

Hsuan-Tien Lin

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EDUCATION

California Institute of Technology, Pasadena, CA, USA

Ph.D. in Computer Science June 2008
Dissertation: “From Ordinal Ranking to Binary Classification”
M.S. in Computer Science June 2005
Thesis: “Infinite Ensemble Learning with Support Vector Machines”
GPA 4.2/4.0; Member of the Learning Systems Group; Advisor: Professor Yaser S. Abu-Mostafa

National Taiwan University, Taipei, Taiwan

B.S. in Computer Science and Information Engineering June 2001
GPA 4.0/4.0; Ranked 1st out of 78, with 7 President’s Awards (top 5% each semester);
Member of the Machine Learning and Data Mining Group; Advisor: Professor Chih-Jen Lin

RESEARCH INTERESTS

- Machine Learning Theory: Analyzing the generalization performance of learning systems
- Machine Learning Algorithms: Improving existing algorithms including boosting, neural networks, support vector machines; proposing more efficient and more effective learning algorithms
- Machine Learning Applications: Designing practical machine learning solutions that suit specific application needs

JOURNAL PAPERS

- [J3] **H.-T. Lin** and L. Li. “Support Vector Machinery for Infinite Ensemble Learning.” *Journal of Machine Learning Research*, 9(2), 285–312, 2008.
- [J2] **H.-T. Lin**, C.-J. Lin, and R. C. Weng. “A Note on Platt’s Probabilistic Outputs for Support Vector Machines.” *Machine Learning*, 68(3), 267–276, 2007.
- [J1] S.-P. Liao, **H.-T. Lin**, and C.-J. Lin. “A Note on the Decomposition Methods for Support Vector Regression.” *Neural Computation*, 14(6), 1267–1281, 2002.

REFEREED CONFERENCE AND WORKSHOP PAPERS

- [C8] L. Li and **H.-T. Lin**. “Optimizing 0/1 Loss for Perceptrons by Random Coordinate Descent.” In *Proceedings of the 2007 International Joint Conference on Neural Networks (IJCNN 2007)*, 749–754, IEEE, 2007.
- [C7] L. Li and **H.-T. Lin**. “Ordinal Regression by Extended Binary Classification.” In B. Schölkopf et al., eds., *Advances in Neural Information Processing Systems 19: Proceedings of the 2006 Conference (NIPS 2006)*, 865–872, MIT Press, 2007.
- [C6] **H.-T. Lin** and L. Li. “Large-Margin Thresholded Ensembles for Ordinal Regression: Theory and Practice.” In J. Balczár et al., eds., *Algorithmic Learning Theory: ALT 2006*, vol. 4264 of *LNAI*, 319–333, Springer-Verlag, 2006.

- [C5] **H.-T. Lin** and L. Li. “Novel Distance-Based SVM Kernels for Infinite Ensemble Learning.” In *Proceedings of the 12th International Conference on Neural Information Processing (ICONIP 2005)*, 761–766, 2005.
- [C4] **H.-T. Lin** and L. Li. “Analysis of SAGE Results with Combined Learning Techniques.” In P. Berka and B. Crémilleux, eds., *Proceedings of the ECML/PKDD 2005 Discovery Challenge*, 102–113, 2005.
- [C3] **H.-T. Lin** and L. Li. “Infinite Ensemble Learning with Support Vector Machines.” In J. Gama et al., eds., *Machine Learning: ECML 2005*, vol. 3720 of *LNAI*, 242–254, Springer-Verlag, 2005.
- [C2] L. Li, A. Pratap, **H.-T. Lin**, and Y. S. Abu-Mostafa. “Improving Generalization by Data Categorization.” In A. Jorge et al., eds., *Knowledge Discovery in Databases: PKDD 2005*, vol. 3721 of *LNAI*, 157–168, Springer-Verlag, 2005.
- [C1] S.-P. Liao, **H.-T. Lin**, and C.-J. Lin. “A Note on the Decomposition Methods for Support Vector Regression.” In *Proceedings of the 2001 International Joint Conference on Neural Networks (IJCNN 2001)*, 1474–1479, IEEE/Omnipress, 2001.

OTHER PAPERS

- [O3] **H.-T. Lin**. “From Ordinal Ranking to Binary Classification.” Doctoral Dissertation. California Institute of Technology, May 2008.
- [O2] **H.-T. Lin**. “Infinite Ensemble Learning with Support Vector Machines.” Master’s Thesis. California Institute of Technology, May 2005.
- [O1] **H.-T. Lin** and C.-J. Lin. “A Study on Sigmoid Kernels for SVM and the Training of non-PSD Kernels by SMO-type Methods.” Technical Report. National Taiwan University, March 2003.

INVITED TALKS

- | | |
|---|------------|
| From Ordinal Ranking to Binary Classification
Department of Computer Science,
National Tsing Hua University, Hsinchu, Taiwan | March 2008 |
| From Ordinal Ranking to Binary Classification
Department of Computer Science,
National Chiao Tung University, Hsinchu, Taiwan | March 2008 |
| From Ordinal Ranking to Binary Classification
Department of Computer Science and Information Engineering,
National Taiwan University, Taipei, Taiwan | March 2008 |
| From Ordinal Ranking to Binary Classification
Computer Science Department,
California Institute of Technology, Pasadena, CA, USA | March 2008 |
| Automatic Ranking by Extended Binary Classification
Institute of Information Science,
Academia Sinica, Taipei, Taiwan | March 2007 |

- Automatic Ranking by Extended Binary Classification** November 2006
Electrical Engineering Department,
California Institute of Technology, Pasadena, CA, USA
- Introduction to Support Vector Machines** November 2005
Speech Processing Laboratory,
National Taiwan University, Taipei, Taiwan
- Infinite Ensemble Learning with Support Vector Machinery** September 2005
Caltech Second Symposium on Vision and Learning,
California Institute of Technology, Pasadena, CA, USA
- Introduction to Boosting and Joint Boosting** April 2005
Guest Lecture for EE148 Class: “Machine Learning for Computer Vision”,
California Institute of Technology, Pasadena, CA, USA

RESEARCH EXPERIENCE

California Institute of Technology, Pasadena, CA, USA

Research Assistant to Professor Yaser S. Abu-Mostafa July 2003–Present

- Studied the connections between ordinal ranking and traditional machine learning setups, including binary classification, multiclass classification, and metric regression; derived new theoretical and algorithmic results that facilitate the design of better techniques for ordinal ranking
- Proposed the thresholded ensemble model for ordinal ranking and theoretically analyzed its generalization properties; designed a family of fast and robust algorithms for the thresholded ensemble model and applied them on real-world data sets
- Adapted the support vector machinery (SVM) to solve the infinite ensemble learning problem; derived novel kernels for SVM from an ensemble perspective and experimentally compared them with existing ensemble learning approaches in a fair setup; demonstrated the relative advantages and disadvantages of SVM
- Studied the behavior of learning algorithms on noisy or hard examples; proposed a new data categorization method that distinguishes those examples from the easy ones to improve the generalization performance of learning systems

National Taiwan University, Taipei, Taiwan

Research Assistant to Professor Chih-Jen Lin March 2003–June 2003

- Improved the probability estimate routine for binary SVM; proposed a faster and more stable algorithm which became a core part of many real-world SVM applications
- Analyzed the sigmoid kernel for SVM and studied its behavior in different parameters; provided insights and guidelines for its practical usage
- Implemented and evaluated several new and experimental features, including routines for computing decision values and probability estimates, for the world-famous SVM software LIBSVM

National Taiwan University, Taipei, Taiwan

Research Assistant to Professor Chih-Jen Lin September 2000–June 2001

- Conducted research towards designing and implementing a better open-source software for SVM; analyzed the algorithms for support vector regression (SVR) and demonstrated the usefulness of

a simpler choice

- Applied SVR to predict the aqueous solubility of molecules and showed that SVR could achieve better performance over existing approaches

TEACHING EXPERIENCE

California Institute of Technology, Pasadena, CA, USA

Teaching Assistant to Professor Yaser S. Abu-Mostafa: Learning Systems (CS156b) Winter 07-08

- Designed new projects with the Netflix movie ranking challenge in order to give the students solid experience on state-of-the-art learning systems
- Discussed actively with students in class, by appointments, through email, and using the course forum online
- Delivered lectures on the background knowledge needed for the project; guided the students step by step in conquering the project tasks

California Institute of Technology, Pasadena, CA, USA

Teaching Assistant to Professor Yaser S. Abu-Mostafa: Learning Systems (CS156a) Fall 07-08

- Answered daily email queries from a class of size 90+; scheduled appointments to help students on course materials and homework sets
- Was rated between 6.1 to 6.6 (good to excellent) in all aspects (enthusiasm, ability, recommendation level, etc.) by students in the teaching quality feedback report
- Created new homework problems and discussed with the instructor about course plans to improve the quality of the class
- Compiled lecture notes on theoretical materials and wrote a more intuitive proof for the theorem

California Institute of Technology, Pasadena, CA, USA

Teaching Assistant to Professor Erik Winfree: Information and Complexity (CS129b) Winter 06-07

- Designed fresh homework problems as course dynamically proceeded
- Held 2+ hours of TA sessions, graded homework sets, and compiled sample solutions bi-weekly

California Institute of Technology, Pasadena, CA, USA

Teaching Assistant to Professor Yaser S. Abu-Mostafa: Information and Complexity (CS129a)

Fall 04-05, Fall 06-07

- Acted as the head TA and held 2+ hours of TA session bi-weekly; discussed actively with students on course material and homework problems
- Graded homework sets bi-weekly and helped the other TAs maintain the fairness and efficiency of grading

OTHER EXPERIENCE

Defense Office, Kinmen, Taiwan

Personnel Officer (Second Lieutenant)

July 2001–March 2003

- Specialized in handling personal affairs of all 20,000+ soldiers allocated at this frontier of Taiwan, including assigning new soldiers to different units based on their trained skills, ensuring that each unit has sufficient number of people to complete its missions, and calculating the expected retirement days of soldiers

- Combined my expertise in personnel affairs and programming and wrote MilitaryCal, a javascript program that became one of the most popular public resources for soldiers to compute their retirement dates accurately (50,000+ page views monthly)

Websurf Company, Taipei, Taiwan

Project Manager

June 2000–May 2001

- Led an investigation team of 3 people to build the prototype of an http-based forum system with an open protocol compatible with existing telnet-based forum systems in Taiwan

Professional Technology Temple BBS System (PTT), Taipei, Taiwan

Root and Core Administrator

January 1998–May 2001

- Collaborated with a team of 8+ administrators to manage one of the largest bulletin board systems in Taiwan (around 120,000 registered users at that time)
- Developed new features for the system, made professional decisions, and as a result doubled the number of concurrent users online (2,000 \Rightarrow 4,000) during my course as the root

Attila Company, Taipei, Taiwan

Chief Technology Officer

December 1999–October 2000

- Formed a development team of 3 people to create an integrated software that was specifically designed for insurance salesperson for handling personal scheduling and financial affairs

SELECTED HONORS

Caltech Engineering and Applied Science Division Fellowship	2005–2007
Caltech Bechtel Fellowship	2003
President's Award, National Taiwan University (7 times, i.e., within the top 5% of the class consecutively in all 7 semesters)	1997–2001
First Prize, NTU-CIE Student Paper Competition in Computer Science (with S.-P. Liao)	2001
Second Prize, Trend Million-Dollar Internet Programming Contest (with L.-C. Kung, K.-P. Chen, G.-W. Liu, C.-Y. Wu, and J. Lin)	2000
Asia Champion, ACM International Collegiate Programming Contest (also worldwide 10th prize, with L.-C. Kung and K.-P. Chen)	1999
First Prize, National Collegiate Programming Contest of Taiwan (with L.-C. Kung and K.-P. Chen)	1999
Champion, ACM Asia Regional Collegiate Programming Contest (Taipei site, with L.-C. Kung and K.-P. Chen)	1998
First Prize, National Collegiate Programming Contest of Taiwan (with L.-C. Kung and K.-P. Chen)	1998

PROFESSIONAL ACTIVITIES

Journal Paper Reviewer

- IEEE Transactions on Neural Networks

- IEEE Transactions on Pattern Analysis and Machine Intelligence
- Neurocomputing Journal
- International Journal of Computational Intelligence Research
- IEEE Transactions on Systems, Man and Cybernetics
- International Journal of Remote Sensing

Conference Paper Reviewer

- IEEE World Congress on Computational Intelligence (WCCI) 2008
- Conference on Neural Information Processing Systems (NIPS) 2007
- International Conference on Neural Information Processing (ICONIP) 2006
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2006
- Intl. Conf. on Intelligent Sensors, Sensor Network and Information Processing (ISSNIP) 2005
- Taiwanese Conference on Artificial Intelligence and Applications (TAAI) 2004

Technical Discussion Forum Moderator

Kernel Machines Blackboard (<http://kernel-machines.org>) 2006–Present

- Removed spam posts from this major online community of machine learning daily; contributed to the forum with 8% of the total posts and answered technical questions ranging from learning theory to practical software usage

Mentor and Student Performance Evaluator

Ministry of Education of Taiwan (scholarship for talented student program) 2007–2008

- Interviewed a talented undergraduate student in the program and evaluated his study performance and future plans; provided concrete suggestions on how to help the student achieve a higher goal

Student Member of the Graduate Admission Committee

California Institute of Technology (CS/EE) 2004–2008

- Reviewed 60+ application files each year; selected outstanding ones and referred them to faculty members for further screening
- Interviewed the applicants during their campus visits and assessed whether they matched the research environment at Caltech; provided independent judgements and wrote interview reports to help faculty members make the final decision

REFERENCES**Professor Yaser S. Abu-Mostafa**

Professor of Electrical Engineering & Computer Science
California Institute of Technology

Address: 1200 E California Blvd., MC 136-93, Pasadena, CA 91125, USA
Phone: +1(626)395-4842
Email: yaser@caltech.edu

Advisor for M.S./Ph.D. studies & the instructor for the CS129a “Information and Complexity” and the CS156ab “Learning Systems” classes

Professor Chih-Jen Lin

Professor of Computer Science and Information Engineering
National Taiwan University

Address: Room 413, Dept. of Computer Science, National Taiwan University, Taipei, 106, Taiwan
Phone: +886(2)2362-5336x413
Email: cjlin@csie.ntu.edu.tw

Advisor for undergraduate research

Professor Pietro Perona

Professor of Electrical Engineering & Computation and Neural Systems
California Institute of Technology

Address: 1200 E California Blvd., MC 136-93, Pasadena, CA 91125, USA
Phone: +1(626)395-2084
Secretary: Ms. Andrea Boyle (andrea@vision.caltech.edu) – *suggested for general contacts*
Personal Email: perona@caltech.edu

Ph.D. thesis committee member & the instructor for the EE148 “Machine Learning for Computer Vision” class

Professor Jehoshua (Shuki) Bruck

Gordon and Betty Moore Professor of Computation and Neural Systems & Electrical Engineering
California Institute of Technology

Address: 1200 E California Blvd., MC 136-93, Pasadena, CA 91125, USA
Phone: +1(626)395-4852
Email: bruck@caltech.edu

Ph.D. thesis committee member & the instructor for the CNS188a “Computation Theory and Neural Systems” class