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Shengjun(Daniel) Zhang

"There is nothing more practical than a good theory."

Education

UNT (University of North Texas)

Ph.D. Major in Electrical Engineering

· Minor in Business Management

NYU (New York University)

M.S. IN ELECTRICAL ENGINEERING

• Robotic Control

CAU (China Agricultural University)

B.S. IN AUTOMATION OF HONORS PROGRAM WITH Cum Laude

· Control Theory

Denton, Texas, U.S.A

Jan. 2018 - present

New York, New York, U.S.A

Jan. 2015 - Jan. 2017

Beijing, China

Sep. 2010 - Jul. 2014

Research Interests

Artificial Intelligence Statistical Learning, Machine Learning, Reinforcement Learning

Optimization Convex Optimization, Non-convex Optimization, Distributed Optimization

Power System DERs with Transactive Approaches

Professional Experience

University of North Texas.

RESEARCH/TEACHING ASSISTANT Jan. 2018 - present

- Cyber-Physical Energy System Laboratory, Department of Electrical Engineering.
- · Supervisor: Dr. Colleen Bailey & Dr. Tao Yang.

Huazhong University of Science and Technology.

Wuhan, China

Jul. 2018 - Jul. 2018

Jan. 2016 - Jul. 2016

Denton, Texas, U.S.A

VISITING RESEARCHER May 2018 - Jul. 2018

- Key Laboratory of Image Processing and Intelligent Control of Education Ministry, School of Artificial Intelligence and Automation.
- · Supervisor: Dr. Ye Yuan.

Zhejiang University. Hangzhou, China

VISITING RESEARCHER

- Group of Networked Sensing and Control, College of Control Science and Engineering.
- Supervisor: Dr. Junfeng Wu.

New York University. New York, New York, U.S.A

RESEARCH ASSISTANT

- Control/Robotics Research Laboratory, Tandon School of Engineering.
- Supervisor: Dr. Farshad Khorrami.

Research & Projects

AUGUST 30, 2020 Daniel Zhang · Curriculum Vitae

Sparse PCA via Zeroth-order Optimization Approach

UNT

RESEARCH DISSERTATION Sep.2019 - Present

- Applying zeroth-order optimization techniques to Sparse PCA problem.
- Develop new zeroth-order optimization algorithm to solve Sparse PCA problem.
- · Compare proposed zeroth-order algorithm with existing zeroth-order algorithms and first-order algorithms.
- Develop stochastic zeroth-order algorithm for Sparse PCA problem.

Obstacle Avoidance and Navigation Utilizing Proximal Policy Optimization

UNT

Oct. 2019 - Apr. 2020

• Utilizing PPO, a reinforcement learning approach, to guide a TurtleBot to avoid obstacles.

- Compared PPO approach with DDPG and DQN in simulation on ROS platform.
- This work has been accepted by 2020 SPIE Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications II.

Robust Optimization with Event Triggered Communication.

UNT

RESEARCH PROJECT

RESEARCH PROJECT

RESEARCH PROJECT

Feb. 2019

- · Minimize a global cost function formed by a sum of local convex cost functions in a distributed way.
- Develop a robust algorithm over an undirected and connected network.
- The proposed algorithm is arbitrarily initialized unlike the exsiting algorithms.

Analyzing Distributed Optimization Algorithms via IQC.

UNT

Nov. 2018

- Investigate the convergence rate of distributed push-pull based optimization algorithms in directed graph networks.
- Present a unified framework based on integral quadratic constaints (IQCs) from robust control theory.
- Formulate convergence analysis problems into a semidefinite program (SDP).
- This work has been accepted by the 15th IEEE International Conference, and is in **Best Student Paper Shorten List**.

Nonlinear System Identification via Sparse Bayesian Learning.

UNT

Oct. 2018 - Dec. 2018

Course Project

Reimplement Sparse Bayesian Learning Algorithm, proposed in

- A Sparse Bayesian Approach to The Identification of Nonlinear State-space Systems.
- Apply such an algorithm to identify a pendulum model.

Applying Q-Learning to a 4×4 Tic-Tac-Toe.

UNT

COURSE PROJECT

Mar. 2018 - May 2018

• Implement Q-learning algorithm to a 4 \times 4 Tic-Tac-Toe game.

UGV Integrated Mobile Platform.

NYU

RESEARCH PROJECT

Jan. 2016 - Jul. 2016

- Modele the UGV integrated mobile platform and simulated it via V-rep.
- Implemente SLAM and control algorithms on the integrated mobile platform.

Honors & Awards

2019IEEE Outstanding Graduate Student, IEEE local eventDenton, Texas, U.S.A2019College of Engeering Dean Tuition Scholarship, UNTDenton, Texas, U.S.A2019Toulouse Graduate School Scholarship, UNTDenton, Texas, U.S.A2018College of Engeering Dean Tuition Scholarship, UNTDenton, Texas, U.S.A2018Toulouse Graduate School Scholarship, UNTDenton, Texas, U.S.A20122nd prize, Physics Experiment Competition of collegesBeijing, China	2020	Third Place Graduate Student Poster Competition , IEEE North Tech SAS	Denton, Texas, U.S.A
2019Toulouse Graduate School Scholarship, UNTDenton, Texas, U.S.A2018College of Engeering Dean Tuition Scholarship, UNTDenton, Texas, U.S.A2018Toulouse Graduate School Scholarship, UNTDenton, Texas, U.S.A	2019	IEEE Outstanding Graduate Student, IEEE local event	Denton, Texas, U.S.A
2018 College of Engeering Dean Tuition Scholarship, UNT Denton, Texas, U.S.A Toulouse Graduate School Scholarship, UNT Denton, Texas, U.S.A	2019	College of Engeering Dean Tuition Scholarship, UNT	Denton, Texas, U.S.A
2018 Toulouse Graduate School Scholarship , UNT Denton, Texas, U.S.A	2019	Toulouse Graduate School Scholarship, UNT	Denton, Texas, U.S.A
	2018	College of Engeering Dean Tuition Scholarship, UNT	Denton, Texas, U.S.A
2012 2nd prize , Physics Experiment Competition of colleges Beijing, China	2018	Toulouse Graduate School Scholarship, UNT	Denton, Texas, U.S.A
	2012	2nd prize , Physics Experiment Competition of colleges	Beijing, China

Certifications

2016 Machine Learning, Instructor: Andrew Ng, license: NNBCAXYFA2HK.

Stanford University on Coursera

Mentoring_____

Kelvin Darden UNT

M.S. STUDENTProject on load shedding in Smart Grid.

First placement: engineer, Oncor Electric Delivery.

Teaching Experiences

Spring '19 **EENG 2620 Signals and Systems**, Teaching Assistant

LINIT

2018

Fall '18 **EENG 2620 Signals and Systems**, Teaching Assistant

UNT

Fall '18 **EENG 5940 Control and Optimization for Power Systems**, Teaching Assistant

UNT

Professional Activities

Member

IEEE HKN, IEEE Studnet Member, IEEE Young Professionals

Journal Reviewer

IET Control Theory and Applications

Neurocomputing

Automatica

International Journal of Robust and Nonlinear Control

Conference Reviewer

Advances in Neural Information Processing Systems (NeurIPS)

IEEE Conference on Decision and Control (CDC)

American Control Conference (ACC)

IEEE International Conference on Control and Automation (ICCA)

Chinese Control Conference (CCC)

Publications

JOURNAL ARTICLES [4]

Linear Convergence of First- and Zeroth-Order Primal-Dual Algorithms for Distributed Nonconvex Optimization Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

IEEE Transactions on Automatic Control (Under Review). IEEE

Under Review

🖾 A Primal-Dual SGD Algorithm for Distributed Nonconvex Optimization Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

SIAM Journal on Optimization (In Submission). SIAM

In Submission

Linear Convergence of the Alternating Direction Method of Multipliers for Distributed Nonconvex Optimization Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

IEEE Transactions on Signal Processing (In Submission). IEEE

In Submission

🖺 A Magnetic Nanoparticle Based Nucleic Acid Isolation And Purification Instrument for DNA Extraction of Escherichia coli O157: H7

Yahui Chen, Jianhan Lin, Qin Jiang, Qi Chen, Shengjun Zhang, Li Li Journal of nanoscience and nanotechnology 16.3 (2016) pp. 2296–2300. American Scientific Publishers

2016

CONFERENCE PROCEEDINGS [7]

Zeroth-order Algorithms for Distributed Stochastic Nonconvex Optimization Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

In Submission

Exponential Convergence for Distributed Smooth Optimization Under the Restricted Secant Inequality Condition

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson 21st IFAC World Congress

Berlin, Germany

2020

Linear Convergence for Distributed Optimization Without Strong Convexity Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

50th IEEE Conference on Decision and Control (CDC)

59th IEEE Conference on Decision and Control (CDC)

Jeju Island, Republic of Korea 2020

2020

Daniel Zhang, Colleen P. Bailey

SPIE Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications II

California, United States

2020

Optimal Control Under Communication Constraints for Multi-agent Unmanned Vehicles Daniel Zhang, Colleen P. Bailey

SPIE Optical Science Technologies for Advanced Security and Defence Systems

15th IEEE International Conference on Control and Automation (ICCA)

Edinburgh, United Kingdom

Event-Triggered Control for Consensus of Multi-Agent Systems with Nonlinear Output and Directed Topologies Xinlei Yi, Shengjun Zhang, Tao Yang, Junfeng Wu, Karl Henrik Johansson 38th Chinese Control Conference (CCC)

Guangzhou, China

🖹 Computational Convergence Analysis of Distributed Optimization Algorithms for Directed Graphs Shengjun Zhang, Xinlei Yi, Jemin George, Tao Yang

Edinburgh, Scotland

2019

PREPRINT [2]

Distributed Proportional-Integral Optimization Algorithms with Event-triggered Communication Wen Du, Xinlei Yi, Shengjun Zhang, Jemin George, Tao Yang

2019

Distributed Economic Dispatch over Networks with Markovian Communication Losses Junfeng Wu, Shengjun Zhang, Tao Yang, Ling Shi, Hong Wang

2018