

# Junbo Zhang

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## Education

- 09/2009 - present** PhD Candidate in School of Information Science and Technology  
Southwest Jiaotong University, Chengdu, China  
Supervisors: [Prof. Tianrui Li](#) & [Prof. Yi Pan](#)
- 09/2005 - 06/2009** Bachelor of Telecommunication Engineering  
Southwest Jiaotong University, Chengdu, China

## Experience

- 05/2013 - present** Research Assistant at The Chinese University of Hong Kong, Hong Kong  
*Research and develop large-scale deep learning and feature engineering algorithms.*
- 05/2013 - present** Research Intern at [Huawei Noah's Ark Lab](#), Hong Kong  
*Research and develop large-scale deep learning and feature engineering algorithms.*  
*Applied above techniques to telecommunication data mining and computer vision problems.*
- Proposed a novel deep learning approach for learning high-level representation, which is presented at the 20th ACM SIGKDD Conference on Knowledge Discovery and Data Mining ([KDD 2014](#)).
  - Proposed a novel algorithm for mining discriminative and essential frequent sequential patterns via model-based search tree. It is the core component of the prediction model, which is used for the consumer complaint problem in the telecommunications industry. The related patent application has been submitted.
  - Proposed a novel algorithm for mining discriminative and essential frequent sequential patterns via model-based search tree. It is the core component of the prediction model, which is used for the consumer complaint problem in the telecommunications industry. The related patent application has been submitted.
  - Proposed a novel locally linear deep learning for large-scale stellar spectrum recognition.
- 02/2012 - 02/2013** Visiting PhD Student at Georgia State University, USA  
*Research and develop parallel algorithms, large-scale algorithms in cloud computing and GPU cluster.*
- Participated as a mentor in 8-week NSF REU Undergraduate Summer Research Program.
  - Proposed large-scale feature selection algorithms, provide HADOOP and SPARK implementations.
  - Proposed a composite relation for data fusion & a novel parallel matrix algorithm using multi-GPU.
- 08/2011 - 09/2011** Intern at Belgian Nuclear Research Centre (SCK-CEN), Belgium  
*Research and develop incremental and parallel algorithm for feature selection and knowledge acquisition.*

## Research Topics

- Deep Learning, Representation Learning, Feature Engineering
- Cloud Computing, Distributed Computing, High Performance Computing
- Big Data Mining
- Rough Sets/Fuzzy Sets

## Publications

### Conference Papers

1. **Junbo Zhang**, Guangjian Tian, Yadong Mu, Wei Fan.  
*Supervised Deep Learning with Auxiliary Networks.*  
Proceedings of the 20th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD 2014**), New York, USA, 2014, pp. 353-361.  
(AR: 151/1036 = 14.6%)
2. **Junbo Zhang**, Tianrui Li, Yi Pan.  
*PLAR: Parallel Large-scale Attribute Reduction on Cloud Systems.*  
The 14th International Conference on Parallel and Distributed Computing, Applications and Technologies (**PDCAT 2013**), Taipei, 2013, pp. 184-191.
3. **Junbo Zhang**, Tianrui Li, Yi Pan.  
*Parallel Rough Set Based Knowledge Acquisition Using MapReduce from Big Data.*  
ACM SIGKDD 2012 Workshop on Big Data Mining (**BigMine 2012**), Beijing, China, pp. 20-27, 2012.

### Journal Papers

1. **Junbo Zhang**, Yun Zhu, Yi Pan, Tianrui Li.  
*Efficient Parallel Boolean Matrix Based Algorithms for Computing Composite Rough Set Approximations.*  
**Information Sciences**, 1st revision.
2. **Junbo Zhang**, Jian-Syuan Wong, Yi Pan, Tianrui Li.  
*A Parallel Matrix-based Method for Computing Approximations in Incomplete Information Systems.*  
Accepted for publication in IEEE Transactions on Knowledge and Data Engineering (**TKDE**).
3. Dun Liu, Tianrui Li, **Junbo Zhang**.  
*Incremental Updating Approximations in Probabilistic Rough Sets Under the Variation of Attributes*  
**Knowledge-Based Systems**, vol. 73, pp. 81–96, 2015.
4. Anping Zeng, Tianrui Li, Dun Liu, **Junbo Zhang**, Hongmei Chen.  
*A Fuzzy Rough Set Approach for Incremental Feature Selection on Hybrid Information Systems.*  
**Fuzzy Sets and Systems**, vol. 258, pp. 39–60, 2015.
5. Dun Liu, Tianrui Li, **Junbo Zhang**.  
*A Rough Set-based Incremental Approach for Learning Knowledge in Dynamic Incomplete Information Systems.*  
**International Journal of Approximate Reasoning**, vol 55, no. 8, pp. 1764–1786, 2014.
6. **Junbo Zhang**, Tianrui Li, Yi Pan, Chuan Luo, Fei Teng.  
*A Parallel and Incremental Algorithm for Updating Knowledge Based on Rough Sets in Cloud Computing Platform.*  
Accepted for publication in **Journal of Software**. (in Chinese)
7. Anping Zeng, Tianrui Li, **Junbo Zhang**, Hongmei Chen.  
*Incremental Maintenance of Rough Fuzzy Set Approximations under the Variation of Object Set.*  
**Fundamenta Informaticae**, vol. 132, no. 3, pp. 401-422, 2014.
8. **Junbo Zhang**, Jian-Syuan Wong, Tianrui Li, Yi Pan.  
*A Comparison of Parallel Large-scale Knowledge Acquisition Using Rough Set Theory on Different MapReduce Runtime Systems.*  
**International Journal of Approximate Reasoning**, vol. 55, no. 3, pp. 896-907, 2014.
9. **Junbo Zhang**, Tianrui Li, Hongmei Chen.  
*Composite Rough Sets for Dynamic Data Mining.*  
**Information Sciences**, vol. 257, pp. 81-100, 2014.

10. **Junbo Zhang**, Dong Xiang, Tianrui Li, Yi Pan.  
*M2M: A Simple Matlab-to-MapReduce Translator for Cloud Computing.*  
**Tsinghua Science and Technology**, vol 18, no. 1, pp. 1-9, 2013.
11. Yi Pan, **Junbo Zhang**.  
*Parallel Programming on Cloud Computing Platforms: Challenges and Solutions.*  
**KITCS/FTRA Journal of Convergence**, vol. 3, no. 4, pp. 23-28, 2012.
12. **Junbo Zhang**, Tianrui Li, Da Ruan, Zizhe Gao, Chengbing Zhao.  
*A Parallel Method for Computing Rough Set Approximations.*  
**Information Sciences**, vol. 194, pp. 209-223, 2012.
13. **Junbo Zhang**, Tianrui Li, Da Ruan, Dun Liu.  
*Rough Sets Based Matrix Approaches with Dynamic Attribute Variation in Set-valued Information Systems.*  
**International Journal of Approximate Reasoning**, vol. 53, no. 4, pp. 620-635, 2012.
14. **Junbo Zhang**, Tianrui Li, Da Ruan, Dun Liu.  
*Neighborhood Rough Sets for Dynamic Data Mining.*  
**International Journal of Intelligent Systems**, vol. 27, no. 4, pp. 317-342, 2012.
15. Dun Liu, Tianrui Li, Da Ruan, **Junbo Zhang**.  
*Incremental learning optimization on knowledge discovery in dynamic business intelligent systems*, **Journal of Global Optimization**, vol. 51, no. 27: pp. 325-344, 2011.

## Book Chapter

1. **Junbo Zhang**, Tianrui Li, Da Ruan.  
*Rough Sets Based Incremental Rule Acquisition in Set-Valued Information Systems.*  
**Autonomous Systems: Developments and Trends**, pp. 135-146, 2012.

## Awards & Honors

- National Scholarship, China, 2013.
- National Scholarship, China, 2012.
- “Si Shi Yang Hua” Medal in **Southwest Jiaotong University**, 2012. (Top 1/1000, the students’ top honor of Southwest Jiaotong University).
- 2009-2014 Special Grade Scholarship for PhD Students, **Southwest Jiaotong University**.
- First Prize in the 9th “Huawei Cup” National Postgraduate Mathematical Contest in Modeling, China, 2012.
- Second Prize in the 8th National Postgraduate Mathematical contest in Modeling, China, 2011.
- Second Prize in the 2nd “Huawei Cup” Innovation Programming Contest, China, 2010.
- Second Prize in the 6th National Postgraduate Mathematical contest in Modeling, China, 2009.
- Second Prize in the 2nd Sichuan Provincial Programming Contest, China, 2008.
- Honorable Mention in the 33th ACM Asia Programming Contest, 2008.
- Second Prize in the 1st Sichuan Provincial Programming Contest, China, 2007.
- Second Prize (the 12th Place in person) in the TopCoder Sichuan Provincial Contest, China, 2007.
- Third Prize in National Electrical Engineering Association Mathematical Contest in Modeling, China, 2007.
- The President Scholarship of School of Information Science and Technology, Southwest Jiaotong University, 2006, 2007.
- 2005-2009 Undergraduate Comprehensive Scholarship of Southwest Jiaotong University.

## Projects

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|--------------------------|---|
| <b>11/2012 - present</b> | Research on dynamic knowledge discovery techniques and efficient algorithms under granular computing, the Fostering Foundation for the Excellent Ph.D. Dissertation of Southwest Jiaotong University, China. Leader and principal investigator.                                 |
| <b>10/2012 - 10/2013</b> | Dynamic knowledge discovery system based on rough sets in cloud computing environments, the Science and Technology Planning Project of Sichuan Province, China. Leader and principal investigator.  |
| <b>10/2011 - 09/2012</b> | Research on dynamic knowledge discovery techniques under granular computing and probabilistic rough sets, and its fast algorithms based on cloud computing, the Doctoral Innovation Funding Project of Southwest Jiaotong University, China. Leader and principal investigator. |

<b>10/2011 - 09/2012</b>	Research on dynamic knowledge discovery system based on cloud computing and rough sets, the Young Software Innovation Foundation of Sichuan Province, China. Leader and principal investigator.
<b>05/2012 - 07/2012</b>	8-week NSF REU Undergraduate Summer Research Program hosted by the Department of Computer Science, Georgia State University, the National Science Foundation, USA. Participated as a mentor.
<b>01/2012 - present</b>	Research on dynamic updating knowledge theories and algorithms based on granular computing, the National Natural Science Foundation of China.
<b>01/2012 - present</b>	Research on composite rough set models and algorithms of knowledge discovery, the National Natural Science Foundation of China.
<b>01/2009 - 12/2011</b>	Research on incremental learning theories and methods based on granular computing, the National Natural Science Foundation of China.

## Professional Activities

### Review for Journal

- [ACM Transactions on Knowledge Discovery from Data \(TKDD\)](#)
- [IEEE Transactions on Computers \(TOC\)](#)
- [IEEE/ACM Transactions on Computational Biology and Bioinformatics \(TCBB\)](#)
- [IEEE Transactions on NanoBioscience](#)
- [World Wide Web Journal \(WWWJ\)](#)
- [International Journal of Cloud Computing \(IJCC\)](#)
- [International Journal of Bioinformatics Research and Applications \(IJBRA\)](#)
- [International Journal of Computational Intelligence Systems \(IJCIS\)](#)

### Extracurricular Activities

- IBM Cloud Academy CON, NC, Research Triangle Park (RTP), North Carolina, USA, Apr. 2012.
- 2010 Workshop on Frontiers of Data Management, Soochow University, Suzhou, China, Dec. 2010.
- 2010 Workshop on Massive Data Mining and Knowledge Discovery, Southwest Jiaotong University, Chengdu, China, Nov. 2010.
- 2010 China Computer Federation Advanced Disciplines Lectures (the 11th issue) - Massive Data Mining and Knowledge Discovery, Southwest Jiaotong University, Chengdu, China, Nov. 2010.
- Intel Software College - Multi-core Programming for Academia, Fudan University, Shanghai, China, 2010.
- 2010 National Graduate Summer School - Data Intensive Computing and Unstructured Data Management, Renmin University of China, Beijing, China, Jul. 2010.
- 2009 Workshop on Massive Data Mining and Knowledge Discovery, Southwest Jiaotong University, Chengdu, China, Dec. 2009.
- National Graduate Summer School (Dragon Star Plan) - Data Mining, Zhejiang University, Hangzhou, China, 2009.

## Skills

**Operating System** Linux-based OS, Mac OS, Windows XP, Windows 7/8

**Programming Language** C, C++, CUDA C (GPU), Python, Java, Shell, Matlab (and various) languages with practical experiences.

**Others** Hadoop, Spark, Theano + Pylearn2 (GPU-based Deep Learning Packages), Weka, L<sup>A</sup>T<sub>E</sub>X, MS Office(Visio, Word, Excel, PowerPoint)