

TING LIU

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EDUCATION

Xi'an Jiaotong University, *Software Engineering*

Xi'an, **China**

List of "Double First-Class" University Project, Project 985, Project 211

Master of Engineering

Sep 2017 - Jun 2020

Relevant Coursework: Artificial Intelligence, Mathematical Statistics

Fujian Normal University, *Digital Media Technology*

Fujian, **China**

Bachelor of Engineering, GPA: 3.27/4.0

Sep 2013 - Jun 2017

Relevant Coursework: Advanced Mathematics, Linear Algebra, Discrete Mathematics, Data Structure and Algorithm, C Language Programming, C++ Object-Oriented Programming

PUBLICATIONS

- **Ting Liu**, Xing An, Yanbo Liu, et al. A Novel Deep Learning System for Breast Lesion Risk Stratification in Ultrasound images. MICCAI, 2022.
- Yang Gu, **Ting Liu**, Xing An, et al. Deep learning based classification of breast lesions with ultrasound images: A multicenter study. CSUM, 2022.
- Yang Gu, Wen Xu, **Ting Liu**, et al. Ultrasound-based deep learning in the establishment of a breast lesion risk stratification system: a multicenter study. European Radiology, 2022. Accepted.
- Xiaoping Xu, Xiangwei Zeng, **Ting Liu**. Development and Supervision of Artificial Intelligence Breast Ultrasound. 2022. Under Review.
- **Ting Liu**, Xing An, Bin Lin, et al. An Efficient Tracker for Thyroid Nodule Detection and Tracking during Ultrasound Scanning. ASMUS, 2021.
- **Ting Liu**, Xiaodong He, Ruifeng Zhao, et al. 3D U-Net Based Automatic Segmentation of Organs at Risk from CT. AAPM, 2019.

WORK EXPERIENCE

Shenzhen Mindray Bio-Medical Electronics, Co., Ltd.

Beijing, **China**

Medical Image Algorithm Engineer

Sep 2020 - Present

Project 1: Breast Lesion Risk Stratification in Ultrasound Images

- Proposed a deep learning method to classify breast lesions as benign or malignant and as one of six BI-RADS categories, simultaneously.
- Introduced a multitask soft label generating architecture, in which task-related soft labels were obtained from a teacher model and utilised to guide the training of a student model, thereby improving the overall classification accuracy by approximately 2%.
- Presented a consistency supervision mechanism to ensure predictions of two tasks were consistent by optimising a cross entropy loss between the pathology and predicted BI-RADS categories.
- Designed a cross-class loss function that penalised different degrees of misclassified items with different weights to make the predictions of BI-RADS closer to annotations.
- The proposed method achieved **state-of-the-art** status on two public datasets (BUSI and ADIAT).

Project 2: Thyroid Nodule Detection and Tracking during Ultrasound Screening

- Proposed an efficient deep learning tracker for simultaneously detecting and tracking nodules.
- Introduced an attention based fusion block to combine the features of previous and current frames, thus increasing detection accuracy.
- Presented an advanced post-processing strategy to train the network to obtain the best prediction, replacing general post-processing methods.
- Developed a mini-batch self-supervised learning module which reduced the false positive rate (FPR) by around 5%.
- The proposed method achieved 91% recall with 3.8% FPR at 30 fps on a dataset of 1555 clips.

Project 3: Posterior Echo Classification in Breast Ultrasound Images

- Proposed a machine learning method to classify posterior features as 'enhancement', 'shadowing', 'combined pattern' or 'no posterior features' categories.
- Divided the area below a lesion into three horizontal layers and then extracted features separately to reduce the influence of noise.
- Computed absolute and relative feature values and categorized them based on SVM.

SCHOLARSHIPS AND AWARDS

- Mar 2020: Excellent Master Dissertation
- Nov 2019: Excellent Postgraduate
- Sep 2019: Excellent Professional Practice Postgraduate
- Nov 2016: Second Prize Scholarship
- Dec 2014: National Encouragement Scholarship

SKILLS

- English level: IELTS 6.5
- Programming languages: Python, PyTorch