CHARLES WAN

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EDUCATION

Erasmus University Rotterdam — **Rotterdam, Netherlands**
Rotterdam School of Management — **September 2019 - Present**
Department of Technology & Operations Management
Doctor of Philosophy

- Deployment of AI in organizations pertaining to worker agency and incentives, explainability and robustness

Johns Hopkins University — **Washington, DC, US**
School of Advanced International Studies (SAIS) — **Bologna, Italy**
Master of Arts — **May 2019**

- Concentrations: International Economics, Specialization in Quantitative Methods and Economic Theory; European and Eurasian Studies

Cornell University — **Ithaca, NY, US**
B.Sc. in Electrical and Computer Engineering — **January 2008**
B.A. in English — **January 2008**

- Dual-Degree Program
- Cornell Presidential Research Scholar

PROFESSIONAL EXPERIENCE

June 2018 – July 2018 — **Bologna, Italy**
Junior Economist — **June 2018 – July 2018**

- Worked on macroeconometric models

July 2008 - December 2016

- Various roles in commodities trading in Europe, the US and Asia

RELEVANT DOCTORAL COURSEWORK

- Supervised Machine Learning
- Unsupervised Machine Learning & Reinforcement Learning
- Deep Learning
- Advanced Econometrics I & II
- Advanced Micro-econometrics
- Microeconomics
- Noncooperative Games
- Advanced Game Theory
- Evolutionary Game Theory
- Cooperative Games in Operations Research (audit)
- Bayesian Econometrics (audit)
- Algorithmic Game Theory (audit)
- Convex Analysis for Optimization (audit)
- Mathematical Neuroscience (audit)
- Nonparametric Statistics (audit)
- Algorithm Mechanism Design (audit)

ADDITIONAL INFORMATION

Languages: Chinese, German, French, Italian

Programming Skills: Python, R, Javascript, MATLAB

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Summary of Current Research

I am currently working on two research projects pertaining to the deployment of AI in organizations. The first project examines the role of explanations in algorithm-enhanced decision-making processes. Explanations in machine learning, by attributing a particular outcome to a subset of features, reduce a high-dimensional feature space to a low-dimensional one in order to facilitate human understanding. If the power of discretion lies with the human worker, this could lead to a reduction in efficiency as the human worker is induced to re-engage with her sparse and possibly biased heuristic model. There therefore exists a potential trade-off between explainability and efficiency. I try to develop an analytical framework that models human psychology as an endogenous variable within the machine learning pipeline and test my hypotheses empirically using randomized field experiments.

My second project explores the tension between trust in AI and worker agency in an organizational setting. I develop an information theoretic framework for measuring the "gap" between worker priors and algorithmic output. Difficulties in implementing AI's recommendations could arise if the gap is large. Mechanisms such as explanations and repeated positive exposure could lead to greater trust in the algorithm. The more the worker trusts the AI, however, the weaker her incentive to form priors, leading to a reduction of worker agency. This is problematic if the AI is not robust and cannot generalize to unforeseen events that might have a substantial impact on its performance (e.g., by causing a big shift in the data distribution), especially for mission critical systems. I try to model worker agency and incentives endogenously and design experiments to empirically test the trade-offs between, on the one hand, efficiency gains from full delegation to the algorithm and, on the other hand, robustness to distributional shifts in data.