Control Theory

RESEARCH EXPERIENCE

Distributed Fake News Detection

with Prof. Behrouz Touri, Prof. Soheil Mohajer

Sept 2021–Present

- Formulated the problem of fake news detection using **distributed fact checkers** with limited and unknown trust
- Introduced an **online** version of the **Dawid-Skene estimator** used for crowdsourcing labelling tasks
- Designed an **adaptive protocol** for the estimate of the reliability parameter of the modeled fact-checkers
- Studied the convergence of the estimates using tools from **stochastic approximation** and control theory

Maximal Dissent: a state-dependent approach for distributed optimization

with Prof. Behrouz Touri, Prof. Marcos Vasconcelos, and Prof. Urbashi Mitra

Jul 2020–Oct 2021

- Proposed a novel algorithm for the problem of distributed convex optimization through the consensus-based subgradient method, introducing state-dependence in the consensus component of the optimizer.
- Provided analysis to study the convergence of **state-dependent consensus-based subgradient methods**.
- Proposed analysis avoids the necessity of B-connectivity of the communication graph by studying the contraction of Lyapunov function to establish a generalized result for the almost-sure convergence result of the algorithms.

Almost-sure Reachability in Safety Critical Systems

with Prof. Behrouz Touri

Jun 2019–Jul 2020

- Studied the stochastic version of a constant-rate multi-mode system under the constraint that the state of the systems stays within a provided safe set with probability one.
- Determined the reachable set of states when the necessary condition for reachability of the entire safety set is violated.

Asymptotic analysis of Change Point Detection without Post-Change Distribution

with Prof. Rakesh K. Bansal

Jul 2017–May 2018

- Modified the change-point detection algorithm with the use of a universal compression algorithm to estimate the post-change distribution.
- Analyzed the modified algorithm with linear correction terms under constraints on the false alarm in a window for finite order finite state Markov Chains.

Texas Instruments India*Bengaluru, India | Software Engineer, Guide: Sureshkumar Manimuthu*

Summer 2016

- Created an application on an embedded system involving a DLP projector and TDA3x SOC chip. The application was designed to control a DLP-based headlight to mask the light falling on a pedestrian.
- Obtained hands-on experience working with an SoC consisting of multiple cores.
- Carried out the application development in a link and chain framework using vision SDK.

PUBLICATIONS

JOURNALS

- **A. Verma**, A. Sharbafchi, S. Mohajer, B. Touri, “Distributed Fact Checking: Learning Unreliability,” in preparation for *IEEE Transactions on Automatic Control*, IEEE
- **A. Verma**, B. Touri, “Almost-Sure Reachability” in preparation for *IEEE Control Systems Letter*, IEEE
- **A. Verma**, M. Vasconcelos, U. Mitra, B. Touri, “Maximal Dissent: a State-Dependent Way to Agree in Distributed Convex Optimization,” in *IEEE Transactions on Control of Network Systems*, IEEE, 2023
- R. Parasnis, **A. Verma**, M. Franceschetti, B. Touri, “A random adaptation perspective on distributed averaging,” in *IEEE Control Systems Letters (L-CSS)*, 7, pp.241-246, IEEE, 2022

CONFERENCES

- **A. Verma**, A. Sharbafchi, B. Touri, S. Mohajer, “Distributed Fact Checking: Learning Unreliability,” in 2024 *American Control Conference (ACC)*, IEEE, 2024
- **A. Verma**, A. Sharbafchi, B. Touri, S. Mohajer, “Distributed Fact Checking,” in 2023 *International Symposium on Information Theory (ISIT)*, pp. 2649-2654, IEEE, 2023
- **A. Verma**, M. Vasconcelos, U. Mitra, B. Touri, “Max-gossip subgradient method for distributed optimization,” in 2021 60th *IEEE Conference on Decision and Control (CDC)*, pp. 3130-3136, IEEE, 2021
- **A. Verma**, R. K. Bansal, “Sequential change detection based on universal compression for Markov sources,” In 2019 *IEEE International Symposium on Information Theory (ISIT)*, pp. 2189-2193, IEEE, 2019

TEACHING AND PROFESSIONAL SERVICE

- Teaching Assistant for Random Processes, Stochastic Processes for Dynamical Systems, Special Topics: Stochastic Approximation Theory and Applications, UC San Diego
- Teaching Assistant for An Introduction to Information Theory, MOOC, Representation and Analysis of Random Signals, IITK
- Reviewer for Journals and Conferences: IEEE-TAC, Automatica, IEEE-TCNS, IEEE-TIT, IEEE L-CSS, IEEE-CDC, ACC, ISIT

REFERENCES

- Prof. Behrouz Touri, Associate Professor, Electrical and Computer Engineering, UC San Diego.
- Prof. Soheil Mohajer, Associate Professor, Electrical and Computer Engineering, University of Minnesota.
- Prof. Marcos M. Vasconcelos, Assistant Professor, Electrical and Computer Engineering, Florida State University.