Rui Liu

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Education

Boston University — **Boston, MA, USA**
Ph.D of System Engineering, ***GPA:*** *4.0/4.0 ,* — *Expected Graduation: May 2022*
Advisor: Prof. Alex Olshevsky

University of Chinese Academy of Sciences, — **Beijing, China**
Master of Science, Operations Research and Cybernetics, ***GPA:*** *92.37/100,* — *June 2017*
Advisor: Prof. Han-Fu Chen

Nankai University — **Tianjin, China**
Bachelor of Science, Mathematics and Statistics, ***GPA:*** *92.49/100,* — *June 2014*

Skills

Programming: Python, C++, R, and Matlab.
Experienced in **machine learning, multi-agent system, optimization, stochastic approximation, and statistics** algorithms and techniques.

Research Experience & Publications

Reinforcement Learning

- **Rui Liu,** Alex Olshevsky, "Distributed TD(0) with Almost No Communication.", Preprint, 2021
  • Provided a new non-asymptotic analysis of distributed TD(0) (relies on "one-shot averaging") with linear function approximation.
  • Demonstrated a version of the linear time speedup phenomenon, where the convergence time of the distributed process is a factor of N faster than the convergence time of TD(0).

- **Rui Liu,** Alex Olshevsky, "Temporal difference learning as gradient splitting.", International Conference on Machine Learning (ICML), PMLR, 2021. **Accepted for long presentations.**
  • Provided an interpretation of TD in terms of a splitting of the gradient of an appropriately chosen function.
  • This interpretation yielded improved convergence times, as well as a better scaling with the discount factor.

Matrix Completion

- **Rui Liu,** Alex Olshevsky, "Asymptotic Convergence Rate of Alternating Minimization for Rank One Matrix Completion.", IEEE Control Systems Letters, 2020.
  • For alternating minimization for matrix completion, bounded the asymptotic convergence rate by the variational characterization of eigenvalues of a reversible consensus problem.
  • Numerically evaluated bounds on various classes of graphs.

Stochastic Approximation

- **Rui Liu,** Han-Fu Chen, "Distributed and recursive blind channel identification to sensor networks.", Control Theory and Technology, 2017.

  • Proposed a distributed and recursive blind channel identification algorithms(based on the truncated stochastic approximation) for both time-invariant and time-varying networks.
  • Proved its convergence and showed computation results consistent with theoretical analysis.

Work Experience

- **Teaching Fellow:** Probability, Statistics, and Data Science (ENG EK381, Boston University), Fall 2019 and Fall 2020.

Awards

- Dean's Fellowship Award, Sep. 2017-Aug. 2018
- Samsung Scholarship, Sep. 2012-Aug. 2013
- Meritorious Winner of The Mathematical Contest in Modeling, 2013
- First Prize of Excellent Undergraduate Scholarship, Sep. 2011-Aug. 2012