# HE JIANG

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## EDUCATION

**Peking University, Department of Machine Intelligence Science** Beijing
Bachelor in Science September 2011 – July 2016 (will graduate in July 2016)

- GPA: 3.67/4.00 Rank 4/46; admitted on basis of performance on national college admissions exam (top 0.5%)
- Thesis topic: distributed learning algorithms and discrete unsupervised learning.

## PUBLICATIONS

1. Chen Dan, Kristoffer Arnsfelt Hansen, He Jiang, Liwei Wang, Yuchen Zhou. "On Low Rank Approximation of Binary Matrices", submitted to *8th Innovations in Theoretical Computer Science (ITCS 2017).*

## RESEARCH EXPERIENCE

**Hong Kong University of Science & Technology (Dept. of Computer Science & Engineering)** Hong Kong, China
Research Assistant to Prof. Yangqiu Song Sep 2016 – Jul 2017
**Full-time Research Assistant**

- I implemented a graph-based semi-supervised learning algorithm on heterogeneous information networks (HINs). It explores a feature called meta-graph, which embeds useful semantic relations in knowledge bases.
- The algorithm is suitable for many tasks in/with knowledge bases (KBs), e.g. semi-supervised document classification to make use of auxiliary information from knowledge bases.
- This work will be submitted to *23rd ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 17')*.

**Peking University (Department of Machine Intelligence Science)** Beijing, China
Research Assistant to Prof. Liwei Wang Apr 2014 – Present
**Undergraduate Research Program (funded by Principal Foundation)**

- Paper [1] was submitted, before that it was submitted to *ITCS 2017*.
- Studied binary low rank approximation, binary projection and relaxed integer programming for the problem.
- With regards to the aforementioned article we designed the first algorithm for low-rank approximation of binary matrices (like a discrete version of principal component analysis) for general rank-k approximation, and proved the approximation rate of O(k). The algorithm runs in polynomial time when k is fixed.
- I proved the lower bound of our algorithm's approximation rate, and deduced that the bound was tight. Carried out experiments to search the examples for constructive proof of the lower bound.
- I did a survey of related literature to find several applications/motivation for our algorithm.

**Carnegie Mellon University (Department of Computer Science)** Pittsburgh, USA
Research Assistant to Prof. Emma Brunskill Jul 2015 – Sep 2015
**Intern Student Program (funded by School of EECS, Peking University)**

- We implemented a system called DeepTutor whose focus was to teach each student math skills in a way that best suited them. I was responsible for the direct Deep Q-Network model.
- A partially observable Markov decision process (POMDP) was proposed to fit the tutoring scenario. Studied how to formulate the POMDP from the Assistment data set.
- A deep reinforcement learning algorithm was implemented to deduce the optimal policy and the representation of the students' level of knowledge.
- The first real-life application of modified deep RL algorithm for learning POMDPs.

**Peking University (Department of Computer Science)** Beijing, China
Projects of *Empirical Methods in NLP* under guidance of Dr. Yansong Feng Mar 2014 – Jun 2014

- A Semantic role labeling system was implemented for CoNLL-2004 shared task.
- A dependency parsing model was implemented for CoNLL-2008 shared task. It used perceptron algorithm to learn the oracle for parsing automata. The parsing automata used Arc-Standard transition.
- Several Chinese word segmentation projects done: by dictionary matching, probabilistic modeling (HMM and CRF) and structured perceptron for sequential tagging.
- Project of learning N-gram model and smoothing. N-gram was learned by counting and Good-Turing smoothing. Testing was done by determining the sentence with higher likelihood of testing sentence pairs.

Projects of *Introduction to Artificial Intelligence* under guidance of Prof. Qunqing Xie Nov 2014 – Dec 2014

- Controlling a wheeled robot to reach a given destination in real space without hitting any obstacles. The robot is capable to sense the obstacles nearby by sonar and radar sensors.
- I implemented a modified version of Shortest Path Faster Algorithm (SPFA) to find the optimal path and avoid hitting anything with the partial information from the sensor.
- I did several optimization to make the path smoother and finally performed best on real maps among all teams in the course.

## WORKING EXPERIENCES

**Megvii Inc. (Object Detection Group)** Beijing, China
Research Internship Jan 2016 – Jul 2016

- Helped the Object Detection Group to port Piotr's Matlab Toolbox from Matlab to C++. We overhauled the module to make it more convenient for further research.
- Reproduced several pedestrian detection methods like ACF, LDCF, RotatedFilters, etc. I also reproduced some results using deep neural networks.

**Tencent Inc. (WeChat Basic Platform Group)** Shenzhen, China
Research Internship Oct 2016 – Jul 2017

- Using knowledge base(KB) based algorithm to analyze and predict the spread rumors in WeChat community.
- Part of the HKUST research assistant program.

## SELECTED AWARDS AND HONORS

- National Scholarship (top 2% in all students) 2013
- Tencent Innovative Scholarship (top 10% student in school of EECS) 2014
- Lee Wai Wing Scholarship 2015
- Merit Student 2015
- Third Prize, PKU ACM Competition 2013,2015
- Outstanding Graduate Student 2016
- Summa Cum Laude 2016

## TEACHING EXPERIENCE

**Peking University (Department of Computer Science)** Beijing, China
TA for course seminar of *Algorithm Design and Analysis*, instructed by Prof. Minghui Zhou Mar 2015 – Jun 2015

- This course dealt with many of the topics covered in Christos Papadimitriou's book *Algorithms*.
- I gave instructions to students regarding the course project which focused on role mining of open source community, introducing them with basic machine learning approach.
- I organized seminars and graded homework, and responsible for answering technical questions.

## ADDITIONAL INFORMATION

**Additional Professional and Extracurricular Experiences**

- Harmonica Association of Peking University, President (Jul 2014 – Jun 2015). I head up a team of 15 people and 200 club members, and organized the association's 25 year anniversary concert and run a harmonica competition each semester. Lectures about musical basics, outdoor plays.
- Linux Association of Peking University, Core Participant (Sep 2012 – Present)
- Mental-health counsellor of the class (Sep 2013 – Jul 2015). The job is to help fellow students keep a good mental health status with proper cares and talks. In emergency situations, I report to professionals in the school.

**Interests**

- Harmonica: I have been playing diatonic, tremolo, chromatic and chord harmonica for 4 years. During the time, I have been teaching *Introduction to Blues Harmonica* lessons for three years.
- Electronic piano (level 6).
- Soccer (center back / goalkeeper for over 10 years)
- Baseball & Fencing

**Computer and Language Skills**

- C/C++, Python, Lua(Torch7), Java, Scala, Matlab(Octave/Scilab), R.
- Latex & Texmacs
- Linux distributions, managing Git repositories.
- Languages Mandarin Chinese (native language), English working proficiency), Hindi (1 year of undergraduate experience, basic fluency), French (basic fluency), Xibe gisun (my tribal language, learning).