Yijun Huang, Ph.D.

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EDUCATION

Doctor of Engineering, Mechanical and Electrical Engineering
Chinese Academy of Sciences, Shenyang Institute of Automation, China 2005-2010
Thesis - 3D Reconstruction from Multiple Views

Doctor of Engineering: Course Study
University of Science and Technology of China 2005-2006

Bachelor of Engineering, Automation
Nankai University, China 2001-2005

WORKING EXPERIENCES

Volunteer Research Assistant 2014 - Present
University of Rochester, United States

- Develop machine learning models and optimization algorithms for big data problems: feature selection, social media data and medical data analysis for healthcare, active learning.
- Develop AsynML: an asynchronous parallel algorithm package for solving some popular machine learning problems on multi-core / multi-socket systems.

Volunteer Research Assistant 2013 - 2014
University of Wisconsin-Madison, United States

- Develop an asynchronous parallel framework on multi-core / multi-socket system to implement optimization algorithms: deep learning, linear regression, SVM, logistic regression.

Software Engineer 2010 - 2013
Tianjin Jinhang Institute of Computing Technology, China

- Develop real-time computer vision applications on the embedded system: path planing for aircrafts, computer-vision based real-time navigation (visual SLAM) for UAVs, real-time video stabilization for robotic car, real-time communication / control system for aircrafts.

Research Assistant 2006 - 2010
Chinese Academy of Sciences, Shenyang Institute of Automation

- 3D modeling / reconstruction from images, Structure from Motion (SFM), camera calibration.

PROJECTS

Machine learning and optimization algorithms development for big data problems 07/2013 - Now

Project 1: Work with multiple big and complex data sources (from soucial media, health record, business survery, biomedical data, etc), utilize machine learning techniques to build predictive models to meet the pratical needs, and solve these models by designing efficient optimization methods.

- Develop two kinds of sparse feature selection methods: a bilevel exclusive sparsity algorithm, and an exclusive sparsity norm minimization method.
- Develop a range regression algorithm for ordinal labeling problems.
- Develop a predict method for contemporaneous patient risk monitoring by combining longitudinal data that reflect the degeneration of the health condition.
- Analyze Twittes and implement a label propagation method to predict users' health statuses.

Project 2: Develop an asynchronous parallel software framework for multi-core / multi-socket server to implement parallel optimization algorithms / solvers for big data problems in machine learning and scientific computing.

- Build an unlocked asynchronous parallel software framework to manage distributed storage and distributed processing on the multi-core / multi-socket server (Intel Core / Intel Xeon), based on NUMA and POSIX Pthread libraries.
- Implement some popular asynchronous parallel optimization algorithms for big data problems: deep learning, linear system, SVM, LASSO, Logistic regression, etc.

Embedded system development 06/2010 - 05/2013

Project 3: Design a PCIe device (DSP+FPGA) for efficient path planning computing.

- Designed and validated path planing algorithms on PC.
- Accelerated the most-computation intensive part with FPGA (Xilinx Virtex-6).
- Developed parallel implementations of these algorithms on Nvidia GPU.

Project 4: Build real-time computer-vision based navigation / guidance systems for UAVs.

- Designed real-time infrared target recognition and tracking algorithms.
- Designed (V-SLAM) map feature recognition algorithms.
- Implemented these algorithms on DSP/ARM (TI TM320c64x, TI TM320c67x, ADSP210).

Project 5: Develop embedded video stabilization system for robotic car.

- Developed efficient image deblurring algorithms to compensate for video device shake.
- Implemented these algorithms on DSP/ARM.

Project 6: Develop real-time embedded control/communication devices for aviation applications.

- Developed embedded softwares on DSP/ARM for: interfacing with devices (SPI, UART, 1553 bus, and Ethernet interface); testing hardware models; and implementing protocol stacks (e.g., UDP/IP).

Graphics and Computer Vision 07/2006 - 06/2010

Project 7: Develop a 3D modeling system to reconstruct and visualize the target object from an image sequence.

- Implement an Space Carving based method to obtain the complete 3D digital model of the target object from an image sequence;
- Proposed an efficient method for constructing the 3D visual hull of the object.

Project 8: Develop an image-based measurement system for rail tankers.

- Develop a high accuracy 3D reconstruction method for our applications;
- Calibrated cameras;
- Proposed a uniform structure from motion (SFM) framework based on multifocal tensors.

PUBLICATIONS

- **Y. Huang** and J. Liu, "Exclusive Sparsity Norm Minimization with Random Groups via Cone Projection", 2017. ArXiv:1510.07925 (accepted by IEEE Transactions on Neural Networks and Learning Systems).
- **Y. Huang**, Q. Meng, J. Liu and S. Huang "CHI: A Contemporaneous Health Index for Disease Monitoring using Longitudinal Data", 2016. (Journal of Biomedical Informatics under review).
- J. Zhong, **Y. Huang**, and Ji Liu, "Asynchronous Parallel Empirical Variance Guided Algorithms for the Thresholding Bandit Problem", 2017. arXiv:1704.04567 .
- X. Lian, H. Zhang, C.-J. Hsieh, **Y. Huang**, and J. Liu, "A Comprehensive Linear Speedup Analysis for Asynchronous Stochastic Parallel Optimization from Zeroth-Order to First-Order", NIPS, 2016.
- H. Yang, **Y. Huang**, L. Tran, J. Liu and S. Huang, "On Benefits of Selection Diversity via Bilevel Exclusive Sparsity", CVPR, 2016.
- X. Lian, **Y. Huang**, Y. Li, J. Liu, "Asynchronous Parallel Stochastic Gradient for Nonconvex Optimization", NIPS, 2015.
- J. Zhao, R. Xia, W. Liu, J. Xu and **Y. Huang**, "Research on Volume Measurement Technology for Rail Tanker Based on Computer Vsion", International Conference on Mechatronics and Applied Mechanics, 2011.
- F. Yang, W. Liu and **Y. Huang**, "A Method of Automatic Wheel Identify and Classify", Chinese Journal of Microcomputer Information, 2010.
- **Y. Huang** and W. Liu, "Robust Estimation of the Fundamental Matrix Based on LTS and Bucketing", International Conference on Wavelet Analysis and Pattern Recognition, 2009.
- **Y. Huang**, W. Liu and J. Zhao, "Metric Reconstruction Based on Multifocal Tensors", IEEE International Conference on Intelligent Computing and Intelligent Systems, 2009.
- **Y. Huang**, W. Liu and J. Zhao, "An Approach to Metric Reconstruction Based on Trifocal Tensor", Chinese Journal of Scientific Instrument, 2009.
- **Y. Huang** and W. Liu, "A Method for Fundamental Matrix Estimation Using LQS", Journal of Image and Graphics, 2009.

PATENS

- **Y. Huang**, W. Liu and J. Zhao, "An Approach to Metric Reconstruction Based on Trifocal Tensor", Cn101750029a, 2009.
- J. Zhao, R. Xia, W. Liu, **Y. Huang**, "An Approach on volume measurement technology for rail tanker based on computer vision", Cn101629805, 2010.

HONORS

- Rank 1 (1/200+) of National Higher Education Entrance Examination, Tianjin 32rd High School 2001
- Outstanding Student Scholarship, Nankai University 2005

SKILLS

Solid background and rich experiences of data analytics, machine learning, optimization, computer architecture, image processing and graphics.

Programming languages: proficient in C\C++ (10 years +), matlab (7 years +), Verilog (2 years+), and Python (2 years +); experienced in Java and R.

Development Experiences: POSIX Multi-threads Programming (3 years +), Hadoop and Tensor Flow (1 year+), TI's DSP and ADI's ADSP (2 years +), ARM (2 years +), Xilinx FPGA (2 years+), NVIDIA GPU (1 year +), OpenCV (3 years+), OpenGL (2 years+) and GUI (Qt, MFC) (3 years+).

Others: experienced in SQL, OpenMP, Communication protocols (1553, TCP, UDP, UART).

Languages: Mandarin and English.