Zuobai Zhang

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Education

School of Computer Science, Fudan University, Shanghai **Sept. 2017 – Jul. 2021(expected)**
Bachelor of Computer Science (Honor Class)

- **Cumulative GPA:** 3.92/4.0, **School Rank:** 1/145
- **Cumulative Major GPA:** 4.0/4.0
- **Core Courses:**
  - **Systems and Database:** · Digital Logic and Component (A) · Introduction to Computer Systems (A) · Introduction to Database Systems (A)
  - **Algorithms and Machine Learning:** · Data Structure (A) · Pattern Recognition and Machine Learning (A) · Data Mining (A)
  - **Mathematics:** · Mathematical Analysis (A) · Linear Algebra (A) · Set Theory and Graph Theory (A) · Algebra Structure and Mathematical Logic (A) · Operations Research (A)

Publication

- **Nearly Linear Time Algorithm for Mean Hitting Times of Random Walks on a Graph.**
  Zuobai Zhang, Wanyue Xu, Zhongzhi Zhang
  To appear in *ACM International Conference on Web Search and Data Mining (WSDM) 2020*
- **Fast Approximation of Coherence for Second-Order Noisy Consensus Networks.**
  Zuobai Zhang, Wanyue Xu, Yuhao Yi, Zhongzhi Zhang
  Submitted to *IEEE Transactions on Cybernetics (TCYB)*
- **Fast Estimation of the Diagonal of Pseudoinverse of Graph Laplacian.**
  Qi Bao, **Zuobai Zhang**, Wanyue Xu, Zhongzhi Zhang
  Submitted to *IEEE Transactions on Knowledge and Data Engineering (TKDE)*
- **Power-Law Graphs Have Minimal Scaling of Kemeny Constant for Random Walks.**
  Wanyue Xu, Yibin Sheng, **Zuobai Zhang**, Haibin Kan, Zhongzhi Zhang
  Submitted to *The Web Conference (WWW) 2020*

Research Experience

Fast Algorithms on Graph Mining **Fudan University**
Advisor: Prof. Zhongzhi Zhang *Apr. 2018 - Feb. 2019*

- Presented a series of approximation algorithms with nearly linear time for some graph mining quantities based on Laplacian Solvers and provide approximation guarantees for these algorithms.
- To demonstrate the efficiency and accuracy of our algorithms, conducted experiments on several model networks and a large set of realistic networks from different domains.
- Contributed to a first-author paper which has been accpeted by **WSDM 2020**, and two papers which have been submitted to **TCYB** and **TKDE**, respectively.
- Supported by Fudan's Undergraduate Research Program Opportunities Program (FDUROP) under Grant No.19914.

Edge Centrality Based on Optimizing the Robustness of a Graph **Fudan University**
Advisor: Prof. Zhongzhi Zhang *Mar. 2019 - present*

- Proposed a novel centrality measure for edges based on the eigen-drop of spectral radius of the non-backtracking matrix of a graph.
- Transformed the optimization problem to a submodular optimization problem by approximation and put forward a fast algorithm with approximation guarantee.
- Experimental results demonstrate that our algorithm outperforms other optimization strategies and is able to scale to large networks.

Optimization on Kirchhoff Index via Edge Addition **Fudan University**
Advisor: Prof. Zhongzhi Zhang *Jul. 2019 - present*

- Proved the NP-Hardness of the optimization of Kirchhof index by adding edges.
- Proposed a sub-quadratic approximation algorithm for the special case of single edge addition which significantly reduces the cubic time complexity of the exact algorithm.

Project

Y86 Simulator **Nov. 2018 - Jan. 2019**

- Implemented the Y86-64 simulator in the *Introduction to Computer System* book.
- Developed a Y86 Assembler in **Python** and designed a frontend to visualize the CPU execution process.

Geo-fencing Algorithm Design **Dec. 2018 - Jan. 2019**

- Proposed several geo-fencing algorithms to support the insertion, deletion and query of points and polygons.
- Built spatial index with data structures, including k-d tree, quad-tree and R tree, and employed the grid method to determine the spatial relationship between points and polygons.

Mini-CSRanking **Apr. 2019 - Mar. 2019**

- Built a Web application with **Django** to emulate CSRankings, which ranks scholars according to their papers.
- Imported registeration features and supported adding and following scholars.

MIPS CPU Design **Mar. 2019 - Jun. 2019**

- Designed MIPS single-cycle, multi-cycle and pipeline CPUs with various cache strategies.
- Implemented a MIPS assembler in **Python**.

KDD Cup 2012 Algorithm Reproduction **May 2019 - Jun. 2019**

- Reproduced the **Latent Factor Model** and **AdaBoost** algorithms in **Julia** to predict users' interests .
- Achieved the 5th place on public board and the 3rd place on private board.

Honor & Award

Chinese National Scholarship (Top 1%) **Oct. 2019**
Honorable Mention, Interdisciplinary Contest in Modeling **Apr. 2019**
Chun Tsung Scholar Program **Apr. 2019**
Wish Scholarship **May 2019**
Chinese National Scholarship (Top 1%) **Oct. 2018**
Gold Medal, ACM-ICPC Asia Regional Contest EC-Final **Dec. 2017**
Silver Medal, ACM-ICPC Asia Regional Contest Beijing Site **Nov. 2017**
Gold Medal, ACM-ICPC Asia Regional Contest Qingdao Site **Nov. 2017**
Tengfei College Freshmen Scholarship **Sept. 2017**
Silver Medal, National Olympiad in Informatics, National Finals **Jul. 2016**
First Prize (2nd place), National Olympiad in Informatics, Shandong Division **Nov. 2015**

Skill

- **Programming Languages:** C/C++ > Python = LaTeX> Julia = MATLAB > JavaScript » HTML
- **English Test:**
  - **TOEFL iBT: 94** (Reading: 27, Listening: 28, Speaking: 17, Writing: 22)
  - **GRE: 331** (Verbal Reasoning: 162, Quantitative Reasoning: 169, Analytical Writing: ?)