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, Distributed Systems, Algorithmic Game Theory
- Implemented a baseline reinforcement learning agent to solve the OpenAI Gym CarRacing-v0 problem in Python/PyTorch

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*

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 user cases, which established a consistent client-server data format and consolidated data storage on the server as a single source of truth
- **Front-end:** Developed a rapid 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 steamlined user authentication

ViewFin — *Toronto, Canada*

Software Engineer — *May 2019 - Aug. 2019*

- **Architecture:** Designed the architecture for a cryptocurrency trading platform and implemented data processing, centralized signal computation and generic strategy execution modules that supports running multi-strategy swarm of 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*

- **Back-end:** Developed and enhanced server-side search features 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
- **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
- 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, and reinforcement learning algorithms for devising trading strategies in Python/Tensorflow
- Wrote accompanying blog posts for most topics which included overview, technical design, challenge discussion and future steps

Brawlstars AI — *Feb. 2019 - Apr. 2019*

- Generated gameplay data, and implemented object detection algorithms to identify player/ally/enemy positions and visual rewards, given the lack of game API data, for supervised learning
- Implemented an reinforcement learning environment and deep Q-learning network for training the agent in Python/Tensorflow

Food Image Recognition Thesis, University of Western Ontario — *Sept. 2015 - Apr. 2016*

- Surveyed various image data feature extraction and normalization techniques including edge detection, bag of features, and convolutional neural networks (CNN) to improve overall image recognition accuracy; achieved a 10-class top-1 image classification error of 1.93% using CNN and support vector machine (SVM) after cross-validation and parameter-tuning