

# SHUYI ZHANG

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February 22, 2017

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## KEY STRENGTHS

- Experienced in Artificial Intelligence, Machine Learning and Heuristic Search. Applied to the popular game, Hearthstone, to create a strong AI player.
- Designed a search algorithm to find a retro-synthesis path among millions of chemical drug synthesis reaction data.
- Co-founder of GameCloud Ltd., a start-up Mobile Phone Games Studio. Published 2 top apps in AppStore, both are prize winners in a startup competition.
- Team lead for a group of developers, successfully developed several games and business software packages.

## EDUCATION

- **University of Alberta** Edmonton, Canada  
*MSc (Research Based) in Computing Science (GPA: 3.8)* *September 2014 - Expected August 2017*
- **University of Alberta** Edmonton, Canada  
*Bachelor of Science Honors, Computing Science (First Class, GPA: 3.8)* *January 2010 - December 2013*

## PROJECTS AND RESEARCHES

- **Deep Reinforcement Learning for Complex Computer Games (Thesis)** *May 2015 - Present*  
**Language/Framework:** Python, C#/ Theano, WPF
  - Designed hierarchical deep reinforcement learning algorithms to play the game Hearthstone.
  - Integrated machine learning and Monte Carlo Tree Search to build a master-human level AI player.
- **Idempotent Decomposition Problem in LLVM** *January 2015 - April 2015*  
**Language/Framework:** C++/LLVM
  - Designed the Genetic Algorithm and Nested Monte Carlo Tree Search to the hitting set problem in the process of idempotent decomposition in LLVM compiler using C++.
  - The result is equivalent to state-of-the-art algorithms but our scalability is better.
- **New Map-Matching Framework in Cloud Server** *January 2015 - April 2015*  
**Language/Framework:** Java/PostgreSQL, Amazon EC2
  - Invented and implemented a novel hybrid map-matching algorithm to match the GPS signals to a valid path in urban area.
  - Deployed the implementation on a cloud server, which has an improvement of 17% speed over the state-of-the-art algorithm under variational sampling rate.
- **Parallel Matrix Computation Framework** *October 2014 - December 2014*  
**Language/Framework:** C++/OpenMP
  - Design and implemented a parallel matrix computation framework designed for large scale matrix inversion and multiplication.
  - Tested the framework on a 64-core machine and achieved a good near-linear speed-up.

## WORK EXPERIENCES

- **Data Engineer, WuXi AppTec**

*May 2016 - December 2016*

**Language/Framework:** Python/keras, Theano, scikit-learn, RDkit

- Researched on using search algorithms and data-driven methods to assist drug retro-synthesis path design.
- Modeled the retro-synthesis path design as a heuristic search problem, and designed the search algorithm.
- Worked out a reaction evaluation function to guide the search by applying unsupervised learning on reaction data.
- Implemented the search framework which has a 67.5% to construct a correct retro-synthesis path on test data.

- **Software Developer, SHUNSOFT**

*January 2015 - June 2015*

**Language/Framework:** PHP, JavaScript, ASP.NET, Java / Android Studio

- Developed a stable back-end dashboard of SHUNSOFT's online-trading system using JavaScript.
- Developed an Android stock trading app that allows users to monitor the market data and make stock transactions under SHUNSOFTs the risk management system.

- **Lead Game Developer, Co-founder, GameCloud Ltd.**

*January 2014 - August 2014*

**Language/Framework:** C++, C#/Cocos2D-x, Unity3D

- As a start-up company cofounder and the main developer, co-published 4 games quickly.
- One app reached AppStore (China) Free top 100 Chart in May 2015 and gained a total 400,000 downloads, another app reached the AppStore (China) Paid top 200 Chart.

## SKILLS

- **Programming language:** Python, Java, C++, C#, Matlab, LaTeX, SQL, PHP, JavaScript
- **Libraries/Framework:** keras, Theano, scikit-learn, Android, Cocos2d-x, Unity3D, OpenGL, RDkit, Qt, Matlab, Weka, MPICH/OpenMP, MySQL, EC2, CouchDB, Hadoop, J2EE
- **Software/IDE:** Visual Studio, PyCharm, Xcode, Eclipse, IntelliJ IDEA, Android Studio, Matlab, MySQL Benchmark, Sublime

## SELECTED HONORS AND AWARDS

- Awardee of University of Alberta Undergraduate Scholarship
- Awardee of University of Alberta International Continuing Undergraduate Scholarship
- Awardee of University of Alberta Academic Excellence Scholarship