Tengyang Xie

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Research Interests

My research interests lie primarily in the intersection of **machine learning**, **statistics** and **optimization**, with focus on **reinforcement learning**, **differential privacy**, **stochastic programming**, and **deep learning**.

Education

Ph.D. Student - Computer Science (GPA: 4.0/4.0) 2016 - Present
University of Massachusetts Amherst, Amherst, MA, USA
Advisor: Prof. Gerome Miklau *and* Prof. Philip Thomas

Bachelor of Science - Physics (Major GPA: 4.0/4.3) 2012 - 2015
Undergraduate Student - Mathematics (Major GPA: 4.0/4.3) 2011 - 2012
University of Science of Technology of China, Hefei, Anhui, China

Relevant Courseworks

Mathematics & Physics: Probability Theory, Mathematical statistics, Real Analysis, Complex Analysis, Functional Analysis, Statistical Physics, Quantum Mechanics, Advanced Quantum Mechanics, Computational Physics (Monte Carlo Methods)

Computer Science: Machine Learning, Probabilistic Graphic Model, Reinforcement Learning, Advanced Algorithm, Interactive Machine Learning

Research Experience

University of Massachusetts Amherst | Amherst, MA
- *Research Assistant*
- *Advisor:* Prof. Gerome Miklau *and* Prof. Philip Thomas

- I am working with Prof. Gerome Miklau and Prof. Philip Thomas on the intersection between machine learning and privacy, in particular reinforcement learning and differential privacy. I am also working closely with Prof. Bo Liu and Prof. Yangyang Xu on reinforcement learning and stochastic optimization.
- We proposed privacy approaches for policy evaluation and off-policy policy evaluation (OPE). We also developed a policy search approach for reinforcement learning with variance-related criteria under coordinate descent update framework.

University of Science and Technology of China | Hefei, Anhui, China
- *Research Assistant*
- *Advisor:* Prof. Kai Xing

- I was working with Prof. Kai Xing on data mining and networking. We proposed an acoustic localization approach which is the first post-disaster remote localization approach that is robust against most harsh environments in underground disasters, and implemented it by extensive experimental study in an operating coal mine.

Key Research Projects

Policy Evaluation with Differential Privacy
- *with Prof. Gerome Miklau and Prof. Philip Thomas*

- Intersection between **reinforcement learning** and **differential privacy**.
- Proposed and implemented a data-efficient approach of differential private policy evaluation with temporal-difference (TD) methods.
- Proposed a robust approach of differential private off-policy policy evaluation (OPE).
- **Paper in progress**.

Proximal Risk-Sensitive Policy Optimization
- with Prof. Bo Liu and Prof. Yangyang Xu

- Intersection between **reinforcement learning** and **optimization**.
- Developed a policy search approach for reinforcement learning with variance-related criteria and a variance reduction technique based on stochastic block coordinate descent.
- Provided convergence analysis and finite-sample analysis theoretically and evaluated on various domains.
- **Paper in progress**.

Generating Synthetic Datasets Differential Privately Using GANs
- with Prof. Gerome Miklau

- Intersection between **deep learning** and **differential privacy**.
- Developed an approach to generating synthetic datasets not only providing differential privacy guarantees but also remaining statistical properties of the real data using generative adversarial networks (GANs).

Off-Policy Control Based on Bellman Residual
- with Prof. Bo Liu

- This project mainly focuses on **reinforcement learning**.
- Proposed and implemented a new objective function for policy optimization, which is a gradient based TD-learning algorithm that incorporates policy gradients.

Skills

Python, C/C++, Tensorflow, Matlab, Mathematica, LaTeX...

Teaching

Teaching Assistant Spring 2018
CS 590M, Introduction to Simulation, Prof. Peter J. Haas
University of Massachusetts Amherst, Amherst, MA, USA

Teaching Assistant Fall 2017
CS 119, Introduction to Programming with Python, Prof. William T. Verts
University of Massachusetts Amherst, Amherst, MA, USA

Awards

2014 Outstanding Student Scholarship, Silver Medalist (Top 10%)
2014 The Mathematical Contest in Modeling (MCM), Honorable Mention
2013 Outstanding Student Scholarship, Silver Medalist (Top 10%)
2012 Outstanding Student Scholarship, Bronze Medalist (Top 20%)
2011 Outstanding Freshmen Scholarship
2010 China National Physics Olympiad, First Prize
2009 China National Physics Olympiad, Second Prize
2009 China National Mathematical Olympiad, Second Prize

References available upon request.