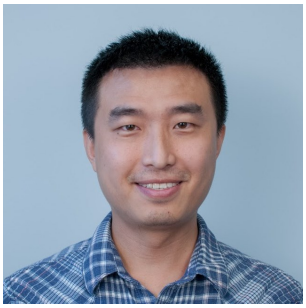
Stony Brook University

Biomedical Informatics Special Seminar



Yifan Peng, PhD;

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Clinical Natural Language Processing and Deep Learning in Assisting Medical Image Analysis

Tuesday, February 18, 2020 2 pm—3 pm
Mart-7m-0602_BMI

Abstract:

Medical imaging has been a common examination in daily clinical routine for screening and diagnosis of a variety of diseases. Although hospitals have accumulated a large number of image exams and associated reports, it is yet challenging to effectively use them to build high precision computer-aided diagnosis systems. In this talk, I will present an overview of cutting-edge techniques for mining existing free-text report data for assisting medical image analysis via natural language processing and deep learning. Specifically, I will discuss (1) a rule-based method on dependency graph to text-mine findings/diseases from the radiological reports, and (2) a transformer-based deep learning model to extract attributes (e.g., type, location, size) of findings/diseases (lesions) from the radiological reports. Using these methods, we are able to construct large-scale weakly-labeled image datasets with rich information. I will then demonstrate two case studies of medical image analysis using these datasets: (1) a text-image embedding deep neural network to classify common thorax disease and generate report in chest X-rays, and (2) a multitask universal lesion analysis network to detect, tag and segment lesions in CT images. Finally, I will conclude my talk with my near-future goal, which is to weave machine learning, text-mining and image analysis together, and build automatous systems with a higher-level understanding of the clinical world.

Bio:

Dr. Yifan Peng is a research fellow in the Text Mining Research Group directed by Dr. Zhiyong Lu at National Center for Biotechnology Information (NCBI), National Library of Medicine (NLM), National Institutes of Health (NIH). His main research interests include biomedical and clinical natural language processing and medical image analysis. His current projects focus on biomedical named entity recognition and relation extraction, clinical report generation, and automated classification of retinal disease from color fundus images. Prior to NCBI, Dr. Peng obtained his Ph.D. degree from the University of Delaware under the mentorship of Dr. Cathy Wu and Dr. Vijay Shanker. During his doctoral training, he investigated applications of machine learning in biomedical relation extraction, specifically working on deep analysis of the linguistic structures of biomedical texts.

Questions? Please call the Biomedical Informatics Department at 631-638-2590.