Henry (Hanxiang) Pan

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Education

University of Pennsylvania   *Philadelphia, USA*
MASTER OF SCIENCE IN ENGINEERING, COMPUTER AND INFORMATION SCIENCE (CIS)   *Aug. 2019 - Exp. Dec. 2020*
- **Relevant Courses:** Machine Learning, Reinforcement Learning, Deep Learning, Computer Vision, Algorithmic Game Theory
- **Projects:** Implemented a reinforcement learning agent to solve OpenAI Gym's *CarRacing-v0, Acrobot-v1, MountainCarContinuous-v0, Pendulum-v0* problems; trained two tic-tac-toe agents through self-play in Python/PyTorch; wrote accompanying technical *blog posts* on my website

University of Western Ontario | Richard Ivey School of Business   *London, Canada*
BACHELOR OF SCIENCE, HONORS SPECIALIZATION IN COMPUTER SCIENCE AND MINOR IN ECONOMICS   *Sept. 2014 - Apr. 2016*
(DISCONTINUED) BACHELOR OF ARTS, HONORS BUSINESS ADMINISTRATION (HBA)   *Sept. 2011 - Apr. 2014*
- **Thesis:** *Enhancing Food Image Recognition for Nutrition Analysis* - surveyed various image feature extraction and normalization techniques to improve overall image recognition accuracy; achieved a 10-class top-1 image classification error of 1.93% using convolutional neural networks and support vector machine (SVM) after cross-validation and parameter-tuning in MATLAB

Work Experience

University of Pennsylvania   *Philadelphia, USA*
RESEARCH ASSISTANT (UNDER PROF. BARRY G. SILVERMAN)   *May 2020 - Aug. 2020*
- **Research:** Analyzed an monolithic application; identified inefficient data flow and researched technologies to implement the StateSim Service
- **Architecture:** Drafted an architecture proposal for the StateSim service that supports file sharing, user management and authentication
- **Implementation:** Developed the StateSim service business logic in Python; implemented a GraphQL API in Python Graphene to support the three use-cases; achieved a clearer division of application responsibilities and unified client-server communication into one avenue
- **Data:** Designed the database schema and developed Object Relationship Mapping (ORM) models in SQLAlchemy to support the proposed use-cases, which established a consistent client-server data format and consolidated data storage on the server as a single source of truth
- **Prototyping:** Developed a prototype of a client application for functional testing of the service; developed an application loader module that masks a 2-minute loading time with background logistical data processing and streamlined user authentication

ViewFin   *Toronto, Canada*
SOFTWARE ENGINEER   *May 2019 - Aug. 2019*
- **Architecture:** Designed the architecture for a cryptocurrency trading platform and implemented data processing, signal computation and strategy execution modules that supports running a swarm of generic multi-strategy agents in parallel across multiple exchanges
- **Dataflow:** Established a websocket communication pipeline both among internal components and with external services using Python
- **Infrastructure:** Developed a multithreaded backtesting tool in Python, continuous integration (CI) pipeline using Docker and a dashboard for tracking live and backtesting trading performance using React and Node.js

Paymentus   *Toronto, Canada*
APPLICATION ENGINEER (TEAM LEAD)   *Nov. 2017 - Aug. 2018*
- **Full-stack:** Implemented generic UI form components in React and API/microservices in Node.js for the biller self-onboarding feature
- **Framework:** Designed the first end-to-end (E2E) testing framework; implemented core libraries for developing data-driven tests in Node.js, Puppeteer and Jest; containerized the testing environment with Docker for the CI pipeline; analyzed 100+ application feature flows for over 1000+ generic and custom billers with emphasis on complexity and reusability to identify areas for component testing
- **Leadership:** Managed a team of 7 test engineers; conducted phone/in-person interviews; led the test engineering team scrum meetings; planned sprints and provided mentorships to other engineers

Citigroup (Velocity Desktop Trading Application Team)   *Toronto, Canada*
SOFTWARE DEVELOPER / TECHNOLOGY ANALYST   *Jun. 2016 - Nov. 2017*
- **Architecture:** Investigated and implemented a cache architectural change from a peer-to-peer (P2P) model to an efficient client-server model, which reduced component startup-time and latency by 9X and mitigated deadlocks
- **Back-end:** Developed and enhanced server-side search functionality for interest rate swaps (IRS), bonds and internal financial instruments in Java and Spring; migrated a legacy data source for 300+ IRS products and added support for 200+ non-benchmark IRS products by redesigning field mappings and by implementing reference data enhancements to support consistent order flow for downstream components
- Developed an Electron-based configuration management tool that allows for finding and editing properties via one centralized search bar

Projects & Research

Trading with Machine Learning   *Feb. 2019 - May 2019*
- Implemented neural networks for price prediction at three different abstraction levels - Python Numpy, Keras and Tensorflow; leveraged reinforcement learning algorithms to devising trading strategies in Python/Tensorflow
- Wrote accompanying *blog posts* including overview, technical design, challenge discussion and future steps for the above topics

Brawlstars AI   *Feb. 2019 - Apr. 2019*
- Generated gameplay data, and implemented object detection algorithms to identify player/ally/enemy positions and visual rewards, with lack of game API, for supervised learning
- Implemented a reinforcement learning environment and deep Q-learning network for training the agent in Python/Tensorflow