# Harvey Huang

#### DOCTORATE CANDIDATE IN DECISION, RISK AND FINANCIAL SCIENCE

# About Me

• Technical Skills: Python • Golang • C# • Solidity • LaTeX | Frameworks: OpenAl Gym • Tensorflow • Unity WebGL • WebSocket

• Language: Mandarin (native) • English (fluent, IELTS 8.0) | Interests: Tennis • Basketball • Esports

# **Education**

#### **University of Melbourne**

Melbourne, Australia

PHD IN DECISION, RISK AND FINANCIAL SCIENCES · BCOM HONOURS IN FINANCE (2016) · FIRST CLASS HONOURS

Jul. 2012 - Jul. 2022 (expected)

- PhD: Australian Government Research Training Program (RTP) Scholarship.
- BCOM: Melbourne International Undergraduate Scholarship · Melbourne Global Grant Scholarship.
- Exchange to Marshall School of Business, University of Southern California (Jan. 2014 Jun. 2014) GPA: 3.8/4.0.

# Research and Work Experience \_\_\_\_\_

## Brain Mind and Markets Lab 🟛

Melbourne, Australia

 $\mathsf{PHD} \cdot \mathsf{TUTOR}$ 

Jul. 2017 - NOW

- Conducted research to evaluate the performance of traditional and distributional reinforcement learning algorithms in a multi-armed bandit task with tail risks. Identified the source of failure, and proposed solutions to improve the existing reinforcement learning algorithms based on statistical methods (all in Python).
- Designed an online multi-armed bandit human behaviour experiment with different reward distributions (Gaussian, student-t, exponential). Conducted analysis on why humans could efficiently estimate mean values and make effective decisions under different environments.
- For the online experiment, implemented the UI client (Unity WebGL) and the server (Go & Python). Established a dual-way connection between the client and the server using WebSocket protocol and goroutine/asyncio, with the capacity of running multiple experiment sessions at the same time. Implemented the data generating process by adding a C++ native plugin to the WebGL client.
- Tutored Foundations of Fintech (BlockChain, Robo-Advisor, Natural Language Processing, Credit Analysis) Derivative Securities Corporate Financial Policy International Finance.

Deloitte Consulting Shanghai, China

INTERN · DATA ANALYST

Feb. 2017 - May. 2017

- · Assisted senior consultants to provide a strategic advisory service on smart city planning projects to one of the state governments.
- Created a web-scraping script (Python Scrapy) to automatically collect data from websites. Cleaned and filtered the raw data for analysis.
- Performed exploratory data analysis and model analysis using linear regression & non-supervised models.

# **Publication**

• Peter Bossaerts, Shijie Huang & Nitin Yadav. Exploiting Distributional Temporal Difference Learning to Deal with Tail Risk. 2020. Risks, 8(4), 113.

# Projects.

#### Option Pricing (Python) 1

- Implemented option pricing using binomial model, Black-Scholes-Merton model, Longstaff-Schwartz model, covering European, American and Exotic options.
- Implemented simulation of asset price (with Poisson jump), volatility (Heston) and interest rate (Vasicek, CIR).

#### Reinforcement Learning (Python)

- Implemented deep reinforcement learning algorithms, including DQN, A2C and distributional DQN (Categorical C51, Quantile and Expectile).
- Wrote a detailed guide and discussion on practical implementation of all three distributional DQN models. **2**

### **Cryptocurrency (Python)**

- Established WebSocket connections with multiple crypto exchanges (Binance, CoinJar, OKEx) and Interactive Brokers. Using asyncio, asynchronously extracted real-time spot and futures price & volume data from multiple exchanges.
- · Monitored and calculated real-time cross-exchange and triangular arbitrage opportunities across multiple asset classes.

# BlockChain (Golang & Solidity) 1

- Implemented a mini Ethereum based blockchain system from scratch, covering detailed steps including creating private-public key pair, initiating transactions, miner transaction verification and block mining.
- Created a smart contract token on Ropsten test network, using Solidity OpenZeppelin framework (see EtherScan).