Yijun Huang, Ph.D.

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EDUCATION

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

Graduate Course Study
University of Science and Technology of China 2005-2006

B.S., Automation
Nankai University, China 2001-2005

WORKING EXPERIENCES

Software Engineer 2017 - Present
Huawei Seattle lab, IntelliPro

- Develop computer vision and machine learning applications for the mobile devices: SLAM; real-time video summarization.

Volunteer Research Assistant 2014 - 2017
University of Rochester, United States

- Develop machine learning models and optimization algorithms for big data problems: feature selection, social media, medical longitudinal data analytics for healthcare, active learning, and computer vision.

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

- Develop AsynML: an asynchronous parallel toolbox on multi-core / multi-socket systems to solve large scale machine learning problems: deep learning, linear regression, SVM, logistic regression, and linear systems.

Algorithm Researcher & Developer 2010 - 2013
China Aerospace Science and Technology Corporation, China

- Develop image/video applications in embedded systems (DSP/ARM/FPGA/GPU) for aircrafts: path planing, real-time infrared target recognition and tracking, electronic image stabilization, and real-time communication system.

Research Assistant 2006 - 2010

Chinese Academy of Sciences, Shenyang Institute of Automation

- Research on 3D modeling / reconstruction, digital camera calibration, and digital visualization.

SKILL SETS

Research background and experiences: **data analytics**, **machine learning**, **computer vision**, **optimization**, and **computer architecture**.

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

Development experiences: POSIX Multi-threads Programming (3 years +), TensorFlow, Pytorch and Caffe (1 year+), Hadoop and Spark (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+).

Other tools: SQL, OpenMP, Communication protocols (1553, TCP, UDP, UART).

Languages: Mandarin and English.

PROJECTS

Computer vision and machine learning application development for mobile devices 10/2017 - Now, Huawei

Project 1: Develop the monocular SLAM (camera + IMU) for real-time application on mobile platform (Huawei Mate 9, android system).

- Improve the accuracy and efficiency of real-time recognition and tracking on mobile phones.
- Design and implement optimization methods to fuse the IMU (inertial measurement unit) and camera signals, adjust the camera's pose, and optimize the visual and inertial measurements.

Project 2: Develop real-time video summarization on mobile platform (Huawei Mate 10, android system).

- Train and integrate three sub-function models (aesthetic engine, scene Prediction, and human rating) on the GPU server; perform inference with the video using trained models on the mobile platform; select the key subshots to generate the video summarization based on the inferences results.
- My responsibility is to optimize the inference computing on the platform; design algorithms to integrate three sub-function models' prediction results for selecting proper key subshots; design and implement the whole video summarization work flow.

Machine learning and optimization algorithms development for big data problems 07/2013 - 09/2017, University of Rochester, University of Wisconsin-Madison

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 practical needs, and solve these models by designing efficient optimization methods.

- Develop two diversity feature selection algorithms: a bilevel exclusive sparsity algorithm, and an exclusive sparsity norm minimization optimization.
- 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 the lock-free 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, China Aerospace Science and Technology Corporation

Project 3: Design a PCIe device for efficient path planning computing.

- Design and validate multiple image processing algorithms for path planning on PC.
- Implement state-of-the-art image processing algorithms on FPGA (mainly Xilinx Virtex-6) in Verilog.
- Develop parallel implementations of state-of-the-art image processing algorithms on Nvidia GPU for the purpose of comparison to the FPGA implementations.

Project 4: Build a real-time infrared target recognition and tracking device for aerocraft navigation.

- Design multiple real-time infrared target recognition and tracking algorithms.
- Implement state-of-the-art algorithms on DSP (TI TM320c64x, TI TM320c67x, ADSP210).

Project 5: Develop embedded EIS (Electronic Image Stabilization) system.

- Develop multiple efficient image deblurring algorithms to compensate for video device shake.
- Implement state-of-the-art algorithms on DSP/ARM.

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

- Develop softwares for embedded systems DSP/ARM: 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, Chinese Academy of Sciences

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

- Propose an algorithm to obtain a 3D digital model of the target object from an image sequence (This algorithm improves the traditional Space Carving methods);
- Propose an efficient method for constructing the 3D visual hull.

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

- Propose a high accuracy 3D reconstruction algorithm for our applications;
- Calibrate cameras;
- Propose a uniform reconstruction framework based on multifocal tensors.

HONORS

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

SOFTWARE

- ASYNML: an asynchronous parallel algorithm package for solving some popular machine learning problems on multi-core / multi-socket machines.

PUBLICATIONS (Google Scholar link)

- **Y. Huang** and J. Liu, "Exclusive Sparsity Norm Minimization with Random Groups via Cone Projection", IEEE Transactions on Neural Networks and Learning Systems, 2018.
- H. Wang*, **Y. Huang***, J. Liu, H. Huang, "New Balanced Active Learning Model and Optimization Algorithm", IJCAI, 2018. (* equal contribution, under review)
- **Y. Huang**, Q. Meng, J. Liu and S. Huang "CHI: A Contemporaneous Health Index for Disease Monitoring using Longitudinal Data", Journal of Biomedical Informatics, 2017.
- J. Zhong, **Y. Huang**, and J. Liu "Asynchronous Parallel Empirical Variance Guided Algorithms for the Thresholding Bandit Problem", Journal of Machine Learning Research, 2017. (Under review).
- 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. (Spotlight, rate 4%)
- 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.

HOBBIES

- RTS Games: StarCraft II (SC2) and Smite. I am a big fan of SC2 (Starcraft II) and have played it for 4 years as a zerg player. My best achievement is the **Master** rank on the North America server (top 5% among all players).
- DIYs: leatherworking, woodworking, baking.
- Sports: badminton, tennis, swimming, yoga.
- Other: photography, tourism, cartoon.