Wei Dai (David)

CONTACT INFORMATION

Machine Learning Department, Carnegie Mellon University — Email: wdai@cs.cmu.edu
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RESEARCH INTERESTS

Large-scale machine learning, parallel machine learning algorithms and theory

EDUCATION

Carnegie Mellon University, Pittsburgh, PA

Ph.D. Candidate — **2012 – Present**

- Expected graduation date: May 2017
- Department: Machine Learning, School of Computer Science

California Institute of Technology, Pasadena, CA

Bachelor of Science (Computer Science) — **2012**

Honor

Wesleyan University, Middletown, CT

Bachelor of Art (Physics and Mathematics) — **2010**

High Honor

EMPLOYEMENT

Facebook, Menlo Park, CA

Software Engineering Intern — **May 2015 – Aug 2015**

· Developed a distributed machine learning backend for large-scale logistic regression solved by LBFGS using Petuum parameter server.

· Benchmarked Petuum against Facebook's internal system and open-sourced Vowpal Wabbit; showed that Petuum achieves high system throughput and comparable to better trained models.

Google, Pittsburgh, PA

Software Engineering Intern — **May 2013 – August 2013**

· Contributed to the Ad Quality backend; developed hyperparameter-tuning framework to optimize SmartAds training system with convex and non-convex optimization algorithm; built a web frontend for other teams to interface with the framework.

LinkedIn, Mountain View, CA

Software Developer Intern — **June 2012 – August 2012**

· Implemented several background tasks in the payment backend using Java, Oracle SQL, Python, and Spring Framework.

OpenX, Pasadena, CA

Software Developer Intern — **April 2012 – June 2012**

· Simulated large number of users to load-test several internal servers using Erlang and Tsung; developed Tsung modules to enable Thrift protocols.

Caltech Computer Science Department, Pasadena, CA

Research Assistant — **June 2011 – September 2011**

· Contributed to the Community Seismic Network project which uses machine learning algorithms to detect earthquakes on smartphones and other distributed sensors.

· Applied *coreset* to training Gaussian mixture model with expectation-maximization (EM) algorithm on smartphone acceleration data.

Teaching Assistant **March 2011 – March 2012**

· Held weekly Office Hour and grade students' work for Computer Language Shop on C programming language.

Argus Information & Advisory LLC, White Plains, NY

Summer Analyst Intern **June 2010 – August 2010**

· Benchmarked U.S. credit card issuers' performances and provided customer management strategies based on account-level data analysis using MySQL.

· Developed Microsoft Power Point VBA to streamline the presentation production.

Wesleyan University Physics Department, Middletown, CT

Research Assistant **January, 2008 – May 2010**

· Simulated, using a computer cluster, a system of nano-particles modified by multiple single strand DNA that exhibits versatile properties with promising future applications.

· Published two papers on Langmuir and Soft Matter.

Teaching Assistant **September 2008 – May 2009**

· Oversaw weekly introductory physics lab.

· Conducted weekly problem solving sessions for math course: Vectors and Matrices.

Wesleyan University, Office of Residential Life, Middletown, CT

Residential Advisor **September 2009 – May 2010**

· Fostered diverse community in school dormitories by engaging residents in community activities and creating a safe and supportive residential environment.

Wesleyan University, Scientific Computing and Informatics Center, Middletown, CT

Tutor **September 2009 – May 2010**

· Provided tutoring for scientific programming such as C, Python, Mathematica, and computer graphing. Also helped students with the university computer cluster.

Wesleyan University, Instructional Media Service, Middletown, CT

Computer Lab Consultant **August 2007 – May 2010**

· Oversaw the school computer lab and assisted students with technical problems. Set up video and audio equipments for campus events.

Wesleyan University, East Asian Studies Department, Middletown, CT

Research Assistant **August 2009 – May 2010**

· Translated and organized historical Chinese documents for research purposes.

Selected Publications

Y. Wang, V. Sadhanala, **W. Dai**, W. Neiswanger, S. Sra, E. P Xing
"Asynchronous Parallel Block-Coordinate Frank-Wolfe"
To appear in International Conference of Machine Learning (ICML), 2016.

J. K. Kim, Q. Ho, S. Lee, X. Zheng, **W. Dai**, G. Gibson, E. P. Xing.
"STRADS: A Distributed Framework for Scheduled Model Parallel Machine Learning"
European Conference on Computer Systems (EuroSys), 2016.

Y. Zhou, Y. Yu, **W. Dai**, Y. Liang, E. P. Xing
"On Convergence of Model Parallel Proximal Gradient Algorithm for Stale Synchronous Parallel

System"
Artificial Intelligence and Statistics (AISTATS), 2016.

E P. Xing, Q. Ho, P. Xie, **W. Dai**
"Strategies and Principles of Distributed Machine Learning on Big Data"
arXiv:1512.09295, 2015.

J. Wei, **W. Dai**, A. Qiao, H. Cui, Q. Ho, G. R. Ganger, P. B. Gibbons, G. A. Gibson, E. P. Xing
"Managed Communication and Consistency for Fast Data-Parallel Iterative Analytics"
ACM Symposium on Cloud Computing (SoCC), 2015. **[Best Paper]**

E. P. Xing, Q. Ho, **W. Dai**, J. K. Kim, J. Wei, S. Lee, X. Zheng, P. Xie, A. Kumar, Y. Yu
"Petuum: A New Platform for Distributed Machine Learning on Big Data"
Knowledge Discovery and Data Mining (KDD), 2015.

J. Yuan, F. Gao, Q. Ho, **W. Dai**, J. Wei, X. Zheng, E. P. Xing, T. Liu, and W. Ma
"LightLDA: Big Topic Models on Modest Compute Cluster"
International World Wide Web Conference (WWW), 2015.

W. Dai, A. Kumar, J. Wei, Q. Ho, G. Gibson, E. P. Xing
"Analysis of High-Performance Distributed ML at Scale through Parameter Server Consistency Models"
AAAI Conference on Artificial Intelligence, 2015 (oral presentation).

H. Cui, A. Tumanov, J. Wei, L. Xu , **W. Dai**, J. Haber-Kucharsky, Q. Ho, G. R Ganger, P. B. Gibbons, G. A. Gibson, E. P Xing
"Exploiting Iterative-ness for Parallel ML Computations"
Symposium on Cloud Computing (SoCC), 2014.

H. Cui, J. Cipar, Q. Ho, J. K. Kim, S. Lee, A. Kumar, J. Wei, **W. Dai**, G. R. Ganger, P. B. Gibbons, G. A. Gibson, E. P. Xing
"Exploiting Bounded Staleness to Speed Up Big Data Analytics"
Annual Technical Conference (ATC), 2014.

W. Dai, J. Wei, X. Zheng, J. K. Kim, S. Lee, J. Yin, Q. Ho, E. P. Xing
"Petuum: A Framework for Iterative-Convergent Distributed ML"
NIPS, Big Learning Workshop, 2013.

W. Dai, S. K. Kumar, F. W. Starr
"Universal two-step crystallization of DNA-Functionalized Nanoparticles"
Soft Matter, Vol. 6, pp. 6130-6135, 2010.

W. Dai, C. W. Hsu, F. Sciortino, F. W. Starr
"Valency Dependence of Polymorphism and Polyamorphism in DNA-Functionalized Nanoparticles"
Langmuir, Vol. 26, pp. 3601-3608, 2010.

W. Dai
"Effect of Valency on the Dynamics and Thermodynamics of DNA-linked Nanoparticles Materials"
Bachelor of Arts Honor Thesis: Wesleyan University, 2010.

Contributed Talks

Carnegie Mellon Univ., 2015 Spring: Gave a lecture for 10-605 Machine Learning with Large Datasets on Parameter Server. Title: Parameter server and stuff that makes large-scale machine learning work.

American Physical Society, March 2010 in Seattle, USA. Title: Phase Behavior of DNA-Functionalized Nanoparticles: Dependence on Number and Orientation of Attached DNA strands.

California Institute of Technology: Summer Undergraduate Research Fellowship Seminar Day, October 2011. Title: A Smartphone that Learns: Toward Adaptive Earthquake Detection on Smartphones. (Advanced to final round in Perpall Speaking Competition.)

Honors and Awards

High Honors from Wesleyan University Physics Department: Awarded for my undergraduate honor thesis work, 2010.

Phi Beta Kappa Admission: A selective academic honor society for distinguished students at the nation′s institutions of higher learning, 2010.

Student Prizes at Wesleyan University: Bertman Prize (Physics), Karl Van Dyke Prize (Physics), 2010; Sherman Prize (Mathematics), 2007.

Freeman Asian Scholarship: A four-year full scholarship awarded to two students per country from eleven Asian countries for outstanding scholastic and leadership achievements, 2007.

Programming

C/C++, Matlab, Python, Java, Linux, LaTeX 2_ε