

Boyu Liu (Apply for MS in Computer Science)

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EDUCATION

The Hong Kong University of Science and Technology	2014-2018
<i>B.S., double major in Computer Science & Mathematics GPA: 4.164/ 4.3 Major GPA: 4.260/4.3</i>	
Cornell University	Spring 2017
<i>Undergraduate Exchange Program</i>	
Stanford University	Summer 2016
<i>International Honor Program (summer) Certificate of Intensive Study in Computer Science</i>	

AREAS OF INTEREST

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- Machine Learning
 - Computer Vision
 - Artificial Intelligence

RESEARCH EXPERIENCE

Memory Augmented Tracking (CV, Deep Learning)	Summer & Fall 2017
<i>Researcher (under supervision of Professor Chi-Keung Tang and Yu-Wing Tai, Hong Kong University of Science and Technology)</i>	
<ul style="list-style-type: none"> - Inspired by Neural Turing Machine, built a system to conduct visual object tracking using deep neural network augmented with an external memory module, which was a one-shot learning method that did not need back-propagation to refine network during tracking. - Performed better than state-of-art trackers in cases like occlusion, large-scale shape change, confusing backgrounds. Achieved good results in VOT2016 benchmark. - Paper was submitted to CVPR2018. 	
3D Face Reconstruction (CV, Deep Learning)	Summer 2017
<i>Researcher (intern in SenseTime Group Limited)</i>	
<ul style="list-style-type: none"> - Used VGG and LSTM to reconstruct a pose-invariant, expression-invariant identity 3D face from a set of 2D photos of an individual. On-going project with a two-stage coarse-to-fine structure. - The results using LSTM showed great improvement than just using single photo for reconstruction. Results were better than state-of-art in synthetic data, producing identifiable 3D face with details from real photos. 	
Sentiment Lexicon Induction (Machine Learning, NLP)	Spring 2017
<i>Researcher (under supervision of Professor Claire Cardie, Cornell University)</i>	
<ul style="list-style-type: none"> - Used semi-supervised learning method to generate a Sentiment Lexicon for a certain domain of corpus in Chinese. - Made use of commonly used features such as word embedding, as well as unique features for Chinese like character-level and radical-level similarity between Chinese words. - Implemented and analyzed the unsupervised learning method and features. Paper in progress. 	
Sentiment and Market Prediction (Deep Learning, NLP)	Fall 2016
<i>Research Assistant (Undergraduate Research Opportunity Program, under supervision of Professor Qiang Yang, Hong Kong University of Science and Technology)</i>	
<ul style="list-style-type: none"> - Implemented a News Sentiment Analysis System on Chinese News with Convolutional Neural Network as a Deep Learning method, and used the system to predict the Stock market. - Achieved a prediction Accuracy of 57+% on the Stock market. Implementing next steps: adding channels and features to improve the accuracy. 	

PUBLICATIONS

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- MAVOT: Memory-Augmented Video Object Tracking**
- Submitted to CVPR2018 (first author)
 - Arxiv: <https://arxiv.org/abs/1711.09414>
 - Project page: <https://bliuag.github.io/MAVOT-Project-Page/>
- A Semi-supervised Approach for Chinese Sentiment Lexicon Induction**
- in progress

SELECTED PROJECTS

Computer Vision Related Projects([GitHub](#)) (CV)

- Intelligent Scissors: An image processing tool like Photoshop Magnetic Lasso. (SIGGRAPH 95')
- Face Detection: Used HoG and SVM to detect faces with different sizes. (CVPR 05')
- Single-View Metrology: Reconstructed a 3D model from single image, with user guidance in GUI. (ICCV 99')
- Dense Photometric Stereo: Reconstructed 3D model from 2D pictures of different view. (CVPR 05')

A Christmas Ball ([YouTube](#)) (Graphics)

- Used Skybox, Fresnel Reflection, Chromatic Aberration in OpenGL to simulate snowflakes in Christmas Ball in different patterns with a background environment.

Ultimate Tic-Tac-Toe ([GitHub](#)) (Game AI)

- Built a game AI for the game Ultimate Tic-Tac-Toe.
- Made an experimental analysis on performance of different AI algorithms.

Winograd Schema Challenge ([GitHub](#)) (AI)

- Winograd Schema Challenge is a substitution of Turing Testing, solving pronoun ambiguity with common knowledge.
- Constructed a system for solving pronoun ambiguity by a combination of Natural Language Parser, Narrative Chain and Search Engine.

CodeIT Competition– A system for Automation Stock Operation ([GitHub](#)) (Software)

- First Place in CodeIT Competition, for great result and architecture. Awarded by Credit Suisse.
- Collaborated with four students to develop a system for arbitrage within 24 hours, with an efficient architecture using parallel process and task distribution. Used NodeJS for back-end, AngularJS for front-end, and Firebase for database.

Software Engineering – Team Forming ([Web](#) and [IOS](#)) (Software)

- Leader in a group of 8 students. Built a platform for team forming in Web and IOS. Implemented with AngularJS, Firebase and Ionic, tested with Unit Testing.

COMPETITIONS

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|--|-------------|
| - First Place in CodeIT Suisse Coding Challenge (<i>held by Credit Suisse</i>) | 2016 |
| - ACM-ICPC Regional Contest Shanghai Station Bronze Award | 2015 |
| - ACM-ICPC Regional Contest Taiwan Station Ninth Place | 2015 |

HONORS and AWARDS

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| - Dean's List (<i>HKUST</i>) | 2014-2018 |
| - Cheung On Tak Charity Foundation Scholarship | 2014-2018 |
| - University Scholarship | 2014-2018 |
| - Full Recruitment Scholarship (<i>less than ten awardees</i>) | 2014-2018 |
| - China Merchants Scholarship | 2017 |
| - HKSAR Government Scholarship Fund-Reaching Out Award | 2016 |

WORK EXPERIENCE and ACTIVITIES

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| - Research internship (<i>computer vision and deep learning</i>) in Tencent Youtu | Winter 2017 |
| - Research internship (<i>computer vision and deep learning</i>) in SenseTime Group Limited | Summer 2017 |
| - Vice President of Microsoft Student Club, HKUST Chapter | Fall 2016 |
| - Teaching helper for Computer Science courses | Spring 2016 |
| - Executive Committee in China Entrepreneur Network, HKUST Chapter | 2015 |

SKILLS

- **Language:** C++ (GUI and OpenGL) | Java (including Android) | JavaScript (AngularJS, FireBase, Ionic) | Python | MATLAB
- **Algorithm and Data Structure:** participated in ACM-ICPC contests | Familiar with algorithms and data structures
- **Machine Learning:** Traditional methods (SVM, KNN, Decision-tree) | Theoretical ML knowledge
- **Deep Learning:** CNN | RNN, LSTM | NTM | GAN | Framework: Caffe, TensorFlow
- **Selected Course:** Computer Vision (graduate-level) | Machine Learning (Cornell) | Advanced Artificial Intelligence (graduate-level) | Computer Graphics (Stanford) | Image Processing | Honor Design and Analysis of Algorithms | Operating System | Honors Software Engineering | Linear Algebra | Probability and Random Process