

# ZUN LI

Mobile: +86-139-1625-6613, Email: rezunli96@gmail.com

## EDUCATION

---

**Shanghai Jiao Tong University**, China

*Sept. 2014- June 2018 (expected)*

B.S.E. in Computer Science (IEEE Honored Class)

Overall GPA: 3.71/4.00 (88.26/100) Major GPA: 3.81/4.00 (89.63/100).

**Core Courses:** Mathematical Analysis I & II (93 & 91/100), Linear Algebra (97/100), Probability Theory and Random Process (92/100), Automata Theory (95/100), Software Engineering (92/100, Rank **1st**/60), Artificial Intelligence (90/100), Algorithm Design and Analysis (98/100, Rank **1st**/60).

## INTERESTED AREAS

---

My current interests are Algorithmic Game Theory, Machine Learning and their applications, such as Data Exchange, Computational Advertising and Recommender System.

## PUBLICATIONS

---

- [1] **Zun Li**, Zhenzhe Zheng, Fan Wu, Guihai Chen, “How to Buy Cookies? On Designing Optimal Data Purchasing Strategies for Online Ad Auctions”, **submitted** to *AAAI*, 2018
- [2] **Zun Li**, Hongjiang Lv, Zhenzhe Zheng, Fan Wu, Guihai Chen, “Learning in Online Marketplace: Data Purchasing Policy Designs under Uncertainty”, **submitted** to *AAAI*, 2018
- [3] Zhenzhe Zheng, **Zun Li**, Fan Wu, Guihai Chen, “How to Sell Data? On Designing Optimal Data Trading Strategy for Data Marketplace”, **submitted** to *VLDB*, 2018
- [4] Zhenzhe Zheng, **Zun Li**, Fan Wu, Guihai Chen, “Generalized Online Auctions with Time Varying Values”, In preparation for *IJCAI*, 2018.

## RESEARCH EXPERIENCE

---

**A Top-K Ranking Based Collaborative Filtering Algorithm**

*June 2017 - Present*

*Research Intern at Qing Zhao Group, Cornell University*

*Advisor: Prof. Qing Zhao*

- Investigated machine learning techniques such as Learning-to-Rank and low-rank matrix factorization.
- Designed a new metric measuring on the accuracy of ranking of Top-K items, thus developed a new way to find similar neighbors for each user based on the new metric.
- Proposed a new CF algorithm where each observed rating was assigned a score, based on which rank aggregation among neighbors was conducted.
- Implemented the designed algorithm and obtain 10% gain against state-of-art ones on real datasets.
- Providing theoretical bound for the designed algorithm.

**Mechanism Design for Data Exchange**

*August 2016 - September 2017*

*Researcher Assistant at Advanced Network Lab, SJTU*

*Advisor: Prof. Fan Wu*

My research on Data Exchange is threefold, consisting of:

i. **Computational Advertising and Data Engineering**

- Proposed a general framework consisting of an ad auction model and a data purchasing model, which comprehends a variety of ad auction forms and different classes of learning agents. Modeled advertisers' trade-offs between utilities gained during auction and expenditure paid during data purchasing as a convex optimization problem.
- Rigorously proved the existence and uniqueness of the equilibrium and showed how to calculate the optimal strategy in a simple setting. The methodology was then extended to a general scheme.
- Conducted numerical simulations to evaluate the behaviors of two types of learning agents under different strategic environments.

ii. **Learning Agents in Data Market.**

- Divided into three levels of uncertainty for data consumers. Deployed Bayesian updating method to learn the quality distributions.
  - Proposed interpolation based reinforcement learning algorithms to compute the policies efficiently.
  - Evaluation results showed the algorithms achieved good performances in terms of purchasing choice decision and computational cost.
- iii. **Economic Techniques for Pricing Digital Goods.**
- Proposed a theoretical market model where vendors were allowed to price data by economic techniques like free sampling and versioning.
  - Rigorously derived the optimal trading strategies under various cases.
  - Used a real-life taxi location dataset to evaluate the strategy designs.

### **Online Mechanism Design with Time Varying Values**

*Researcher Assistant at Advanced Network Lab, SJTU*

*October 2017 - Present*

*Advisor: Prof. Fan Wu*

- Considered an online auction model for selling reusable goods where agents' values are assumed to be vary with time. Preemption to reallocate goods to newly arrived agents are allowed.
- Presented dynamic programming allocation method. Proved that the upper bound of competitive ratio with the off-line optimal solution is within constant factors.
- Determined the unique payment by extending classical Myerson's Lemma for the proposed generalized model. Thus designed a strategy-proof online mechanism for agents with time varying values.

## **SELECTED PROJECTS**

### **Xpo: An Online Campus Second-hand Trading Market System** *March 2016 - June 2016*

- Conducted all the business process for a software engineering project, including the documents completion and software production.
- Developed an Android campus second-hand trading platform APP by tools like Android Studio and XAMPP. Implemented pattern design into the system design.

### **MIDI Music Files Synchronization via SeqGAN**

*March 2017 - June 2017*

- Investigated MIDI formats. Used specialized module to extract features from raw MIDI files.
- Researched and implemented Sequential Generative Adversarial Network (SeqGAN) by TensorFlow to train music data set and generate new MIDI files.

### **A Hierarchical Network Selection Game for HetNets**

*March 2017 - June 2017*

- Proposed a generalized game framework for heterogeneous networks selection, including a cooperative game within a population a population and a non-cooperative game between different populations.
- Compared the algorithmic performances of the normal selection, reinforcement learning selection and evolutionary selection toward equilibrium state.

## **PROFESSIONAL ACTIVITIES**

External Reviewer for IEEE TWC, IWQoS 2017, INFOCOM 2018.

## **HONOR & REWARDS**

Meritorious Winner (Top <b>15%</b> Worldwide), Interdisciplinary Contest in Modeling	<i>2016</i>
1st Class Prize (Top <b>2%</b> Provincial Level), National Undergraduate Physics Contest	<i>2015</i>
Litiantangren Corporation Scholarship (Top <b>10%</b> )	<i>2015-2016</i>
SJTU Academic Excellence Scholarship Class-B (Top <b>10%</b> )	<i>2016-2017, 2015-2016</i>
SJTU Academic Excellence Scholarship Class-C (Top <b>20%</b> )	<i>2014-2015</i>
Champion ( <b>1st</b> /1000 Contestants), "Step-by-Step" Campus Orienteering & Quiz Game	<i>2015</i>

## **TECHNICAL SKILLS**

### **Programming Languages Tools**

Python, C++, Verilog, Java, PHP, HTTP/CSS, SQL.  
MATLAB, Mathematica, TensorFlow, Git, L<sup>A</sup>T<sub>E</sub>X, XAMPP.