

SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Faculty of Engineering

Website: <https://www.eng.nus.edu.sg/ece/>

Area: Signal Analysis & Machine Intelligence

Host: Assistant Professor Shou Zheng, Mike

TOPIC	:	Consistency-Based Semi-supervised Evidential Active Learning for Diagnostic Radiograph Classification
SPEAKER	:	Ms. Shafa Balaram Graduate Student, ECE Dept, NUS
DATE	:	Thursday, 24 November 2022
TIME	:	10.00AM to 10.30AM
WEBINAR	:	Zoom Meeting https://nus-sg.zoom.us/j/83780243518?pwd=cktTSlhKcUllWktSWTM3VnILNXITdz09 Meeting ID: 837 8024 3518 Passcode: 280287

ABSTRACT

Deep learning approaches achieve state-of-the-art performance for classifying radiology images, but rely on large labelled datasets that require resource-intensive annotation by specialists. Both semi-supervised learning and active learning can be utilised to mitigate this annotation burden. However, there is limited work on combining the advantages of semi-supervised and active learning approaches for multi-label medical image classification. Here, we introduce a novel Consistency-based Semi-supervised Evidential Active Learning framework (CSEAL). Specifically, we leverage predictive uncertainty based on theories of evidence and subjective logic to develop an end-to-end integrated approach that combines consistency-based semi-supervised learning with uncertainty-based active learning. We apply our approach to enhance four leading consistency-based semi-supervised learning methods: Pseudo-labelling, Virtual Adversarial Training, Mean Teacher and NoTeacher. Extensive evaluations on multi-label Chest X-Ray classification tasks demonstrate that CSEAL achieves substantive performance improvements over two leading semi-supervised active learning baselines. Further, a class-wise breakdown of results shows that our approach can substantially improve accuracy on rarer abnormalities with fewer labelled samples.

BIOGRAPHY

Shafa is currently a Ph.D. student at the ECE Department of NUS attached to the Institute of Infocomm Research at A*STAR. Her research interests include deep learning with reduced annotation burden and reinforcement learning for medical imaging applications. Prior to joining NUS, she received her MEng degree in Biomedical Engineering from Imperial College London in 2019.

<https://www.eng.nus.edu.sg/ece/highlights/events/>