Richard Wang

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Education

California Institute of Technology (Caltech)

B.S. Computer Science; Class of 2023

COURSEWORK:

Computer Science: Computing Systems, ML and Data Mining, Programming Methods, Decidability and Tractability, Data Structures, Compilers and Interpreters, Computer Architecture, Expert Systems, Learning Systems, Vision Neuromechanics Theory and Computation, GPU Programming, Algorithms, Information Theory

Math: Discrete Math, Abstract Algebra, Calculus on Manifolds, Differential Equations, Probability and Stats, Number Theory, Applied Linear Algebra, Probability Models, Mathematical Options Pricing

Experience

MACHINE LEARNING RESEARCHER, PERFORMANCE STAR LLC – 2023 - PRESENT

- Developed full ML data pipelines, training, and inference pipelines, servers, and API from scratch using Python, Docker, Kubernetes, MLflow, Tensorflow, Tensorflow Serving, and Flask.
- Led research in generative models for high-dimensional, sparse time-series data from semiconductor fabrication; focused on predictive maintenance and anomaly detection for on-device real time inference.
- Designed and implemented siamese and generative deep learning architectures, using spectral preprocessing techniques for novel learning frameworks.
- Developed hybrid methods (mathematical + deep learning) for modeling chaotic dynamical systems
- Research and development into Dynamic Mode Decomposition (DMD), Complex Valued Neural Networks (CVNN), Wavelet analysis, VAEs, transformers, and other SoA deep learning and mathematical techniques.

DATA ANALYSIS INTERN, BLUESKY – 2023

- Research and development for automated query optimization on Snowflake.
- Implemented machine learning solutions for time series modeling on query metadata.

MACHINE LEARNING RESEARCH INTERN, MIT LINCOLN LABS – 2022

- Research and analysis on various SoA semantic segmentation ML models for government projects.
- Designed and implemented image-to-image models using Pytorch.
- Implemented ML pipeline with Hydra and DVC.

MACHINE LEARNING RESEARCH INTERN, THERMO FISHER SCIENTIFIC – 2021

- Developed machine learning solutions for non-identical image-mask homography estimation and image manipulation AI.
- Implemented virtual machine automation for ML ops deployment.

CALTECH DEANS TUTOR – 2020-2023

- Teaching systems programming, math, and analytical physics.

DATA ANALYSIS INTERN, UNIVERSITY OF SOUTHERN CALIFORNIA (USC) – 2020

- Analyzed single-cell sequencing data, comparing gene expression profiles between various cancer cell lines.

- Performed unsupervised gene cluster analysis to investigate drug resistance mechanisms.

DATA ANALYSIS INTERNSHIP, UNIVERSITY OF MICHIGAN ANN ARBOR – 2018-19

- Analyzed high-throughput compound screening data using statistical methods.
- Discovered a novel compound for cancer therapy and won National Regeneron Scholar Award.

Awards and Publications

- 2024 Publication and patent in preparation: *Siamese Learning and Dynamic Mode Decomposition in Semi-supervised Predictive Maintenance for Recipe-Agnostic Semiconductor Fabrication*
- 2022 National Association of Basketball Coaches (NABC) Academic Excellence Award
- 2021 Presentation at Thermo Fisher Scientific Innovation Day (Poster: *Homography Estimation for Non-Identical Image Mask Pairs*)
- 2019 NuevaHacks NEAR Protocol Best Util (NuevaHacks Prize Winner)
- 2019 Regeneron Scholar (Paper: *Identify Novel Natural Products with Inhibitory Effects on HOXA-9-induced Acute Leukemia through in vitro functional Assays*)
- 2019 Presentation at Pathobiology for Investigators, Students and Academicians Conference
- 2018, 2019 President's Award for Volunteer Work
- 2017 NorCal Sports TV Asian-American All Star (www.youtube.com/watch?v=E67m1DTT-Gk)
- 2016 US Chess Federation High School National Chess Team Champion (https://news.harker.org/harker-students-win-individual-and-team-national-chess-championships/)
- 2015 NorthSouth NorCal Top10 Basketball (https://www.northsouthbasketball.com/college-players)

Volunteer Work and Non-Profit

YOUTH BASKETBALL COACH, HOOPRIGHT – 2024

- Coaching 6th grade boys basketball for AAU in the Bay Area.

GUITAR LESSONS, CANON MUSIC – 2024

- Teaching youth guitar lessons in various genres in the Bay Area.

BASKETBALL COACH, CUPERTINO HOOPS – 2016-19; 2023-24

- Youth coaching 3rd-6th grade with a local basketball rec-league.

Key Skills

Programming: Python, C/C++, PyTorch, Tensorflow, x86-64 assembly, Mathematica, JS, Java, SQL

Math: Functional Analysis, Advanced Algorithms and Discrete Maths, Complexity Theory, Probability and Statistics

Apps/Frameworks: IDA Pro, Wireshark, git, aircrack, MySQL, nodeJS, sqlite, LAMP, MLflow, Kubernetes, Docker, Jupyter

Projects

SELF DRIVING MODEL CAR

Engineered model car with self-driving capabilities using Intel Real-Sense depth camera and ROS. Autonomous navigation, on-device ML. In Python.

COMPILER + INTERPRETER

Compiler for Java as well as an interpreter for Java bytecode (basically a mini JVM). In C.

WEB PROXY

Multi-threaded web proxy in C++. Using a concurrent hash table to implement a LRU cache system.

ML SONAR FISH TRACKING

An Alaskan government project to detect, track, identify, and count fish via machine learning and motion tracking techniques. Deployed real-time ML solutions for in-water sonar data.

MINI OS

Simple monolithic operating system from scratch. File system, kernel threads, different programs. In C.

Personal

Bilingual: English (Native), Mandarin (Native)

Misc: Former Caltech Men's Basketball Team; Former President of Cooking Club; CTF and Hackathon enthusiast; Former Caltech Quant Trading Club, Former Caltech Chess Club, Guitar and Piano nerd