

Guang-He Lee

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Education

Massachusetts Institute of Technology (MIT)

Cambridge, MA

PH.D. IN COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE LABORATORY (CSAIL)

2017 - now

- Advisor: Tommi S. Jaakkola
- GPA: 4.0/4.0; Courses: Nonlinear Optimization, Inference and Information, Algorithms for Inference, Computer Networks

National Taiwan University (NTU)

Taipei, Taiwan

M.S./B.S. IN DEPT. OF COMPUTER SCIENCE AND INFORMATION ENGINEERING (CSIE)

2016 - 2017/2011 - 2015

- (M.S.) Advisor: Yun-Nung (Vivian) Chen. Thesis: Unsupervised Sense Representation by Reinforcement Learning [PDF]
- (B.S.) GPA: 4.2/4.3; Rank: 2/111; Straight A+ in undergraduate CSIE courses.
- Selected Courses (All A+): Machine Learning, Machine Learning: Theory and Practice (KDD Cup), Machine Learning and Having it Deep and Structured, Natural Language Processing, Social Network Analysis, Web Retrieval and Mining, Parallel Programming.
- Programming Language: C/C++, Python, Matlab; Tool: Scikit-Learn, OpenMP, Pthread, TensorFlow, Caffe, Latex.

Papers and Patents

CONFERENCE PAPERS

- [1] [Guang-He Lee*](#), [Yonglong Tian*](#), [Hao He*](#), [Chen-Yu Hsu](#), and [Dina Katabi](#), “RF-Based Fall Monitoring Using Convolutional Neural Networks” (to appear) in *ACM International Joint Conference on Pervasive and Ubiquitous Computing (Ubicomp’18 / IMWUT)*
- [2] [Guang-He Lee](#) and [Yun-Nung Chen](#), “MUSE: Modularizing Unsupervised Sense Embeddings” in *Proc. of the 2017 Conference on Empirical Methods in Natural Language Processing (EMNLP)* (acceptance rate: 22.8%), pages 327-337, Sep. 2017. ACL. [PDF]
- [3] [Guang-He Lee](#), [Shao-Wen Yang](#), and [Shou-De Lin](#), “Toward Implicit Sample Noise Modeling: Deviation-driven Matrix Factorization,” arXiv preprint. [PDF]
- [4] [Guang-He Lee](#) and [Shou-De Lin](#), “LambdaMF: Learning Nonsmooth Ranking Functions in Matrix Factorization Using Lambda,” in *Proc. of the 2015 IEEE International Conference on Data Mining (ICDM)* (acceptance rate: 18.2%), pages 823-828, Nov. 2015. IEEE. [PDF]

WORKSHOP PAPERS

- [5] [Guang-He Lee](#), [David Alvarez-Melis](#), and [Tommi S. Jaakkola](#), “Game-Theoretic Interpretability for Temporal Modeling” in *the 5th Workshop on Fairness, Accountability, and Transparency in Machine Learning (FAT/ML 2018) at ICML 2018*, Stockholm, Sweden, 2018. [arXiv]
- [6] [Hao He](#), [Hao Wang](#), [Guang-He Lee](#), and [Yonglong Tian](#), “Bayesian Modelling and Monte Carlo Inference for GAN” in *ICML 2018 Workshop on Theoretical Foundations and Applications of Deep Generative Models*, Stockholm, Sweden, 2018. [arXiv (coming soon)]

PENDING PATENT APPLICATIONS

- [7] [Guang-He Lee](#) and [Shao-Wen Yang](#), “Observing the Unobserved: A Multi-modal Approach using Missing Data Tensor Factorization,” international patent filing application under Patent Cooperation Treaty (PCT): PCT/US2015/049110.
- [8] [Guang-He Lee](#) and [Shao-Wen Yang](#), “Interactive Sampling Monitoring for Low-power IOT using Discriminative Probabilistic Tensor Factorization,” international patent filing application under PCT: PCT/US2015/000390.
- [9] [Guang-He Lee](#), [Kalpana Algotar](#), [Shao-Wen Yang](#), and [Addicam Sanjay](#), “Ultra-reliable Indoor Positioning using Random Forests with Temporal Bagging,” international patent filing application under PCT: PCT/US2015/067244.
- [10] [Yu-An Chung](#), [Guang-He Lee](#), and [Shao-Wen Yang](#), “Cost-Sensitive Classification with Deep Learning using Cost Aware Pre-Training,” U.S. patent filing application: P88497/14/757,959.

Honors and Awards

Best Master Thesis Award

ACLCLP

- Recognizes the Best Master Thesis in NLP research among all universities in Taiwan.

2017

Best Master Thesis Award

TAAI

- Recognizes the Best Master Thesis in AI research among all universities in Taiwan.

2017

Presidential Awards (8 times)

NTU

- Recognizes students with top 5% GPA in each department in each semester.

2011-2015 (every semester)

The Honorary Member of the Phi Tau Phi Scholastic Honor Society

Phi Tau Phi Scholastic Honor Society

- Honors top 1% of undergraduate graduands in academic performance and moral conduct among about 300 graduands in the College of EECS at NTU.

2015

Microsoft-IEEE Young Fellowship

Microsoft Research Asia and IEEE

- Recognizes prominent young researchers in Asia (3 recipients in Taiwan).

2014

Irving T. Ho Memorial Scholarship

Irving T. Ho Memorial Foundation

- Awards to top undergraduate students in the College of EECS at NTU (4 recipients in 2013 and 2 recipients in 2014).

2013 and 2014

Research Experience

Machine Intelligence and Understanding Lab, National Taiwan University

Taipei, Taiwan

MASTER'S STUDENT (ADVISOR: PROF. YUN-NUNG (VIVIAN) CHEN)

Oct. 2016 - Jul. 2017

1. MUSE: Modularizing Unsupervised Sense Embeddings

- MUSE is the first system to exploit reinforcement learning to model the decision process for unsupervised sense selection.
- MUSE improves time complexity on purely sense-level representation learning method from exponential to linear.
- Achieved state-of-the-art performance on contextual word similarities and 16% improvement on synonym selection to prior art.

Intel Labs, Intel Corporation

Taipei, Taiwan

RESEARCH INTERN (MANAGER: DR. YEN-KUANG CHEN; MENTOR: DR. SHAO-WEN YANG)

Jun. 2015 - Sep. 2015

1. Robust Machine Learning for Heteroscedasticity:

- Proved that the noises upon data are almost surely diverse given continuous and stochastic noises.
- Proposed a novel low-rank noise structure for factorization models to model the heteroscedasticity, c.f. a sparse structure.
- Proposed a novel uncertainty modeling framework for tree-based model using gradient boosting.
- Achieved 7 times faster training time and significantly lower error than the state-of-the-art deep learning model.

2. Passive RFID tracking in retail stores:

- Invited to visit Hillsboro (Oregon), Chandler (Arizona) and Santa Clara (California) offices to cooperate with the IoT Group.
- Passive RFID data are unreliable due to lack of internal power source; thus precise tracking of thousands of clothes is hard.
- Proposed a temporally smoothed random forest model with an empirical 90% accuracy using multi-store real data.

3. Cost-sensitive Deep Learning:

- Designed a deep learning model to embed cost information in the pre-training and training stage.
- Achieved superior performance to the Bayes, one-sided regression, and standard deep learning methods in 7 out of 8 datasets.

Machine Discovery and Social Network Mining Lab, National Taiwan University

Taipei, Taiwan

RESEARCH ASSISTANT (ADVISOR: PROF. SHOU-DE LIN)

Feb. 2014 - Jun. 2015

1. Learning-to-Rank (LTR) Matrix Factorization (MF):

- Proposed to optimize ranking in MF directly by lambda gradient, compared with existing approximation and bounding methods.
- Proved that there is a divergent effect on directly combining lambda gradient with MF.
- Proposed a stable formulation for lambda gradient on MF and a faster training algorithm from $O(N \log N)$ to $O(1)$ for a pair of data.

2. Heterogeneous Transfer Learning for Convolutional Neural Network (CNN) in Super Resolution (SR):

- Designed a transfer learning procedure for CNN among heterogeneous tasks.
- Achieved 11.54 times faster training time by transferring CNN from object recognition to super resolution.

3. KDD Cup 2014 for predicting promising projects for DonorsChoose.org (Rank 12/472), jointly advised by Prof. Chih-Jen Lin:

- Proposed the most accurate validation set in NTU team by analyzing the temporal relationship in data.
- Created the best single model in NTU team by designing a joint feature weighting and selection procedure for random forest.

4. Multi-round Multi-party Influence Maximization (IM) in Social Network:

- Proposed a Genetic Algorithm model for IM, which is NP-hard.
- Achieved superior performance to the Greedy Algorithm, which holds currently the best theoretical approximation factor in PTIME.

Professional and Extracurricular Activity

Program Committee Member

- 33rd AAAI Conference on Artificial Intelligence (AAAI 2019)

Reviewer

- 2018 ICML workshop on Theoretical Foundations and Applications of Deep Generative Models

Teaching Assistant

- Applied Machine Learning, instructed by Prof. Tommi Jaakkola and Regina Barzilay

Dept. of IDSS, MIT

2018

Teaching Assistant

- Algorithm Design and Analysis, Fall 2013 (82 students), instructed by Prof. Hsin-Mu Tsai.
- Machine Discovery, Fall 2016 (90 students), instructed by Prof. Shou-De Lin.
- Intelligent Conversational Bot, Spring 2017 (88 students), instructed by Prof. Yun-Nung Chen.

Dept. of CSIE, NTU

2013, 2016, and 2017

Student Volunteer

CHARITY CAMP FOR COUNTRYSIDE ELEMENTARY SCHOOL

- Raised 40 ukuleles and taught disadvantaged children to play ukulele.

Ukulele Club, NTU

2014

Director of Team Mentors

NTU CSIE CAMP FOR SENIOR HIGH SCHOOL STUDENTS

- Led 20 mentors (college students) to train 100 participated senior high school students on basic computer science.

Dept. of CSIE, NTU

2012