Omid Charrakh

Profile

Expert in Causal Inference, Machine Learning, and Quantum Computation. Experienced in Data Science, Deep Learning, and Statistical Inference.

Employment History

Doctoral Researcher at MCMP-LMU, Munich

April 2017 — March 2023

I designed AI-powered solutions for inferring causal facts from statistical data in the quantum domain:

- Developing novel algorithms for causal discovery among quantum systems using ML & DL
- Extensive research on causal modeling (e.g., instrumental variables, potential outcomes, AB testing)
- **Topics:** causal modeling, active learning, non-parametric regression, generative modeling, deep learning, simulation, numerical optimization
- **Techniques**: Pytorch, Sklearn, Scipy, RayTune, CDT, Networkx, Numpy, Pandas, Matplotlib

Research Assistant at LMU Statistics, Munich

March 2020 — December 2022

I worked on several projects at the chair of Statistical Learning and Data Science:

- **wildlifeML:** a computer-vision project for detecting and classifying animals in Bavarian forests; we developed a new python package
- Teaching assistant in lecture "Python for ML and Data Science"
- Coauthoring a paper on deep learning & regression analysis (e.g., time-series analysis, mixture modeling, GLM, GAM, GAMLSS)
- **Topics:** computer vision, regression analysis, data science
- **Techniques**: TensorFlow, Keras, R programming

Teaching Assistant at LMU, Munich

October 2012 — March 2020

Teaching assistant in seventeen lectures at Physics and Math departments. Examples: Computational Physics, Statistical Physics, Electrodynamics, Advanced Mathematics, and Quantum Information.

Research Assistant at MCMP-LMU, Munich

October 2016 — March 2017

Doing research on Probabilistic Graphical Models and Quantum Information.

Robotic Design at AUT, Tehran

October 2008 — June 2009

Designing a line tracking robot and programming an AVR microcontroller.

Internship

AUTSAT Project at AUT, Tehran

June 2010 — September 2010

Implementing a Monte Carlo simulation for analyzing the effect of thermal noise on High-Frequency electronic devices

Details

Konradinstraße 19A
12105, Berlin, Germany
+491631733528
omid.charrakh@gmail.com

Links

LinkedIn

GitHub

Xing

Skills

Causal Inference, Statistical Inference, Regression Analysis, Machine Learning, Deep Learning, Computer Vision, Data Analysis, Data Visualization, Bayesian networks, Artificial Intelligence, Simulation

Python, R, Git, SQL, LaTeX, MATLAB, C++

High-Frequency Electronics, Signal Processing, Robotics

Communication skills, Analytical & Critical thinking, Academic teaching & writing

Languages

English (advanced)

German (elementary)

Persian (mother tongue)

Honors

- Studienstiftung des deutschen Volkes: Doctoral scholarship from the German Academic Scholarship Foundation (July 2018-March 2020)
- **Hanneke Janssen Memorial Prize**: International award for the best Master's thesis in the field of Foundations and Philosophy of Physics (December 2017)
- Quantum Networks: Financial award for presenting a poster at the University of Oxford (August 2017)
- MCMP Scholarship: scholarship for starting PhD studies (April 2017-September 2018)
- The top 2% out of 11,000 candidates in the Iranian universities entrance exam (October 2011)
- Prize for Exceptional Talents in Engineering: Awarded to the top engineering students of the AUT (October 2007)
- The top 0.1% out of 274,000 candidates in the Iranian universities entrance exam (September 2007)

Selected Conferences

- A ML Approach to Causal Discovery in Quantum Mechanics. Munich 2021
- Quantum Entanglement, Relativity and Causality. Munich 2019
- On the Reality of the Wavefunction, Solstice of Foundations. Zurich 2018
- On the problem of the PBR Theorem, QCQMB. Prague 2017
- Thermal Noise in High-Frequency Devices. Tehran 2012

Publication

- Machine Learning Analysis of EPR-Bell Correlations (under preparation)
- Quantum Causal Discovery with Machine Learning (under preparation)
- Automated wildlife image classification: An active learning tool for ecological applications (under submission)
- Neural Structured Regression: A Review of Neural Networks as Computational Toolbox for Statistical Regression (under review)
- On the Reality of the Wavefunction" (in arXiv)

Certificates

Several online courses in Coursera & Udemy: ML with Scikit-learn and StatsModels, Theory of Gaussian Process Regression for ML, Scalable ML on Big Data using Apache Spark, Introduction to DL & NNs with Keras, Image Classification with CNNs using Keras, Databases and SQL for Data Science with Python, R Programming for Data Science, A/B Testing, Generative Adversarial Networks (GANs)

Education

PhD in Quantum Foundations, Ludwig-Maximilans-University Munich

April 2017 — March 2023

Dissertation: The Foundations of Quantum Causal Inference: the Case of Machine Learning Methods

MSc in Physics, Ludwig-Maximilans-University Munich

October 2012 — September 2016

Dissertation: On the Reality of the Wavefunction (with distinction)

BSc in Electrical Engineering, Amirkabir University of Technology

October 2007 — September 2012

Dissertation: Thermal and Quantum Noises in High Frequency Devices (with distinction)