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CENTER FOR RESEARCH IN COMPUTER VISION

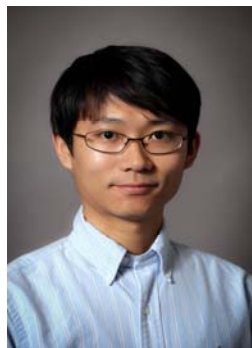
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**“Deep learning Strategies in Classification of CT Attenuation Patterns  
for Interstitial Lung Diseases”**

Friday, May 22, 2015 at 2:00 PM (HEC 103)



**ABSTRACT**

Interstitial lung diseases (ILD) involve several abnormal imaging patterns observed in computed tomography (CT) images. Accurate classification of these patterns plays a significant role in precise clinical decision making of the diseases' extent and nature. Routine clinical practice for ILD pattern classification relies on manual and qualitative observation. Therefore for more efficient, robust, and accurate description, it is important to develop automated pulmonary computer-aided detection (CAD) systems. Conventionally, such CAD systems require experts' manual identification of regions of interest (ROIs) as a prerequisite. This protocol is time consuming and inhibits fully automatic assessment. In this work, we present a new method to classify ILD imaging patterns on CT images. The main novelty of the proposed framework is the use of the entire image as a holistic input with the aid of data augmentation. By circumventing the prerequisite of manually defined ROIs, our setup can better address the clinical workflow, although significantly more challenging than previous work. The adaption of deep convolutional neural network (CNN) models can effectively tackle this challenge. With proper settings for CNN, qualitative and quantitative results using a publicly available ILD database shows higher or comparable classification rates than the state-of-the-art methods.

**BIOGRAPHY**

Dr. Ziyue Xu is currently a research scientist with the Center for Infectious Disease Imaging in the Department of Radiology and Imaging Sciences at National Institutes of Health. After receiving B.S. and 1 year's research experience in 2006 from the Research Institute of Image and Graphics in Tsinghua University, Dr. Xu has been a research assistant for five years in the Iowa Institute for Biomedical Imaging in the University of Iowa, where he received Ph.D. degree in Computer Engineering in 2012. He has also worked as an R&D intern in GE Global Research Center in 2011. Dr. Xu has been working extensively in medical image processing and analysis. His previous works include: 1) image structural feature extraction and its applications in medical imaging: matching, filtering, interpolation, segmentation, and structure assessment; 2) pulmonary structure detection and segmentation; and 3) functional and hybrid image segmentation and quantification. His current research focuses on deep learning-based medical image analysis in clinics.