

## **Contact**

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## **Research Interests**

Machine Learning and its applications in Computer Vision, Medical Image Processing and Natural Language Processing.

## **Educations**

- |                       |   |
|-----------------------|---|
| Sep, 2008 – Jul, 2014 | PhD at <a href="#">i-Vision Group</a> , Dpt. of Automation, Tsinghua University.<br>Supervisor: <a href="#">Jie Zhou</a> .  |
| Sep, 2005 – Mar, 2008 | Master Degree of Telecommunication Engineering, Beijing University of Posts and Telecommunications (BUPT). Supervisors: <a href="#">Fei Su</a> and <a href="#">Anni Cai</a> . |
| Sep, 2001 – Jul, 2005 | Bachelor Degree of Telecommunication Engineering, Wuhan University of Technology (WHUT). Rank 2 of 200+.  |

## **Experiences**

- |                                     |   |
|-------------------------------------|---|
| Aug, 2015 – Aug, 2016<br>(expected) | Post-doctoral researcher, Dpt. Of Statistics, Rutgers University. Host: <a href="#">Tong Zhang</a> <ul style="list-style-type: none"><li>• Character-level and word-level one-hot neural network applied to text classification</li><li>• Medical image segmentation based on deconvolutional neural network</li></ul>  |
| Sep, 2014 – Aug, 2015               | Post-doctoral researcher, Medical College, Cornell University. Host: <a href="#">Guanglei Xiong</a> and <a href="#">James K. Min</a> <ul style="list-style-type: none"><li>• 3D heart pose estimation from CT volume based on end-to-end trained cascade pose regression</li><li>• Vessel segmentation based on 3D convolutional neural network</li><li>• Machine learning approach for blood pressure (Fractional Flow Reserve , FFR) prediction from CT volume based on graph model</li></ul> |
| Jul, 2013 – Apr, 2014               | Intern at Institute of Deep Learning, Baidu Inc. Mentor: <a href="#">Tong Zhang</a> and <a href="#">Kai Yu</a> . <ul style="list-style-type: none"><li>• Multi-threading code for LogitBoost algorithm</li><li>• Investigation of sampling classes for multi-class Boosting</li><li>• Theoretical analysis of convergence rate for LogitBoost</li></ul>   |
| Oct, 2011 – Apr, 2012               | Visiting student at Australia National University and NICTA. Advisors: <a href="#">Mark Reid</a> and <a href="#">Robert Williamson</a> . <ul style="list-style-type: none"><li>• Loss function and numeric optimization of Boosting</li></ul>   |

## **Programming Language**

C++, CUDA C, Matlab, Python, Lua

## **Projects and Code**

- One-Hot Convolutional Neural Network for text classification (Lua, Torch 7, CUDA C)
  - One-Hot convert module. [Link](#)
  - Text classification main logic. [Link](#)
- CT volume segmentation based on 3D convolutional neural network (Matlab, CUDA C, VTK, ITK)
  - Neural Network Computational Graph (DAG), a common library. [Link](#)
  - Vessel segmentation from 3D CT volume. [Link 1](#), [Link 2](#)
  - 3D heart pose regression. [Link](#)
- Adaptive One-vs-One LogitBoost software package(C++, Matlab, OpenCV, TBB). [Link](#)
- A demo for video shot boundary detection and video retrieval based on SIFT feature (C++, OpenCV, DirectShow). Sub-program of Key Technologies Research and Development Program of China, 2009BAH40B03. Around 2011.
- Leading developer of BUPT group for Fingerprint Verification Contest 2006 (FVC 2006) (C++, OpenCV). Around 2006.
- Miscellaneous... see my [github](#) and [Matlab file exchange](#)

### Papers

- **Peng Sun**, Tong Zhang, Jie Zhou. "A Convergence Rate Analysis for LogitBoost, MART and Their Variant". **ICML2014**
- **Peng Sun**, Mark D. Reid, Jie Zhou. "An Improved Multiclass LogitBoost Using Adaptive-One-vs-One", Machine Learning (**MLJ**), 2014, 97(3): 295-326.
- **Peng Sun**, Jie Zhou. "Saving Evaluation Time for the Decision Function in Boosting: Representation and Reordering Base Learner", **ICML 2013**.
- **Peng Sun**, Mark D. Reid, Jie Zhou. "AOSO-LogitBoost: Adaptive One-Vs-One LogitBoost for Multi-Class Problems", **ICML 2012**.
- Mark D. Reid, Robert C. Williamson, **Peng Sun**. "The Convexity and Design of Composite Multiclass Losses", **ICML 2012**.
- **Peng Sun**, Yanan Na, and Jie Zhou. "A novel algorithm for cut shot boundary detection." Seventh International Symposium on Multispectral Image Processing and Pattern Recognition (**MIPPR2011**). SPIE, 2011.

### Technical Reports

- **Peng Sun**, James K. Min, Guanglei Xiong. "Globally Tuned Cascade Pose Regression via Back Propagation with Application in 2D Face Pose Estimation and Heart Segmentation in 3D CT Images." <http://arxiv.org/abs/1503.08843>, 2015
- **Peng Sun**, Haoyin Zhou, Devon Lundine, James K Min, Guanglei Xiong. "Fast Segmentation of Left Ventricle in CT Images by Explicit Shape Regression using Random Pixel Difference Features". <http://arxiv.org/abs/1507.07508>, 2015

### Professional Activities

- Registered reviewer for Journal of Machine Learning Research (JMLR), Machine Learning (MLJ), IEEE Transaction on Image Processing (TIP) and ICML 2016
- Invited talk at Learning to Rank Team, Division of Page Searching, Baidu Inc., Oct 2013.