

YIXUAN LI

1 Hacker Way, Menlo Park, CA 94025
Phone: (607) 232 - 0763 · Email: yixuanli@fb.com
<http://www.yixuanli.net>

EDUCATION

- Cornell University** Aug. 2013 - Dec. 2017
Ph.D. in Electrical and Computer Engineering (current GPA: 4.0) *Ithaca, NY, USA*
Minor: Computer Science
Thesis Committee: John E. Hopcroft, Kilian Q. Weinberger, Thorsten Joachims
Research Interests: Machine Learning, Deep Learning, Computer Vision
Thesis: *Representation Learning for Web Intelligence*
- Shanghai Jiaotong University** Sept. 2009 - Jun. 2013
B.Eng in Information Engineering (Major GPA: 92.1/100, Rank: 1/98) *Shanghai, China*
Honors: National Scholarship of China (2 years); Academic Excellence Scholarship (3 years)

WORK EXPERIENCE

- Research Scientist, Facebook Research** October 2017 - Now
Large Scale Deep Learning for Visual Recognition (mentored by Manohar Paluri) *Menlo Park, CA, USA*
- Building open world recognition models and platforms when both dataset and label sizes scale to large extent.
- Machine Learning Scientist Intern, GrokStyle Inc.** May 2017 - Aug. 2017
Object Detection for Visual Search (mentored by Kavita Bala and Sean Bell) *Ithaca, NY, USA*
- Developed Faster-RCNN based object detection service to enable bounding box recommendation for visual search.
- PhD Research Intern, Google Research & Machine Intelligence.** May 2016 - Aug. 2016
Measuring and Inferring User Interest from Gaze (hosted by Vidhya Navalpakkam) *Mountain View, CA, USA*
- Designed and performed user studies to systematically understand and validate the relationship between user's implicit eye gaze pattern and explicit interest.
 - Developed gaze and viewport based metrics quantifying user's attention, and deployed machine learning models that enable inferring user interest from gaze.
 - Wrote and published paper in the World Wide Web Conference (**WWW'17**).
- PhD Intern, Google Inc.** May 2015 - Aug. 2015
Fake Social Engagement Detection on YouTube (hosted by Oscar Martinez) *Mountain View, CA, USA*
- Analyzed massive and highly complex YouTube spam datasets using quantitative analysis techniques (e.g., clustering, regression, inferential statistics).
 - Developed a localized clustering pipeline using MapReduce, which greatly expanded the daily fake social engagement (e.g., comments, subscribes, Likes) take-down volume on YouTube. The pipeline was integrated with existing abuse infrastructure and is currently running in Google's production.
 - Wrote and published paper to in the World Wide Web conference (**WWW'16**).

RESEARCH EXPERIENCE

Improve Reliability of Neural Network Predictions

April. 2017 - November 2017

Research Mentor (joint work with S. Liang, R. Srikant)

Ithaca, NY

- Proposed a simple and effective method for detecting out-of-distribution examples in neural networks based on temperature scaling and input perturbation techniques.
- Conducted evaluation on state-of-the-art network architectures (DenseNet, WideResnet) under a diverse set of in- and out-distribution dataset pairs.. Demonstrated significantly lower false positive rate compared to state-of-the-art approach.
- Wrote and published paper in **ICLR'18**.

Stacked Generative Adversarial Networks

Sept 2016. - Dec. 2016

Thesis Research (joint work with X. Huang, O. Poursaeed, J. Hopcroft and S. Belongie)

Ithaca, NY

- Developed a novel framework for generating realistic natural images using multitudes level of deep generative models.
- Performed extensive visual quality evaluation by comparing with state-of-the-art approaches, demonstrated the effectiveness using Inception Score.
- Wrote and published paper in **CVPR'17**.

Efficient Training of Deep Neural Network Ensembles

Sept. 2016 - Feb. 2017

Thesis Research (joint work with G. Huang, G. Pleiss, J. Hopcroft and K. Weinberger)

Ithaca, NY

- Proposed Snapshot Ensemble, to obtain the ensembling multiple neural networks at no additional training cost. The performance compares favorably with expensive independently trained network ensembles.
- Conducted extensive evaluation with diverse network architectures (including ResNet, Wide ResNet, DenseNet) and vision tasks (CIFAR-10, CIFAR-100 and ImageNet). Demonstrated significantly lower error rates compared to state-of-the-art approaches.
- Wrote and published paper in **ICLR'17**.

Convergent Learning of Deep Neural Networks Representations

Feb. 2015 - Dec. 2015

Project Lead (joint work with Jason Yosinski, Jeff Clune, John Hopcroft, Hod Lipson)

Ithaca, NY, USA

- Proposed a novel framework for examining separately trained deep neural networks: training multiple networks and comparing and contrasting the features learned by each of their neurons.
- Performed extensive statistical analysis on neuron activations using correlation and mutual information measurement.
- Developed neuron matching approaches by approximately aligning neurons from two networks via spectral clustering algorithm. (**NIPS Workshop'15, JMLR**)
- Wrote and published paper in the International Conference on Learning Representation (**ICLR'16**).

Local Community Structure in Large-Scale Social Networks

Sept. 2013 - Oct. 2014

Project Lead (joint work with Kun He, David Bindel and John Hopcroft)

Ithaca, NY, USA

- Developed and implemented a scalable algorithm, LEMON, for mining local structure in large-scale networks based on local spectral clustering, which significantly reduced the complexity compared to previous methods. (**WWW' 15, ICDM'15**)
- Conducted extensive evaluation on algorithm performance with real network datasets with millions of vertices across various domains of applications, including Amazon, YouTube, and DBLP.

Quantifying Geo-Location Disclosure Behavior on Twitter

Project Lead (advised by Dan Cosley)

Feb. 2015 - Jun. 2015

Ithaca, NY, USA

- Crawled over 7 million streaming tweets as well as users' historical tweets using Twitter API.
- Conducted linguistic analysis over the geo-tagged tweets collection using Linguistic Inquiry and Word Count (LIWC), and compared the linguistic characteristics between geo-locators and non-locators.
- Trained various machine learning models (SVM, KNN, Decision Tree, Gaussian Naive Bayes) to discriminate between geo-locators and non-locators using linguistic features of tweets.

Structural Learning of Social and Information Networks

Project Lead (advised by Thorsten Joachims)

Feb. 2014 - Jun. 2014

Ithaca, NY, USA

- Proposed a framework of classifying entities in social networks by adopting discriminative structural learning.
- Developed effective statistical learning models for classification using structural support vector machine.
- Collaborated on data collection, feature engineering, validation, and performance analysis.

Network Capacity and Transmission Delay in Ad Hoc Networks

Undergraduate Research Assistant (advised by Xinbing Wang)

Sept. 2011 - Jun. 2013

Shanghai, China

- Analyzed the performance limits (e.g. throughput, connectivity and delay) of wireless ad hoc networks using graphical and probabilistic models. (TON'14)
- Designed a two-layered cooperative transmission process for cognitive radio (CR) ad-hoc networks and evaluated the capacity and delay performance using queuing theory. (TWC'15)

PUBLICATIONS

1. Shiyu Liang, Ruoyu Sun, **Yixuan Li**, R. Srikant, Understanding the Loss Surface of Neural Networks for Binary Classification. ICML 2018, submitted.
2. Shiyu Liang, **Yixuan Li**, R. Srikant, Principled Detection of Out-of-Distribution Examples in Neural Networks. In proceedings of the 6th International Conference on Learning Representations (ICLR'18)
3. Gao Huang*, **Yixuan Li***, Geoff Pleiss, Zhuang Liu, John Hopcroft and Kilian Weinberger, Snapshot Ensembles: Train 1, Get M for Free. In proceedings of the 5th International Conference on Learning Representations (ICLR'17). * indicates equal contribution.
4. Xun Huang, **Yixuan Li**, Omid Poursaeed, Tianlu Chen, John Hopcroft and Serge Belongie, Stacked Adversarial Generative Networks. In proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR'17).
5. **Yixuan Li**, Pingmei Xu, Dmitry Lagun and Vidhya Navalpakkam, Towards Measuring and Inferring User Interest From Gaze. Accepted to the 26th international conference on World Wide Web (WWW'17).
6. **Yixuan Li***, Jason Yosinski*, Jeff Clune, John Hopcroft and Hod Lipson, Convergent Learning: Do different neural networks learn the same representations? In proceedings of the 4th International Conference on Learning Representation (ICLR'16, Oral presentation 5.7%).
7. **Yixuan Li**, Jason Yosinski, Jeff Clune, John Hopcroft and Hod Lipson, Convergent Learning: Do different neural networks learn the same representations? Proceedings of The 1st International Workshop on "Feature Extraction: Modern Questions and Challenges", (NIPS'15, Oral presentation 6.7%).

8. Jacob Gardner, Paul Upchurch, Matt Kusner, **Yixuan Li**, Kilian Weinberger, Kavita Bala and John Hopcroft, Deep Manifold Traversal: Changing Labels with Convolutional Features. arXiv cs.LG/1511.06421.
9. **Yixuan Li**, Oscar Martinez, Xing Chen, Yi Li and John Hopcroft, In a World that Counts: Clustering and Detecting Fake Social Engagement at Scale. In proceedings of the 25th international conference on World Wide Web (WWW'16). April, Montreal, Canada, 2016.
10. Jiezhong Qiu, **Yixuan Li**, Jie Tang, Zheng Lu, Hao Ye, Bo Chen, Qiang Yang and John Hopcroft, The Lifecycle and Cascade of Social Messaging Groups. In proceedings of the 25th international conference on World Wide Web (WWW'16). April, Montreal, Canada, 2016.
11. Kyle Kloster, **Yixuan Li**, Scalable and Robust Local Community Detection via Adaptive Sub-graph Extraction and Diffusions. Preprint on arXiv.
12. **Yixuan Li**, Kun He, David Bindel and John Hopcroft, Overlapping Community Detection via Local Spectral Clustering, Journal preprint on arXiv, cs.SI:1509.07996, September 2015.
13. **Yixuan Li**, Kun He, David Bindel and John Hopcroft, Uncovering the Small Community Structure in Large Networks: A Local Spectral Approach. In proceedings of the International Conference on World Wide Web (WWW'15), May 2015, Florence, Italy. (acceptance ratio: 14.1%)
14. Kun He, Yiwei Sun, David Bindel and John Hopcroft, **Yixuan Li**, Detecting Overlapping Communities from Local Spectral Subspaces. In proceedings of the International Conference on Data Mining (ICDM'15), November 2015, Atlantic City, NJ, USA. (acceptance ratio 18.2%)
15. J. Zhang, **Yixuan Li**, Z. Liu, F. Wu, F. Yang, Xinbing Wang, On Multicast Capacity and Delay in Cognitive Radio Mobile Ad-hoc Networks, in IEEE Transactions on Wireless Communications (TWC), 2015.
16. **Yixuan Li**, Qiuyu Peng and Xinbing Wang, Multicast Capacity With Max-Min Fairness for Heterogeneous Networks, in IEEE/ACM Transactions on Networking (TON), 2014.

TALKS & PRESENTATIONS

1. "Snapshot Ensembles: Train 1 Get M for Free", Women in Machine Learning (WiML) Workshop, December 2017, Long Beach, CA.
2. "Towards Understanding the Inner Workings of Deep Neural Networks", Grace Hopper Celebration, Artificial Intelligence track, October 4, 2017. Orlando, FL.
3. "Deep Neural Networks for Visual Recognition: Efficiency, Transparency and Reliability", PhD defense talk, October 2, 2017, Ithaca, NY
4. "Towards Understanding, Improving and Scaling Learning in Deep Neural Networks", Invited Talk at Computer Vision Group at Cornell Tech, January 2017, New York City, NY.
5. "Scale, Improve and Understand Learning Through Subspace Embedding", PhD Thesis Proposal Exam, August 2016, Ithaca, NY.
6. "In a World That Counts: Clustering and Detecting Fake Social Engagement at Scale", Oral Presentation at the 25th International World Wide Web Conference (WWW'16), April 2016, Montreal, Canada.
7. "Convergent Learning: Do different neural networks learn the same representations?" Invited Talk at Cornell Statistics Student Seminar, March 2016, Ithaca, NY.
8. "Local Spectral Graph Clustering at Scale: Principle and Its Application" Invited Talk at Google Research NYC, February 2016, New York City, NY.

9. "Convergent Learning: Do different neural networks learn the same representations?" Cornell Machine Learning Discussion Group (MLDG), December 2015, Ithaca, NY.
10. "Convergent Learning: Do different neural networks learn the same representations?" NIPS'15 Workshop on Feature Extraction (Oral Presentation 6.7%), December 2015, Montreal, Canada.
11. Workshop on Information in Networks (WIN'15), October 2015, New York, NY.
12. Computational Social Science Conference at Cornell, September 2015, Ithaca, NY.
13. "Uncovering the Small Community Structure in Large Networks: A Local Spectral Approach", Poster presentation at Google PhD Intern Research Conference (PIRC'15), July 2015, Mountain View, CA.
14. Google Women in Engineering (GWE'15) "We Are GWE" Intern Summit, July 2015, Mountain View, CA.
15. "Uncovering the Small Community Structure in Large Networks: A Local Spectral Approach", Oral Presentation at the 24th International World Wide Web Conference (WWW'15), May 2015, Florence, Italy.

PEER REVIEWED JOURNAL/CONFERENCES

- *IEEE Transactions on Knowledge and Data Engineering* (TKDE)
- *ACM Transactions on the Web* (TWEB)
- *IEEE Transactions on Intelligent Systems and Technology* (TIST)
- *IEEE Transactions on Big Data* (TBD)
- *IEEE Systems Journal*
- *Neural Information Processing System* (NIPS'16)
- *AAAI Conference 2017*
- *Pattern Recognition* (PR)
- *Women in Machine Learning Workshop* (WiML'17)

AWARDS & HONORS

- ACM-Women Scholarship 2017
- Rising Stars in EECS 2017
- D. E. Shaw Exploration Fellowship 2017
- Student Travel Award, International Conference on Learning Representation 2017
- Cornell Graduate Student Conference Grant (ICLR'17) 2017
- Cornell Graduate Student Conference Grant (WWW'15, ICDM'15) 2015
- Cornell University Graduate School Fellowship 2013
- Academic Excellence Scholarship of Shanghai Jiao Tong University (Top 3%) 2012
- National Scholarship of China (Top 3%) 2012
- Meritorious Winner in the American Interdisciplinary Contest in Modeling (Top 10%) 2012
- First Prize in China Undergraduate Mathematical Contest in Modeling (Top 1%) 2011
- National Scholarship of China (Top 3%) 2011
- Academic Excellence Scholarship of Shanghai Jiao Tong University (Top 1%) 2011
- Shanghai Jiao Tong University Scholarship for Studying Abroad 2011
- Academic Excellence Scholarship of Shanghai Jiao Tong University (Top 5%) 2010
- Wen-Yuan Pan Scholarship (1 out of 105) 2010
- Second Prize in National Physics Competition for Undergraduate Students (Top 10%) 2010

LEADERSHIP

Vice President

Technology Entrepreneurship at Cornell University (TEC Club)

Sept. 2014 - Nov. 2016

Ithaca, NY, USA

- Organize events for Cornell students, professors, business leaders and alumni who are interested in entrepreneurship.
- Coordinated on a series of campus events including Cornell Pitch Bootcamp, startup workshops, panel discussion on startup laws, and entrepreneur networking events.

Vice President

Cornell Chinese Student and Scholar Association (CSSA)

Apr. 2015 - Apr. 2016

Ithaca, NY, USA

- Schedule and coordinate events and facilities campus activities for over 2,000 Chinese students.
- Work with other executive officers on delegation of tasks, appointing committees, establishing meeting agenda and fundraising etc.

Vice President

Shanghai Jiaotong University International Communication Association (SICA)

Sept. 2011 - Nov. 2012

Shanghai, China

- Co-founded SICA, a student organization aiming for increasing cross-cultural interactions between foreign exchange students and local Chinese students.
- Organized activities including buddy programs, networking events.

TEACHING

Head Teaching Assistant

Cornell University, Instructor: John Hopcroft

Feb. 2015 - Jun. 2015

Ithaca, NY, USA

CS 4850: Mathematical Foundations for the Information Age

- Organized weekly grading sessions, coordinated among 8 other course TAs, held tutoring sessions.
- Managed and maintained the course website.

MENTORED PROJECTS

1. Jiezhong Qiu. "The Lifecycle and Cascade of Social Messaging Groups". Summer Research Project, 2015 (Visiting student from Tsinghua University, China)
2. Lingfei He, Bonan Dong, Jiankun Lu, Xianqiang Gu, Jiangyu Mao, Changsong Li, Jia Zhang, Ziyang Tang. "CSSA Career Development Website Project". CS 5150: Software Engineering course project, Fall 2015.

COURSE HIGHLIGHTS

- CS6825 The Science Base for the Information Age, Fall 2013
- CS4820 Introduction to Analysis of Algorithms, Spring 2014
- CS6784 Advanced Topics in Machine Learning, Spring 2014
- CS5320 Introduction to Database Systems, Fall 2014
- INFO6010 Computational Methods for Information Science Research, Spring 2015
- NBA5070 Entrepreneurship for Scientists and Engineers, Spring 2015
- CS6783 Machine Learning Theory, Fall 2015
- CS6784 Advanced Topics in Machine Learning, Spring 2016

TECHNICAL STRENGTHS

Programming Languages

Databases

Deep Learning Tools

Visualization Tools

Python (proficiency), C/C++ (proficiency), Shell Script, MATLAB

MySQL, NoSQL, MapReduce, Hadoop, Neo4j

TensorFlow, BLVC Caffe, Theano, Keras

Gephi, Seaborn, Matplotlib, Mayavi, D3.js

Last updated: February 25, 2018