

# Youbao Tang

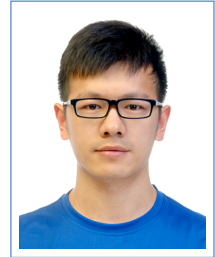
POSTDOCTORAL FELLOW

Radiology and Imaging Sciences  
National Institutes of Health (NIH)  
10 Center Dr., Bethesda, 20814, USA

☎ (1) (240)899-8968

✉ tybxiaobao@gmail.com

📄 <https://tangyoubao.github.io/>



## Education

- Sep. 2011–Dec. 2016 **Doctor of Computer Applied Technology**, *Harbin Institute of Technology (HIT)*, China, *Recommendation*.  
Supervisor: Professor Xiangqian Wu  
Thesis: Research on Visual Saliency Detection Method and Its Application
- Sep. 2009–Jul. 2011 **Master of Computer Science and Technology**, *Harbin Institute of Technology (HIT)*, China, *Recommendation*.  
Supervisor: Professor Xiangqian Wu  
Thesis: Research on Encryption and Decryption Algorithm based on Non-contact Palmprint Feature
- Sep. 2005–Jul. 2009 **Bachelor of Bioinformatics**, *Harbin Institute of Technology (HIT)*, China, *Top 20%*.

## Research Interests

PATTERN RECOGNITION: Writer Identification, Palmprint Recognition  
COMPUTER VISION: Visual Saliency Detection, Scene Text Detection  
**MEDICAL IMAGE PROCESSING, BIOMETRICS and DEEP LEARNING**

## Publications

★ indicates equal contribution, student under my mentoring.

### PREPRINTS

- 2018 Jinzheng Cai★, **Youbao Tang**★, Le Lu, Adam P. Harrison, Ke Yan, Jing Xiao, Lin Yang, Ronald M. Summers, "Accurate Weakly Supervised Deep Lesion Segmentation on CT Scans: Self-Paced 3D Mask Generation from RECIST", *arXiv preprint arXiv:1801.08614*.

### JOURNALS

- 2019 **Youbao Tang**, Xiangqian Wu, "Salient Object Detection Using Cascaded Convolutional Neural Networks and Adversarial Learning", *IEEE Transactions on Multimedia*, 21(9):2237-2247, 2019.
- 2018 **Youbao Tang**, Xiangqian Wu, "Scene Text Detection using Superpixel based Stroke Feature Transform and Deep Learning based Region Classification", *IEEE Transactions on Multimedia*, 20(9):2276-2288, 2018.

- 2018 Sicheng Zhao, Guiguang Ding, Yue Gao, Xin Zhao, **Youbao Tang**, Jungong Han, Qingming Huang, "Discrete Probability Distribution Prediction of Image Emotions With Shared Sparse Learning", *IEEE Transactions on Affective Computing*.
- 2017 **Youbao Tang**, Xiangqian Wu, "Scene Text Detection and Segmentation via Cascaded Convolution Neural Networks", *IEEE Transactions on Image Processing*, 26(3):1509-1520, 2017.
- 2016 **Youbao Tang**, Xiangqian Wu, Wei Bu, "Scene Text Detection Based on Multi-Level MSER", *Journal of Zhejiang University (Engineering Science)*, 50(6):1134-1140, 2016.
- 2015 **Youbao Tang**, Xiangqian Wu, Wei Bu, "Offline Signature Verification Based on ASIFT", *Journal of Beijing University of Aeronautics and Astronautics*, 41(1):110-116, 2015.
- 2014 Xiangqian Wu (Supervisor), **Youbao Tang**, Wei Bu, "Offline Text-Independent Writer Identification Based on Scale Invariant Feature Transform", *IEEE Transactions on Information Forensics and Security*, 9(3):526-536, 2014.

#### CONFERENCES

- 2020 Vatsal Agarwal\*, **Youbao Tang\***, Jing Xiao, Ronald M. Summers, "Weakly-Supervised Lesion Co-Segmentation on CT Scans", *IEEE International Symposium on Biomedical Imaging (ISBI)*.
- 2020 Vatsal Agarwal\*, **Youbao Tang\***, Jing Xiao, Ronald M. Summers, "Weakly-Supervised Lesion Segmentation on CT Scans Using Co-Segmentation", *SPIE Medical Imaging [Oral]*.
- 2020 Jia Liang\*, Yuxing Tang\*, **Youbao Tang**, Jing Xiao, Ronald M. Summers, "Bone Suppression on Chest Radiographs with Adversarial Learning", *SPIE Medical Imaging [Oral]*.
- 2019 Yuxing Tang, **Youbao Tang**, Veit Sanfort, Jing Xiao, Ronald M. Summers, "TUNA-Net: Task-oriented UNsupervised Adversarial Network for Disease Recognition in Cross-Domain Chest X-rays", *International Conference on Medical Image Computing & Computer Assisted Intervention (MICCAI)*.
- 2019 Ke Yan, **Youbao Tang**, Yifan Peng, Veit Sanfort, Mohammadhadi Bagheri, Zhiyong Lu, Ronald M. Summers, "MULAN: Multitask Universal Lesion Analysis Network for Joint Lesion Detection, Tagging, and Segmentation", *International Conference on Medical Image Computing & Computer Assisted Intervention (MICCAI)*.
- 2019 **Youbao Tang\***, Yuxing Tang\*, Jing Xiao, Ronald M. Summers, "XLSor: A Robust and Accurate Lung Segmentor on Chest X-Rays Using Criss-Cross Attention and Customized Radiorealistic Abnormalities Generation", *International Conference on Medical Imaging with Deep Learning (MIDL)*.

- 2019 **Youbao Tang**, Ke Yan\*, Yuxing Tang\*, Jiamin Liu\*, Jing Xiao, Ronald M. Summers, "ULDor: A Universal Lesion Detector for CT Scans with Pseudo Masks and Hard Negative Example Mining", *IEEE International Symposium on Biomedical Imaging (ISBI)*.
- 2019 Yuxing Tang, **Youbao Tang**, Mei Han, Jing Xiao, Ronald M. Summers, "Abnormal Chest X-ray Identification with Generative Adversarial One-Class Classifier", *IEEE International Symposium on Biomedical Imaging (ISBI)* [Oral & Travel Award].
- 2019 **Youbao Tang\***, Sooyoun Oh\*, Yuxing Tang, Jing Xiao, Ronald M. Summers, "CT-Realistic Data Augmentation Using Generative Adversarial Network for Robust Lymph Node Segmentation", *SPIE Medical Imaging*.
- 2019 Yuxing Tang, **Youbao Tang**, Mei Han, Jing Xiao, Ronald M. Summers, "Deep Adversarial One-class Learning for Normal and Abnormal Chest Radiograph Classification", *SPIE Medical Imaging* [Oral].
- 2018 **Youbao Tang\***, Jinzheng Cai\*, Le Lu, Adam P. Harrison, Ke Yan, Jing Xiao, Lin Yang, Ronald M. Summers, "CT Image Enhancement Using Stacked Generative Adversarial Networks and Transfer Learning for Lesion Segmentation Improvement", *International Conference on Machine Learning in Medical Imaging (MICCAI-MLMI)* [Oral].
- 2018 **Youbao Tang**, Adam P. Harrison, Mohammadhadi Bagheri, Jing Xiao, Ronald M. Summers, "Semi-Automatic RECIST Labeling on CT Scans with Cascaded Convolutional Neural Networks", *International Conference on Medical Image Computing & Computer Assisted Intervention (MICCAI)*.
- 2018 Jinzheng Cai\*, **Youbao Tang\***, Le Lu, Adam P. Harrison, Ke Yan, Jing Xiao, Lin Yang, Ronald M. Summers, "Accurate Weakly-Supervised Deep Lesion Segmentation using Large-Scale Clinical Annotations: Slice-Propagated 3D Mask Generation from 2D RECIST", *MICCAI*.
- 2018 Dakai Jin, Ziyue Xu, **Youbao Tang**, Adam P. Harrison, Daniel Mollura, "CT-Realistic Lung Nodule Simulation from 3D Conditional Generative Adversarial Networks for Robust Lung Segmentation", *MICCAI*.
- 2017 **Youbao Tang**, Xiangqian Wu, "Salient Object Detection with Chained Multi-scale Fully Convolutional Network", *ACM Multimedia Conference (ACMMM)*.
- 2016 **Youbao Tang**, Xiangqian Wu, "Saliency Detection via Combining Region-level and Pixel-level Predictions with CNNs", *European Conference on Computer Vision (ECCV)*.
- 2016 **Youbao Tang**, Xiangqian Wu, Wei Bu "Deeply-Supervised Recurrent Convolutional Neural Network for Saliency Detection", *ACM Multimedia Conference (ACMMM)*.
- 2016 **Youbao Tang**, Xiangqian Wu, "Scene Text Detection via Edge Cue and Multi-Features", *International Conference on Frontiers in Handwriting Recognition (ICFHR)*.

- 2016 **Youbao Tang**, Xiangqian Wu, "Text-independent Writer Identification via CNN Features and Joint Bayesian", *International Conference on Frontiers in Handwriting Recognition (ICFHR)*.
- 2015 **Youbao Tang**, Xiangqian Wu, Wei Bu, "Saliency Detection Based on Graph-Structural Agglomerative Clustering", *ACM Multimedia Conference (ACMMM)*.
- 2014 **Youbao Tang**, Xiangqian Wu, Wei Bu, "Text Line Segmentation Based on Matched Filtering and Top-down Grouping for Handwritten Documents", *International Workshop on Document Analysis Systems (DAS)*.
- 2014 **Youbao Tang**, Wei Bu, Xiangqian Wu, "Text-Independent Writer Identification Using Improved Structural Features", *Chinese Conference on Biometric Recognition (CCBR)*.
- 2013 **Youbao Tang**, Xiangqian Wu, Wei Bu, "Offline Text-independent Writer Identification Using Stroke Fragment and Contour Based Features", *International Conference on Biometrics (ICB)*.
- 2013 **Youbao Tang**, Xiangqian Wu, Wei Bu, Hongyang Wang, "Skew Estimation in Document Images Based on an Energy Minimization Framework", *International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV)*.
- 2011 Wei Bu, Qiushi Zhao, Xiangqian Wu, **Youbao Tang**, "A Novel Contactless Multimodal Biometric System Based on Multiple Hand Features", *International Conference on Hand-Based Biometrics (ICHB)*.
- 2011 Xin Cui, Qiushi Zhao, Xiangqian Wu, **Youbao Tang**, "A Contactless Hand Shape Identification System", *International Conference on Advanced Computer Control (ICACC)*.
- 2010 Xiangqian Wu, Enying Gao, **Youbao Tang**, Kuanquan Wang, "A Novel Biometric System Based on Hand Vein", *International Conference on Frontier of Computer Science and Technology (FCST)*.

#### ABSTRACTS

- 2019 **Youbao Tang**, Yuxing Tang, Jing Xiao, Ronald M. Summers, "An Interpretable Generative Model for Chest X-ray Decomposition via Synthesizing Radio-realistic Normal Chest X-rays and Separating Abnormalities", *The Radiological Society of North America (RSNA)*.
- 2019 Yuxing Tang, **Youbao Tang**, Mei Han, Jing Xiao, Ronald M. Summers, "Abnormal Chest X-ray Identification with Generative Adversarial One-Class Classifier", *The Radiological Society of North America (RSNA)* [**RSNA Trainee Research Prize**].
- 2019 Ke Yan, **Youbao Tang**, Yifan Peng, Veit Sanfort, Mohammadhadi Bagheri, Zhiyong Lu, Ronald M. Summers, "MULAN: Multitask Universal Lesion Analysis Network for Joint Lesion Detection, Tagging, and Segmentation", *The Radiological Society of North America (RSNA)*.

- 2018 **Youbao Tang**, Adam P. Harrison, Mohammadhadi Bagheri, Jing Xiao, Ronald M. Summers, "Semi-Automatic RECIST Labeling on CT Scans with Cascaded Convolutional Neural Networks", *The Radiological Society of North America (RSNA)*.
- 2018 **Youbao Tang\***, Jinzheng Cai\*, Le Lu, Adam P. Harrison, Ke Yan, Jing Xiao, Lin Yang, Ronald M. Summers, "CT Image Enhancement Using Stacked Generative Adversarial Networks and Transfer Learning for Lesion Segmentation Improvement", *The Radiological Society of North America (RSNA)*.

#### PATENTS

- 2019 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Saliency based Scene Text Detection", CN Patent, CN106778757B. Granted in 2019/6/4.
- 2018 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Saliency Detection via Combining Region-Level and Pixel-Level Predictions with CNNs", CN Patent, CN106157319B. Granted in 2018/11/2.
- 2016 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Skew Estimation in Document Images Based on an Energy Minimization Framework", CN Patent, CN103400130B. Granted in 2016/7/20.
- 2016 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Writer Identification Using Stroke Fragment and Contour based Features", CN Patent, CN103279770B. Granted in 2016/3/23.
- 2019 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Salient Object Detection Using Cascaded Convolutional Neural Networks and Adversarial Learning", CN Patent Application, CN109829391A.
- 2018 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Scene Text Detection Using Superpixel-based Stroke Feature Transform and Deep Learning based Region Classification", CN Patent Application, CN108345850A.
- 2017 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Salient Object Detection with Chained Multi-Scale Fully Convolutional Network", CN Patent Application, CN107784308A.
- 2016 Xiangqian Wu, Wei Bu, **Youbao Tang**, "Visual Saliency Detection based on Deeply-supervised Recurrent Convolutional Neural Network", CN Patent Application, CN107247952A.

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#### Research Experience

- Jul. 2017–Present **NIH-PingAn CRADA Project**, POSTDOCTORAL RESEARCH FELLOW, NIH, Bethesda, MD, USA.  
Mentor: Dr. Ronald M. Summers and Dr. Le Lu.  
Researching on large-scale medical imaging analysis using deep learning.

- Mar. 2016–Dec. 2016 **Research on Signature Video Based Personal Recognition**, NATIONAL NATURAL SCIENCE FOUNDATION, China, Application Writer and Main Researcher.  
I was in charge of hand detection and segmentation, and identity recognition via signature video sequences.
- Jan. 2015–Dec. 2016 **Research on Automated Fundus Lesion Recognition Based on Visual Attention Model**, NATIONAL NATURAL SCIENCE FOUNDATION, China, Main Researcher.  
I was in charge of salient object detection, segmentation and classification.
- Jan. 2014–Dec. 2014 **Research on Palmprint Recognition in Complex Environment**, NATIONAL NATURAL SCIENCE FOUNDATION, China, Main Researcher.  
I was in charge of hand segmentation and palmprint image quality assessment.
- Jan. 2011–Dec. 2013 **Research on Automatic Diagnosis Techniques of Diabetic Retinopathy Based on Image Recognition**, NATIONAL NATURAL SCIENCE FOUNDATION, China, Main Researcher.  
I was in charge of the system implementation.
- Feb. 2010–Jul. 2011 **Research on Data Encryption and Decryption Algorithm Based on Palmprint Features**, NATIONAL NATURAL SCIENCE FOUNDATION, China, Main Researcher.  
I was in charge of encryption and decryption algorithm research and system implementation.
- Aug. 2009–Jan. 2010 **Research on Contactless Identity Recognition Techniques by Integrating Hand Vein, Handprint, and Handshape**, NATIONAL 863 HIGH-TECH PROGRAM, China, Main Researcher.  
I was in charge of the whole identification system development.

## Awards

- 2018 NIH Fellows Award of Research Excellence (FARE) 2019 competition.
- 2014 National Scholarship
- 2014 2<sup>nd</sup> Price of the Third CCF Youth Internet Entrepreneurship Competition

## Skills

- Languages **Mandarin, English**
- Programming **Matlab, C/C++, Python, Java**
- Interests **Basketball (Frequent player), Swimming, Running, Cooking, Singing**

## Professional Service

### REVIEWER

- IEEE Transactions on Information Forensics and Security
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Multimedia

IEEE Transactions on Circuits and Systems for Video Technology  
IEEE Transactions on Very Large Scale Integration Systems  
IEEE Access  
Medical Image Analysis  
Knowledge-Based Systems  
Neurocomputing  
Artificial Intelligence in Medicine  
American Journal of Roentgenology  
Journal of Experimental & Theoretical Artificial Intelligence  
IET Image Processing  
IET Biometrics  
Journal of Electronic Imaging  
Journal of Digital Imaging  
International Journal of Distributed Sensor Networks  
CVPR 2019/2020, ICCV 2019, AAAI 2020, MICCAI 2018/2019, ICME  
2019, ICHI 2019, PRCV 2019