

Yichen Ruan

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Hi! My name is Yichen Ruan. People also call me Ethan. I'm a Ph.D. student in the ECE Department at CMU. My advisor is Prof. Carlee Joe-Wong. Visit <https://ycruan.github.io> to learn more about me on my personal site.

education

- Jan 2018 - **Ph.D. in Electrical and Computer Engineering** - Carnegie Mellon University
Intro. to Machine Learning (Ph.D.), Statistical Learning, Adv. Algorithms, Deep Learning
- 2016-2017 **M.S. in Systems Engineering** - UC Berkeley
Convex Optimization, Algorithms, Operating Systems, Database, Security, Machine Structure
- 2012-2016 **B.S. in Civil Engineering** - Tsinghua University
Discrete Math, Operations Research Theory, Intro. to AI, Computer Network, Data Structure
- 2014-2016 **Secondary Bachelor's Degree in Economics** - Tsinghua University
Intermediate Micro/Macro Economics, Econometrics, Theory of Finance

publications

- **Y. Ruan**, L. Zheng, M. Gorlatova, M. Chiang and C. Joe-Wong, The Economics of Fog Computing: Pricing Trade-offs for Data Analytics, to appear in Fog and Fogonomics: Challenges and Practices of Fog Computing, Networking, Strategy and Economics, Wiley, 2018.

projects

Edge Machine Learning for Resource-constrained IoT Devices

- Proposed an edge computing solution to run classification tasks on resource-constrained IoT devices.
- Designed a tree-based model containing several nodes. Each node contains a pre-trained classifier. Implemented an algorithm to prune the tree structure such that the number of nodes matches that of edge devices.
- Implemented the system on 8 Raspberry Pis and tested with the Cifar-100 dataset. Observed that the edge system obtained higher accuracy and more throughput compared to the fully centralized system.

Yelp Ratings Prediction

- Build a Naive Bayes model to predict Yelp review ratings using the Bag of Words model.
- Implemented a parallel training and testing algorithm with Spark's map-reduce paradigm.

Computer System Course Projects - system design and functionality implementation

- Operating System (C Language): scheduler, thread, process, syscall, buffer cache, synchronized file system etc.
- Database (Java): file management, B+ tree, join algorithm, query optimization, concurrency control etc.
- Secure Cloud Storage (Golang): secure file store/load/edit/append/share/receive/rename/revoke etc.
- Homemade Numpy (C with SIMD/OpenMP): cache-optimized parallel matrix computations etc.

More projects - see my [homepage](#)

computer skills

- Programming Languages: C, C++, C#, Java, Python, SQL, JavaScript, Matlab, GoLang
- Parallel/Distributed Computing: Hadoop, Spark, OpenMP, SIMD, Terraform
- Machine Learning: PyTorch, Keras, SciKits, NumPy, Pandas, CVX
- Others: Bash, Git, Maven, Vim, GDB, GNU Make, Postgres, LaTeX