Fu Yao 符尧

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Education

Material Science (Later I changed my major) (Sep 2013 – Jun 2015)
College of Engineering, Peking University

Bachelor of Computer Science (Sep 2015 – Jun 2018 expected)
School of Electronics Engineering and Computer Science, Peking University

Exchange Student, PKU-UNSW Globex Exchange Program (Feb 2016 – Jun 2016)
Department of Computer Science and Engineering, University of New South Wales

Selected Courses

Algorithms and Programming Techniques	96	Operating Systems (Honor Track)	95
Lab on Operating Systems(Honor Track)	95	Computer Architecture	85
Lab on Computer Organization and Architecture	91	Empirical Methods in Natural Language Processing	81
Advanced Calculus	88	Advanced Algebra	86

Research & Projects

Natural Language Processing

Generating Answer Sentences with Heterogeneous Memory Network (Jun 2017 - Dec 2017)
Mentor: Yansong Feng; Institute of Computer Science and Technology, Peking University.

- Use Key-Value Memory Network to represent heterogeneous knowledge, split decoder states to address keys and values separately. Propose a cross memory attention mechanism to reduce generation repetition and improve coverage.
- Study and implement various different memory network architectures, attention mechanisms and encoder-decoder architectures. All experimental codes are implemented in Python-Tensorflow, effective codes more than 3000 lines.
- Paper manuscript: Yao Fu, Yansong Feng, *Natural Answer Generation with Heterogeneous Memory*. Submitted to NAACL-HLT 2018

Music Composition with Sentence Level Semantics (Current) (Dec 2017 -)
Mentor: Lei Li; Toutiao AI Lab.

- Conduct an extensive survey about representation, tasks, models, and performances of music composing.
- Use a LSTM network to predict velocities from music scores.
- Building music composition systems with sentence level models.

Chinese Named Entity Recognition (Apr 2017 - May 2017)
Mentor: Yansong Feng; Institute of Computer Science and Technology, Peking University.

- Used a three layer bidirectional LSTM. The network can achieve 85 f1 score on training data (6M Chinese sentences). The model was implemented in keras (500+ lines python).
- Did an extensive test on the influences of different configurations including: number of layers, embedding dimension, batch size, dropout rate, and sampling strategy.

Other Sequence Modeling

Deep Learning for Voice Conversion (Aug 2016 - Nov 2016)
Mentor: Guangyu Sun; Center of Energy-Efficiency Computing and Application

- Studied knowledge about RNN, from basic RNN-LSTM structure to attention mechanism. Did a tutorial about RNN to our group.
- Did a survey about deep learning for Voice Conversion, Implemented some preliminary algorithms about speech processing.

Drone Motion Tracking (Dec 2015 – Jun 2016)
Mentor: Guangyu Sun; Center of Energy-Efficiency Computing and Application

- An energy-efficiency tracking system with low latency for embedded system. 1000+ lines of C++ codes.
- Used Linear Regression and Basic HMM to develop the tracking module to reconstruct the motion track.

Planning and Transportation

Vehicle Routing for Project OzHarvest (Mar 2016 – Feb 2017)
Mentor: Divya Nair; Research Centre for Integrated Transport Innovation (rCITI), University of New South Wales

- A framework for Dynamic Periodic Unpaired Pickup and Delivery Vehicle Routing Problem.
- Implemented and improved an integrated linear programming model and a Tabu Search based heuristic routing algorithm under guidance from my mentor. The output was applied in Australian Governmental OzHarvest Project.
- OzHarvest is a food rescue and delivery project in Sydney. It provide and distributes food for the poor. The network consists of around 800 food providers and more than 400 welfare agencies distributed over an area of 12,000 square kilometres. It operates 13 truck routes, each visiting 10 to 20 food providers and 10 to 15 agencies daily.
- Before I joint rCITI, this work won the Best Paper Award in Transportation Research Board 2016.
- Undertook all the coding work. Implemented:
  - The whole program architecture, 7000+ C++ lines of main program, 2000+ lines of Python testing codes.
  - Static Routing: Heuristic method for multi-vehicle multi-period shortest Hamilton Path added with Clustering | Combination Optimization and Dynamic Programming to find optimal logistics solution
  - Dynamic Routing: Node Arrival, Node Cancellation and Supply Variation handling.
- Publication: D.J. Nair, H. Grzybowska, Y. Fu, V.V. Dixit, *Scheduling and routing models for food rescue and delivery operations,* Socio-Economic Planning Sciences
- Thousands of people in poverty are now consistently benefiting from this project.

System and Architecture

JOS Operating System (Sep 2016 - Feb 2017)
Teacher: Xiangqun Chen; Operating System Engineering Course Project Grade: 92

- Based on MIT 6.828 course framework.
- System framework: bootstrapping – VM – trap – system call - process scheduling – file system – ARM transplant, 10000+ C code in total
- Discussed and tested how to make the system scalable with large number CPU cores.

RISCV CPU Simulator (Sep 2016 - Feb 2017)
Teacher: Guangyu Sun; Computer Architecture Engineering Course Project Grade: 91

- Framework: Decode – Execution – Write Back, System Call, SIMD Simulation, Cache Simulation
- Constructed the framework and finished it with teammates, 3000+ C++ codes in total.
- Discussed and tested how to configure the optimal cache for average access pattern.

Honors

K.M. Wu Alumna Scholarship. College of Engineering, Peking University. (May 2014)
Wusi Scholarship. Peking University (twice) (Sep 2014) (Sep 2015)
C.X. Zhong & X.N. Xia Scholarship, College of Engineering, Peking University.(3 stages) (Jun 2015, 2016, 2017)
Scholarship of Exchange Program, China Scholarship Council. (Top 10%) (Feb 2016)
XiangShang Scholarship. Peking University (Mar 2016)
The CCF Elite Collegiate Award. China Computer Federation (CCF) (Top 1%) (Jul 2017)

Miscellaneous

Xixi and Her Friends Book Store (Startup), cofounder (Jan 2014 -)

- In my second year in college I started a book store in my home town, aiming to free high school students from endless homework. Thousands of students have benefited from the program. We later started a startup and raised over 1 million RMB.

PKU Youth, Editor (May 2015 -)

- I am an editor in our school media PKU Youth(北大青年) (the largest student media in China). I published two extensively discussed articles. One is about the observation of my hometown YongShun, one of the 100 poorest county in China. Another is about the observation of top students in PKU, focusing on their hard work, achievements and anxiety.

Photography

- I am a deep lover for traveling and photography. I love cities in China, Australia, and Thailand. Here are some rewards:
  - Third Rank Award, [Song of the Sea] photography competition, Peking University (Jun 2015)
  - Frist Rank Award, [WANSHI·SHIJIE] photography competition, Peking University (Dec 2015)