




TIAN CAO

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INTERESTS	Machine Learning, Image Analysis, Computer Vision	
EDUCATION	University of North Carolina at Chapel Hill , Chapel Hill, NC	08/2015(expected)
	Ph.D. candidate in Computer Science	
	Sichuan University , Chengdu, Sichuan, China	06/2010
	M.S. in Computer Science	
EXPERIENCE	Sichuan University , Chengdu, Sichuan, China	05/2007
	B.E. in Computer Science	
	Research Assistant, UNC Chapel Hill , Chapel Hill, NC	09/2010-present
	Coupled Dictionary Learning for Image Analysis	
	<ul style="list-style-type: none">• Developed coupled dictionary learning methods for multi-modal image prediction, classification and registration.• Learning coupled dictionaries based on sparse coding, and applied the learned dictionary to simplify the multi-modal image analysis problems.• Applied the algorithm to Correlative Microscope images.• Implemented in VTK, ITK, matlab and C++.	
	Research Intern, IBM Almaden Research Center , San Jose, CA	05/2014-08/2014
	Multi-atlas based Image Segmentation	
	<ul style="list-style-type: none">• Investigated methods of learning from ambiguous labels.• Investigated atlas based image segmentation methods with different local features and classifiers.• Implemented atlas based image segmentation framework in Java and matlab.	
	Research Intern, Siemens Corporate Research , Princeton, NJ	05/2012-08/2012
	Real-time Object Detection in Ultrasound Videos	
	<ul style="list-style-type: none">• Developed and implemented a needle detection method for ultrasound videos.• Incorporated with different features and hough transform to vote the needle segment.• Implemented a 3D steerable filtering method to incorporate spatial and temporal information for needle detection in C++.	
	Research Assistant, Chinese Academy of Sciences , Shenzhen, China	09/2009-03/2010
	Energy based Crowd Motion Analysis	
	<ul style="list-style-type: none">• Developed an energy based crowd motion analysis algorithm based on mutual information.• Applied the algorithm to detect the crowd abnormal behaviors.• Implemented in OPENCV and C++.	
	Research Assistant, Sichuan University , Chengdu, China	01/2008-09/2009
	Super-resolution for Ultrasound Speckle Reduction	
	<ul style="list-style-type: none">• Developed a fast and robust super-resolution method for intima reconstruction in ultrasound.• Applied anisotropic diffusion to reduce speckle with edge enhancement in image reconstruction.• Implemented anisotropic diffusion method in C++ and GLSL.	

PUBLICATIONS

- [1].**Tian Cao**, Nikhil Singh, Vladimir Jovic, Marc Niethammer, “Semi-coupled Dictionary Learning for Deformation Prediction”, *International Symposium on Biomedical Imaging (ISBI)*, 2015.
- [2].**Tian Cao**, Christopher Zach, Marc Niethammer et al., “Multi-modal Registration for Correlative Microscopy using Image Analogies”, *Medical Image Analysis (MedIA)*, Elsevier, 2014.
- [3].**Tian Cao**, Vladimir Jovic, Marc Niethammer et al., “Robust Multimodal Dictionary Learning”, *The 16th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2013.
- [4].**Tian Cao**, Christopher Zach, Marc Niethammer et al., “Registration for Correlative Microscopy using Image Analogies”, *Fifth Workshop on Biomedical Image Registration (WBIR)*, 2012.
- [5].Bo Wang, **Tian Cao**, Yuguo Dai, Dong C. Liu, “Ultrasound Speckle Reduction via Super Resolution and Nonlinear Diffusion”, *the 9th Asian Conference on Computer Vision (ACCV)*, 2009.
- [6].**Tian Cao**, Bo Wang, Dong C. Liu, “Optimized GPU Framework of Semi-implicit AOS Scheme Based Speckle Reducing Nonlinear Diffusion”, *proceedings of SPIE Medical Imaging (SPIE MI)*, 2009.
- [7].**Tian Cao**, Chaowei Tan, Dong C. Liu, “Adaptive Curve Region based Motion Estimation and Motion Visualization of Cardiac Ultrasound Imaging”, *the 3rd International Conference on Bioinformatics and Biomedical Engineering (ICBBE)*, 2009.
- [8].**Tian Cao**, Xinyu Wu, Jinnian Guo, Shiqi Yu, Yangsheng Xu, “Abnormal Crowd Motion Analysis”, *IEEE International Conference on Robotics and Biomimetics (ROBIO)*, 2009.

PROFESSIONAL SKILLS

C/C++, Java, Matlab, Python, Bash, CUDA, OPENCV

HONORS & AWARDS

Guanghua Scholarship.	2010
Outstanding graduate Student Award, Sichuan University.	2010
Graduate Student Fellowship, Sichuan University.	2007-2010
Student Innovation Award, Sichuan University.	2005-2007
1st prize of China Undergraduate Mathematical Contest in Modeling.	2006