QUAN ZHOU

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Guangdong Province, China

SUMMARY

I am interested in machine learning and continuous optimization. I received my PhD degree in August 2024.

EMPLOYMENT

Postdoc at Technion, Department of Electrical Engineering — Israel
Supervisor: Prof. Shie Mannor — *Since Nov 2024*

EDUCATION

Imperial College London, Dyson School of Design Engineering — United Kingdom
PhD in Design Engineering — *Oct 2022 - Aug 2024*
Supervisor: Prof. Robert Shorten, Dr. Jakub Mareček

University College Dublin, School of Electrical & Electronic Engineering — Ireland
PhD in Electrical and Electronic Engineering — *Feb 2020 - Aug 2022*
Supervisor: Dr. Jakub Mareček, Prof. Robert Shorten

University of Edinburgh, School of Mathematics — United Kingdom
MSc Operational Research with Risk — *Sep 2018 - Nov 2019*
Relevant modules: Optimization, Operational Research, Stochastic modelling, Time Series, Statistical Programming — Grade: 75, Distinction
Supervisor: Dr. Jakub Mareček, Prof. Jacek Gondzio

Hunan University, College of Finance and Statistics — China
BEc (Hons) Insurance — *Sep 2014 - Jun 2018*
Awarded The Second Prize Scholarship by Hunan University.

PUBLICATION LIST

Quan Zhou, Ramen Ghosh, Robert Shorten, and Jakub Mareček. Closed-loop view of the regulation of ai: Equal impact across repeated interactions. In *2024 IEEE 40th International Conference on Data Engineering Workshops (ICDEW)*, pages 176–181. IEEE, 2024

Aida Manzano Kharman, Christian Jursitzky, Quan Zhou, Pietro Ferraro, Jakub Marecek, Pierre Pinson, and Robert Shorten. An adversarially robust data-market for spatial, crowd-sourced data. *arXiv preprint arxiv:2206.06299*, 2023 [Accepted in Distributed Ledger Technologies]

Quan Zhou and Jakub Mareček. Learning of linear dynamical systems as a non-commutative polynomial optimization problem. *IEEE Transactions on Automatic Control*, 2023

Quan Zhou, Jakub Mareček, and Robert Shorten. Fairness in forecasting of observations of linear dynamical systems. *Journal of Artificial Intelligence Research*, 76:1247–1280, 2023

Quan Zhou, Jakub Mareček, and Robert Shorten. Subgroup fairness in two-sided markets. *Plos one*, 18(2):e0281443, 2023

Quan Zhou, Jakub Mareček, and Robert N Shorten. Fairness in forecasting and learning linear dynamical systems. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 35, pages 11134–11142, 2021

UNDER REVIEW

Mengjia Niu, Xiaoyu He, Petr Rysavy, Quan Zhou, and Jakub Marecek. Joint problems in learning multiple dynamical systems. *arXiv preprint arXiv:2311.02181*, 2023

Quan Zhou and Jakub Marecek. Group-blind optimal transport to group parity and its constrained variants. *arXiv preprint arXiv:2310.11407*, 2023

RESEARCH EXPERIENCE

Machine Learning for Microsoft Azure Sep 2021-Jan 2022

· With a team of researchers at DKI (Data, Knowledge, Intelligence) Group of Microsoft Research Asia, I explore the applications of machine learning in certain problems at Microsoft Azure.

Proper Learning of Linear Dynamic Systems May-Aug 2019
Postgraduate research project under the supervision of Dr. Jakub Mareček (IBM Research) and Prof. Jacek Gondzio (University of Edinburgh).

· The dissertation presents a new approach to proper learning of linear dynamic systems via non-commutative polynomial optimization. Based on unrolling of recursive equations in Kalman filtering, I formulated minimization of least-squares forecast error in terms of the system matrices. By minimizing the forecast error, the parameters of the underlying dynamic can be recovered as non-commutative variables (bounded operators with of unknown dimension). For solving this minimization problem, I apply a hierarchy of SDP relaxations.

Insurance Company Economic Capital Measurement based on Copula Dec 2017 - May 2018
Undergraduate research project under the supervision of Prof. Dihong Chen (Hunan University).

· Built Nested Archimedean Copula model to describe the dependence between loss rates of business lines of a property insurance company, then used Tail Var method to measure how much economic capital the company shall hold to manage underwriting risk. Developed in-depth knowledge of copulas and risk management.

TALKS AT CONFERENCES & WORKSHOPS

2024 ICDE Workshop on Fairness in AI.

2023 Machine Learning NeEDS Mathematical Optimization.

2021 ICLR Workshop on Responsible AI (two posters).

2021 DET Seminar at Dyson School of Design Engineering, Imperial College London.

2021 Thirty-Fifth AAAI Conference on Artificial Intelligence.

AWARD

2024 Funding for the conference "Modern Perspectives in Applied Mathematics: Theory and Numerics of PDEs" at ETH Zurich

SKILLS

Programming Languages	PyTorch, Python, Julia, MATLAB
Software Packages	Mosek, CPLEX, GAMS, Xpress

TEACHING EXPERIENCE

One lecture on fairness for *Machine Learning (2023)*.
TA for *Machine Learning (2023)*, *Signal Processing (2021)*, and *Optimization (2022)*.

VOLUNTEERING

Teacher, AIESEC

- (Kuala Lumpur, Malaysia, Mar 2018) Worked in a Christian charity house for one month and cooperated with a Vietnamese volunteer to teach English and mathematics to around 30 students. On holidays, we organized extracurricular activities.
- (Colombo, Sri Lanka, Jul 2016) Worked in a 6-person team to give English and Chinese courses in a Buddhist primary school and a high school, for one month.

REFERENCES

Dr. Jakub Mareček
Department of Computer Science
Czech Technical University in Prague
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Prof. Robert Shorten
Dyson School of Design Engineering
Imperial College London
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