Enhanced Weakly Supervised Networks through Ultrasound Modality

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Ultrasound imaging is a valuable modality for detecting and characterizing thyroid nodules, aiding in the decision-making process for fine-needle aspiration (FNA). However, the accuracy of ultrasound diagnosis can vary significantly based on factors such as the radiologist's experience, image acquisition, and operator skills. To address these challenges and enhance diagnostic performance, this study presents an innovative approach that improves weakly supervised networks through the incorporation of Conventional Ultrasound and Doppler images. We collected a dataset consisting of 300 thyroid nodules imaged with pairs of conventional ultrasound and Doppler images. These nodules were from patients who underwent thyroid ultrasound-guided FNA, and their diagnoses were confirmed through FNA cytology at Siriraj Hospital between January 2015 and March 2021. Our proposed networks achieved remarkable diagnostic results. Comparing our model to experienced radiologists and residents, we found that it demonstrated diagnostic specificity similar to that of the experts while surpassing them in terms of sensitivity. This suggests that our proposed model has the potential to serve as a valuable clinical tool, working alongside radiologists to enhance the accuracy of thyroid nodule diagnoses.

Biography:

Chadaporn Keatmanee obtained her B.S.I.ED. in Telecommunication Engineering from KMITL, Thailand. She achieved her M.Eng. in Computer Science from the AIT in Thailand. She pursued a dual Ph.D. path, her first Ph.D. in Information Science from the JAIST, Japan. She achieved her second Ph.D. in Engineering and Technology from the SIIT, Thammasat University, Thailand. Currently serving as a lecturer at the Department of Computer Science at Ramkhamhaeng University. With a focus on healthcare research, she aims to spearhead meaningful contributions to the medical industry by leveraging her expertise in medical image processing, machine learning, and data privacy.