TING LIU

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EDUCATION

Xi'an Jiaotong University, Software Engineering Xi'an, **China**
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, 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. Under Review.
- 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. Medical Physics, 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 into benign and malignant, and into 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 utilized to guide the training of a student model, thereby improving the overall classification accuracy by about 2%
- Employed a consistency supervision mechanism to ensure predictions of two tasks are consistent by optimizing a cross entropy loss between the pathology and predicted BI-RADS categories
- Designed a cross-class loss function that penalized 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
- Employed 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 video clips

Project 3: Posterior Echo Classification in Breast Ultrasound Images

- Proposed a machine learning method to classify posterior features into ‘enhancement’, ‘shadowing’ and ‘no posterior features’
- Divided a posterior area 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 Skill: IELTS 6.5
- Programming language: Python, PyTorch