Phone:
1-203-936-8878
Email: joyousprince@gmail.com
Web:
http://cs.yale.edu/homes/wang-huan

Huan Wang

Education

PhD 2013
Supervised by Prof. **Daniel A. Spielman**,
Department of Computer Science,
Yale University, New Haven, U.S.A.

M.Phil 2007
Supervised by Prof. **Xiaoou Tang**,
Multimedia Laboratory, Information Engineering (IE),
The Chinese University of Hong Kong, Hong Kong, China

B. Eng (with honors) 2004
Mixed Honor Class, **Chu Kechen Honors College,**
Information Science and Electrical Engineering (ISEE),
Zhejiang University, Hang Zhou, P. R. China

Working Experience

Research Scientist, Yahoo!Labs, New York	2013-Now
Adjunct Professor (machine learning class), Computer Science Department, New York (Polytech) University	Fall, 2014
Adjunct Professor (algorithm design and data structure class), MFE program, Baruch College, The City University of New York	Fall, 2014
Intern at Microsoft Research, Redmond	2011
Intern at Microsoft Research Asian, Beijing	2010
Teaching Fellow of “Graph and Networks ”, Yale	2010
Teaching Fellow of “Design and Analysis of Algorithms ”, Yale	2010
Teaching Fellow of “Computer Science and Modern Intellectual Agenda”, Yale	2009
Research Assistant, Multimedia Laboratory, CUHK (Quality Migrant Admission Scheme)	2007
Teaching Assistant of ‘Probability Models and Application’, CUHK	2007
Teaching Assistant of ‘Image and Video Processing’, CUHK	2006
Teaching Assistant of ‘Multimedia Coding and Processing’, CUHK	2006

Fields of Interest

- **Machine Learning and Data Mining**
  Dictionary Learning, Compressed Sensing, Graph Theory, Semi-supervised Learning, Subspace Learning, Manifold Analysis, Spectral Analysis, Clustering, Classification, Regression
- **Big Data Analytics**
  Stream Data Analytics, Distributed Learning on top of Apache Spark, Storm, and Hadoop. Big Data Compression and Representation.
- **Computer Vision and Cognition**
  Object/Face Representation and Recognition, Image Registration, Segmentation, Age Estimation

Research Experience*

(Deep) Neural Network on Big Data 2014
- Implemented a simple back-propagation algorithm for the neural network training
- On the production data, the algorithm gives the best performance.

Random Forest on top of Apache Spark and Storm 2014
- Implemented a distributed random forest training algorithm on top of Apache Spark framework
- Testing stage is implemented on top of apache storm
- Encouraging performance on the real-world data.

Approximate Matrix Multiplication 2014
- Approximate large matrix multiplication using randomized algorithms
- Provable performance guarantee

Online K-Nearest Neighbor Classifier on top of Apache Storm 2014
- Designed and implemented an online k-nearest neighbor classifier on top of apache storm.
- Locality sensitive hashing and sketching techniques are used to accelerate the prediction

Dictionary Learning on Large Natural Image Data 2012
- Designed a monotone dictionary learning algorithm with unbalanced coefficient assumptions
- Evaluated the algorithm on natural image data sets

Anomaly Detection in Bing Clusters 2011
- Anomaly detection using the log data generated by the Bing cluster
- Modeled the time series log data using multivariate Brownian Motion

Matrix Decomposition and Dictionary Learning 2010
- Proof on the uniqueness of dictionary learning
- Fast algorithms on the approximate dictionary learning

Curvature Analysis of Image Manifold 2010
- Relation between the Image Derivatives and Image Manifold
- An upper bound on the Image Manifold using Image Bandwidth

Linear Regression by Localized Sample Selection 2009
- A Survey on local sample selection for regression
- Proposed an l_1 based local sample selection algorithm for regression

Graph Construction and Semi-supervised Learning 2008
- A global way of graph construction
- A sparse graph was derived without explicit sparse constraints.

Correspondence Propagation for Image Registration 2007
- Designed a transductive algorithm that utilizes prior knowledge to guide the bipartite matching process
- Derived a closed-form solution that simultaneously preserves feature domain consistency and models geometric distribution.

Factor Analysis for Image Ensembles 2007
- Presented a statistical learning technique, the mode-kn factor analysis, to explore image ensembles.
- Employed statistical Inference for the estimation of pose, illumination and identity
- Enhanced the classification capability by interacting with the process of synthesizing data

Misalignment Robust Face Recognition 2007
- Proposed a misalignment robust framework for subspace learning algorithms to deal with the curse of correspondence problem in face recognition
- Formulated the misalignment correction process as an L1 norm optimization.

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* **Details available at: http://cs.yale.edu/homes/wang-huan/project.html**

Human Age Estimation from Facial Images 2006—2007

- Took the nonnegative and uncertain properties of the human age into consideration
- Formulated the age estimation problem as a two-phase semi-definite programming (SDP).

Semi-supervised Regression on Multi-class/Multi-modality data 2006—2007

- Derived a transductive procedure for the regression problem over multi-class/multi-modality data
- Transduced labels across different class samples to pilot the regression.

Tensor Subspace Analysis for Face Recognition 2006

- Proposed the first convergent solution to Tensor Subspace Learning algorithms
- Integrated Bayesian methods in model learning and inference for pose, illumination and identity estimation
- Evaluated the recognition performance on face databases.

Discriminant Analysis with Applications in Face Recognition and Data Classification 2006

- Presented a novel solution that directly optimizes the trace quotient objective
- Investigated the proposed algorithm systematically on face datasets and machine learning databases.

Manifold Embedding and Clustering 2006

- Proposed a spectral analysis algorithm for image clustering
- Designed a new manifold embedding framework: Maximum Unfolded Embedding.

Error Control Coding (Convolutional Code, Turbo Code and LDPC Code) 2003—2004

- Simulated the encoding and decoding process using C++
- Utilized maximum likelihood (ML/Viterbi) and maximum a posteriori (MAP/BCJR) decoding for the convolutional code.

Embedded System Design and Implementation (a Digital Fiscal Register) 2004

- Designed and implemented an embedded system, including hardware, software drivers and Graphic User Interface (GUI), to facilitate fiscal registration to local computer systems using an IC card.

Micro-Control Unit Design 2002—2003

- Used Schematic and Verilog-HDL in the design process
- Four levels of pipelines
- Implemented using an FPGA.

Publications *

Conference Papers:

[1] Christos Boutsidis, Daniel Hsu, Edo Liberty, and Huan Wang, ‘Fast Matrix Multiplication via One-Side Element-wise Sparsification’, submitted to 9th Annual Machine Learning Symposium, 2015.

[2] Daniel Spielman, Huan Wang, and John Wright, ‘Exact Recovery of Sparse-Used Dictionaries’, Best paper award of the 25th Conference on Learning Theory (COLT), Jun.2012.

[3] Shuicheng Yan, and Huan Wang, ‘Semi-supervised Learning by Sparse Representation’, SIAM International Conference on Data Mining (SDM) Apr. 2009.

[4] Huan Wang, Shuicheng Yan, Thomas Huang and Xiaoou Tang, ‘A Convergent Solution to Tensor Subspace Learning’, International Joint Conferences on Artificial Intelligence (**IJCAI 07 Accepted for Oral presentation**) , Jan. 2007.

[5] Huan Wang, Shuicheng Yan, Jianzhuang Liu, Thomas Huang and Xiaoou Tang, ‘Misalignment Robust Face Recognition’, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR 08**), Jun. 2008.

[6] Huan Wang, Shuicheng Yan, Thomas Huang and Xiaoou Tang, ‘Trace Ratio vs. Ratio Trace for Dimensionality Reduction’, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR 07**), Jun. 2007.

* **I have got 600+ citations. Please visit my google scholar page:** http://scholar.google.com/citations?hl=en&user=7NpTttkAAAAJ

[7] Huan Wang, Shuicheng Yan, Thomas Huang, Jianzhuang Liu and Xiaoou Tang, 'Transductive Regression Piloted by Inter-Manifold Relations', International Conference on Machine Learning (**ICML 07 Accepted for Oral presentation**), Jun. 2007.

[8] Shuicheng Yan, Huan Wang, Thomas Huang and Xiaoou Tang, 'Learning Auto-Structured Regressor from Uncertain Labels', International Conference on Computer Vision (**ICCV 07**), Oct. 2007.

[9] Huan Wang, Shuicheng Yan, Thomas Huang and Xiaoou Tang, 'Maximum Unfolded Embedding: Formulation, Solution, and Application for Image Clustering ', ACM International Conference on Multimedia (**ACM SIGMM06**), Oct. 2006.

[10] Shuicheng Yan, Huan Wang, Thomas Huang and Xiaoou Tang, 'Ranking with Uncertain Labels', IEEE International Conference on Multimedia & Expo (**ICME07 Accepted for Oral presentation**), May. 2007.

[11] Shuicheng Yan, Huan Wang, Xiaoou Tang and Thomas Huang, 'Exploring Feature Descriptors for Face Recognition', IEEE International Conference on Acoustics, Speech, and Signal Processing (**ICASSP07 Accepted for Oral presentation, ~15%**), Apr. 2007.

Journal Papers:

[12] Daniel Spielman, Huan Wang, and John Wright, 'Exact Recovery of Sparse-Used Dictionaries', (arxiv), 2012.

[13] Shuicheng Yan, Huan Wang, Jianzhuang Liu, Xiaoou Tang, and Thomas S. Huang, 'Ranking with Uncertain Labels and Its Applications', Frontiers of Computer Science in China (Journal), 2007.

[14] Shuicheng Yan, Huan Wang, Xiaoou Tang, and Thomas S. Huang, 'Learning Auto-Structured Regressor from Uncertain Labels', IEEE Transactions on Information Forensics and Security (**TIFS**), 2008

[15] Huan Wang, Shuicheng Yan, Jianzhuang Liu, Thomas Huang and Xiaoou Tang, 'Correspondence Propagation with Weak Priors', IEEE Transaction on Image Processing (**TIP**), 2008

[16] Shuicheng Yan, Huan Wang, Xiaoou Tang, and Thomas Huang, 'Synchronized Submanifold Embedding for Person-Independent Pose Estimation and Beyond', IEEE Transaction on Image Processing (**TIP**), 2008.

[17] Shuicheng Yan, Huan Wang, Jilin Tu, Thomas S. Huang, and Xiaoou Tang, 'Mode-kn Factor Analysis for Image Ensembles', IEEE Transactions on Image Processing(**TIP**), 2008.

Thesis:

[18] Huan Wang, 'Dictionary Learning: Algorithms and Analysis', Computer Science Department, Yale University. **(Ph.D Thesis**)

[19] Huan Wang, 'Exploring Intrinsic Structures from Samples: Supervised, Unsupervised, and Semisupervised Frameworks', Department of Information Engineering, the Chinese University of Hong Kong. **(M.Phil Thesis**)

[20] Huan Wang, 'Design and Implementation of an Embedded Fiscal Register', Chu Kechen Honors College, Zhejiang University. (**B.Eng Thesis**)

Academic Service

Reviewer:

International Conference on Machine Learning (ICML2014)
International Conference on Machine Learning (ICML2013)
Emergency External Reviewer for Neural Information Processing Systems Foundation 2013 (NIPS2013)
IEEE Trans. On Image Processing
Neurocomputing (Elsevier)
Pattern Recognition Letters (Elsevier)
IEEE Trans. on Circuits and Systems for Video Technology
IEEE Trans. on Systems, Man and Cybernetics, Part B
International Journal of Computer Mathematics

Organizer:

"Big Data and Stream Analytics" Workshop @ SIAM Conference on Data Mining 2015

Honors & Awards

Chinese Government Award for Outstanding Self-Financed Students Abroad	2013
Best Paper Award at Conference Of Learning Theory (COLT)	2012
Award of Excellence (**Stars of Tomorrow**), Microsoft Research Asia	2010
Fellowship award, Yale University	2008
Studentship award, Chinese University of Hong Kong	2005-2007
Bachelor's degree with Honors, Zhejiang University	2004
Excellent B.Eng Thesis, Zhejiang University	2004
Yongqian Tang Outstanding Student Exchange Fellowship, Zhejiang Univ.	2003
Champion, **University Chorus Competition**, Zhejiang University	2002
Excellence award for moral, intellective and physical merits, Zhejiang University	2001
Excellent Performance Award in Military Training, Zhejiang University	2001
Outstanding Student Scholarship, Zhejiang University	2000-2003
Freshman Award for Academic Excellence, Zhejiang University	2000
Honorary Enrollment, Zhejiang University	2000
First Prize Winner of National Contest of English Competence	1999
Special Prize Winner of National Olympics Contest of Physics	1997
First Prize Winner of National Olympics Contest of Math	1997
Champion, Piano Competition, Zibo, Shandong	1994, 1997
2nd place, Piano Competition, Zibo, Shandong	1993, 1995

Extracurricular Activities & Global Experience

Invited Presentation on IJCAI13 track on Best Papers in Sister Conferences `	2013
Best paper presentation on COLT12, Edinburgh, Britain	2012
Oral presentation on ICML07, Corvallis, OR, USA	2007
Oral presentation on IJCAI07, Hyderabad, India	2007
Cultural Exchange, University of Leeds, Britain	2003
Piano Accompanist for the College Chorus	2001

Engineering Skills

Software Programming

C /C++ /C# / Matlab/Java/ Python, Hadoop/ Spark/Storm, MPI Programming, DirectX Game Programming

Hardware Programming

Verilog HDL / VHDL, CPLD, FPGA programming, Single Chip Programming

Hardware Design

Printed Circuit Board (PCB) Design

Music Related

Piano Playing: Level 10 (Topmost Assessment by Chinese Ministry of Education)

Music Composition