Qianqian **Ma**

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Education

Sep. 2017 - Present	**Boston University** **Ph. D Candidate**, Electrical and Computer Engineering, GPA:3.6. *Advisor : Prof. Alex Olshevsky.* Research : Machine Learning and Distributed Optmization.
Sep. 2015 - Jul. 2017	**Harbin Institute of Technology** **Master of Science in Engineering**, Electrical and Computer Engineering, GPA : 3.4. *Advisor : Prof. Guangcheng Ma*. Research : Optmization, and Control.
Aug. 2010 - Jun. 2014	**Harbin Institute of Technology** **Bachelor of Engineering**, Electrical Engineering, GPA : 3.5. *Advisor : Prof. Guangcheng Ma*. Research : Optimization and Control.

Field of Interests

Machine Learning :	Deep Learning, Crowdsourcing, Reinforcement Learning, Graph Representation Learning, Transfer Learning, Domain Adaptation.
Optimization :	Distributed Optmization, Disease Modeling, Matrix Completion.

Skills

Programming Skills :	Python, R, Matlab, C/C++, LaTeX.
Operation System :	Linux (Ubuntu), MacOS, Windows.
Software :	PyTorch, TensorFlow, Tableau, Git, MATLAB/Simulink, Gurobi, Mosek.

Experience & Projects

- **Nokia Bell Lab**, Data Science Group.

Research Intern
2021.06-2021.08

Reinforcement Learning with Graph-based Impact-driven Exploration, Python.

- Designed a novel reinforcement learning framework with a new type of intrinsic reward for exploration in sparse environments, especially for procedurally generated environments.
- Evaluated the proposed method on multiple challenging procedurally-generated tasks in MiniGrid (e.g., Multi-room), achieved SOTA performance.

Reinforcement Learning | OpenAI MiniGrid | Curiosity Driven | Sparse Environment

- **Boston University**, ECE Department.

Research Assistant
2017.09-Present

Optimal Lockdown for Pandemic Control, R & MATLAB.

- Proposed a framework to design the optimal lockdown policy for various epidemic models.
- Implemented simulations based on real data about COVID-19 break in New York State.
- Demonstrated a number of previously unknown counter-intuitive phenomenon and provided solid explanations and analysis.

arxiv[PDF] | Optimization | Covid-19 | Networked System | Disease Modeling

Adversarial Crowdsourcing through Robust Rank-One Matrix Completion, Python & MATLAB.

- Proposed a new rank-one matrix completion algorithm with unknown and arbitrary perturbations.
- Solved the challenges of Crowdsourcing classification tasks effectively and efficiently in multiple arbitrary adversaries scenarios.

NeurIPS[PDF] | code (MATLAB) | code (python) | Crowdsourcing | Matrix Completion | Recommender System

Contradictory Structure Learning for Semi-supervised Domain Adaptation, Python.

- Proposed a novel framework for semi-supervised domain adaptation by unifying the learning of opposite structures.
- Provided extensive experiments on the benchmarks of DomainNet. and Office-home datasets which achieve SOTA performance.

SDM[PDF] | Transfer Learning | Domain Adaption | Semi-Supervised Learning

Unsupervised Graph Representation Learning, Python.

- Investigated a graph representation learning framework in an inductive and unsupervised scenario.
- Provided the theoretical analysis and effectiveness guarantees of the proposed method.
- Implemented experiments on down-stream machine learning tasks (e.g., clustering & classification).

ICLR[PDF] | code | Graph-Representation Learning | Inductive Learning | Unsupervised Learning

Optimal Vaccine Allocation for Pandemic Stabilization, R & MATLAB.

- Proposed an efficient mathematical framework to get optimal vaccine allocation policy for different age groups based on various epidemic models.
- Implemented simulations based on real-world COVID-19 break data (e.g., New York State, USA).

arxiv[PDF] | Disease Modeling | COVID-19 | Optimization | Data-Driven | Networked System

Distributed Reinforcement Learning Method, Python.

- Explored a new distributed TD(0) where there exists almost no communication between the agents.
- Implemented numerical experiments on classic control problems in the OpenAI Gym and a grid world Markov Decision Process (MDP) problem.

[PDF] | Reinforcement Learning | TD(0) | OpenAI Gym

Projection Free Online Learning in Low-rank Matrix Completion, MATLAB.

- Proposed a new projection-free online learning algorithm for low-rank matrix completion problem.
- Proved the regret bound for the proposed algorithm and implemented simulation experiments.

[PDF] | Online learning | Matrix Completion | Recommender System

Structural Controllability Analysis and Network Control, MATLAB.

- Provided a new and simplified proof for Lin's method to verify if a control system was structural controllable based on perfect matching method.

[PDF] | control theory | networked system

- **Boston University**, ECE department.

Teaching Assistant
2018.09-2019.05

Teaching Assistant for ENG EC503 (Learning from Data).

- A **machine learning** course covering the general theories, algorithms, and applications of machine learning tasks.

classification | regression | density estimation | clustering | dimensionality reduction

- **Harbin Institute of Technology**.

Research Assistant
2015.09 - 2017.07

The Stability Analysis and Fuzzy H_∞ filter design for nonlinear systems with time-delay, MATLAB

- Proposed an improved stability criterion in terms of a new integral inequality for the nonlinear system with distributed time-delay.
- Constructed stabilization criteria through the novel imperfect premise matching approach.
- Established the mathematical model of the nonlinear filtering error system.
- Designed corresponding H_∞ filters by means of the conventional PDC methodology and novel imperfect premise matching methodology, respectively.

IFAC[PDF] | SMC[PDF] | DMBD[PDF] | ICICIP[PDF] | ICICIP[PDF] | [patent] | control theory | nonlinear system

- **Harbin Institute of Technology**.

Volunteer Teacher
2014.07-2015.07

Teacher at Ninglang No.1 Senior High School of Yunnan Province

- Worked as a **full-time teacher for 1 year time** in a senior high school which locates in Yunnan province of china. It was a voluntary project for graduate student of Harbin Institute of Technology.

Publications

- **Qianqian Ma**, Dan Kushnir, "Graph-based Impact-driven Exploration for Procedually-generated Environment," in preparation, 2021.
- **Qianqian Ma**, Yang-Yu Liu, Alex Olshevsky, "Optimal Vaccine Allocation for Pandemic Stabilization," *under review*, 2021.[PDF]
- Can Qin, Lichen Wang, **Qianqian Ma**, "Contradictory Structure Learning for Semi-supervised Domain Adaptation," *2021 SIAM International Conference on Data Mining (SDM)*. [PDF]
- **Qianqian Ma**, Yang-Yu Liu, Alex Olshevsky, "Optimal Lockdown for Pandemic Control," *under review*. [PDF]
- Lichen Wang, Bo Zong, **Qianqian Ma**, Wei Cheng, Jingchao Ni, Wenchao Yu, Yanchi Liu, Dongjing Song, Haifeng Chen, and Yun Fu, , "Inductive and Unsupervised Representation Learning on Graph Structured Objects," *2020 International Conference on Learning Representations (ICLR)*. [PDF]
- **Qianqian Ma**, Alex Olshevsky, "Adversarial Crowdsourcing Through Robust Rank-One Matrix Completion," *2020 Neural Information Processing Systems (NeurIPS)*. [PDF]
- **Qianqian Ma**, Li Li, Guangcheng Ma, Daling Jia, Hongwei Xia, "A new fuzzy H filter design for nonlinear time-delay systems with mismatched premise membership functions," *2017 International Federation of Automatic Control World Congress (IFAC)*. [PDF]
- **Qianqian Ma**, Li Li, Junhui Shen, Haowei Guan, Guangcheng Ma, Hongwei Xia, "Improved fuzzy H_∞ filter design method for nonlinear systems with time-varying delay," *2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. [PDF]
- **Qianqian Ma**, Hongwei Xia, Guangcheng Ma, Yong Xia, Chong Wang, "Improved stability and stabilization criteria for T-S fuzzy systems with distributed time-delay," *2017 International Conference of Data Mining and Big Data (DMBD)*. [PDF]
- **Qianqian Ma**, Lili, Hongwei Xia, Mingyang Yang, and Guangcheng Ma, "New Results on Stability and Stabilization Analyses for T-S fuzzy systems with Distributed Time-Delay under Imperfect Premise Matching," *2016 International Conference on In-*

telligent Control and Information Processing (ICICIP). [PDF]

- Lili, **Qianqian Ma**, Lili, Hongwei Xia, Guangcheng Ma, and Dali Zhang, "New H_∞ Filter Design Approach for Time-Delay Fuzzy-Model-Based System under Imperfect Premise Matching," *2016 International Conference on Intelligent Control and Information Processing (ICICIP)*. [PDF]
- Changhong Wang, Hongwei Xia, Guangcheng Ma, **Qianqian Ma** and Dali Zhang, "Control methods for T-S fuzzy systems with time-delay under imperfect premise matching," *granted China Invention Patent #CN201610976929.7*. [PDF]

★ Honors & Awards

2020, 2021	Boston University SE/CISE grace hopper scholarship
2016	The First Prize of Post-Graduate Students Scholarship Recipient
2016	The May-4th Medal for Excellent Youth (**top 0.1%**)
2015	The First Prize of Post-Graduate Students Scholarship Recipient
2012	The China-Survey University Students Social Research Scholarship Recipient (**top 2.5%**)
2011	The Second Prize of Renmin Scholarship Recipient