HE JIANG

Department of Machine Intelligence

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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 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).