Jiawei Chen

RESEARCH ON COMPUTER VISION

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Work Experience

Youtu X-Lab, Tencent   *ShenZhen, China*

RESEARCHER   *Jul. 2018 - Dec. 2019*

- Developed a deep learning based Automatic Cervical Cancer Screening System which has been used in several hospitals.
- Developed a Computer-aided rapid intraoperative pathological diagnosis method which is based on video classification.
- Proposed a novel generative adversarial network (VideoGAN) for domain adaptation of multicentre videos, which can address the problem of variations among multi-domains. (**AAAI-2020**)

Jarvis Lab, Tencent   *ShenZhen, China*

RESEARCHER   *Jan. 2020 - Now*

- Develop a CT-images based Automatic Coronavirus Screening System (lung disease classification, lesion segmentation).
- Propose a noval self-supervised GAN for object-preserving imgage-to-image domain adaptation. (**ECCV-2020**)
- Propose a noval GAN for medical image domain adaptation using Mutual Information Constraint. (**MICCAI-2020**)
- Study self-supervised learning for nuclei segmentation. (**MICCAI-2020**)

Education

SMU (Southern Medical University)   *GuangZhou, China*

M.ENG. IN BIOMEDICAL ENGINEERING   *Sep. 2015 - Jun. 2018*

- Two papers are accepted by Physics in Medicine & Biology and Radiation Oncology.
- Got a National Scholarship which is given to the top-three in BME Dept.

SMU (Southern Medical University)   *GuangZhou, China*

B.ENG. IN BIOMEDICAL ENGINEERING (MEDICAL IMAGING ENGINEERING)   *Sep. 2011 - Jun. 2015*

- Got the First Prize of Academic Scholarship which is given to the promising students in BME Dept.

Research and Projects

Domain Adaptation: based on Image-to-Image translation   *Youtu X-Lab, Tencent*

RESEACH WORK   *Sep. 2018 - Now*

- **Motivation**: Data from multicentres often have different distribution, e.g., imaging conditions (color and illumination), which make the models trained on one domain often fail to generalize well to another. However, content distortion problem occurred in current GAN based image translation approaches. Thus, we aim to study novel generative adversarial network, to transfer images across different domains to address the problem and improve the model generalization.
- **VideoGAN (AAAI2020)**: is the first work to address the problem of video-to-video domain adaptation, which has an X-shape generator to preserve the intra-video consistency during translation. Furthermore, color histogram loss is proposed to tune the color distribution of each translated frame. The domain adaptation performance is evaluated on the car videos and endoscopic and the results demonstrate VideoGAN can significantly narrow down the gap between different domains.
- **OP-GAN (ECCV2020)**: introduces self-supervised task to disentangles the features of image content from the disturbance of domain differences, so as to bring additional regularization for maintaining the consistency of image-objects.
- **MI^{2}GAN (MICCAI2020)**: disentangles the content features from domain information for both the source and translated images, and then maximize the mutual information between the disentangled content features to preserve the image-objects.

Deep Learning Based Automatic Cervical Cancer Screening System   *Youtu X-Lab, Tencent*

PROJECT WORK   *Jul. 2018 - Now*

- Developed a deep learning based Automatic Cervical Cancer Screening System, which consists of four sections, i.e., inspection of image acquisition quality, lesion classification, segmentation, detection.
- Our computer aided diagnosis (CAD) system achieves a classification accuracy of 86.67%, which is about 5% higher than that of human experts.

Computer-aided Rapid Intraoperative Pathological Diagnosis System   *Youtu X-Lab, Tencent*

PROJECT WORK   *Mar. 2019 - Now*

- Frozen section is widely used for intraoperative pathological diagnosis (IPD), which is essential for intraoperative decision making but suffers from some drawbacks, e.g., time consuming and high misdiagnosis rate. Thus we aim to develop a novel deep learning based IPD system for rapid and accurate intraoperative diagnosis.
- The IPD system is based on the multi-modality fusion, including the Videos and CT images. The video-based branch involves two main components, i.e., feature encoding networks (DenseNet-169) and LSTM-based feature fusion. In the CT-based branch, We extract 1218 radiomics features from the CT images by PyRadiomics, then perform features selection by LASSO.

Clinically Applicable AI System for Accurate Diagnosis of COVID-19 Pneumonia   *Jarvis Lab, Tencent*
PROJECT WORK   *Jan. 2020 - Now*

- Developed an AI system that can diagnose COVID-19 pneumonia and differentiate it from other common pneumonia and normal controls by using Chest CT Images. Our AI system can provide accurate diagnosis that can assist clinicians in performing a quick diagnosis especially when the health system is overloaded.
- The AI system consists of lung segmentation, lesion segmentation and classification (3D ResNet-18), which has been used in WuHan since February 20th.

Publications

JOURNAL ARTICLES

1. **Jiawei Chen**, Xinpeng Xie, Yefeng Zheng, "Beyond Mutual Information: Generative Adversarial Network for Domain Adaptation using Information Bottleneck Constraint", (IEEE TMI under review)

2. Dapeng Du, **Jiawei Chen**, Yefeng Zheng, "Cross-domain Gated Domain Generalization", (IJCV under review. This work was done when Dapeng Du was an intern in my supervision.)

3. **Jiawei Chen**, Yuexiang Li, Yefeng Zheng, "Mutual-GAN: Towards Unsupervised Cross-Weather Adaptation with Mutual Information Constraint", (IEEE TNNLS under review)

4. Yuexiang Li, **Jiawei Chen**, Yefeng Zheng, Youlin Qiao, "Computer-aided Cervical Cancer Diagnosis using Time-lapsed Colposcopic Images", IEEE Transactions on Medical Imaging, **Co-first author**. (IF 7.816)

5. Yuexiang Li, **Jiawei Chen**, Yefeng Zheng "Efficient and Effective Training of COVID-19 Classification Networks with Self-supervised Dual-track Learning to Rank ", **IEEE Journal of Biomedical and Health Informatics**, **Co-first author**. (IF 5.223)

6. **Jiawei Chen**, Haibin Chen, Xin Zhen, "Investigating a Rectal Toxicity Prediction Model with Deformable Accumulated Rectal Surface Dose Maps for Cervical Cancer Radiotherapy", **Radiation Oncology**. (IF 2.895)

7. Xin Zhen, **Jiawei Chen**, Xin Zhen, "Deep Convolutional Neural Network with Transfer Learning for Rectum Toxicity Prediction in Cervical Cancer Radiotherapy: A Feasibility Study", **Physics in Medicine and Biology**. (IF 3.03. Noted that Xin Zhen is my master's supervisor.)

CONFERENCE PROCEEDINGS

1. Xinpeng Xie, **Jiawei Chen**, Yefeng Zheng, "Self-Supervised CycleGAN for Object-Preserving Image-to-Image Domain Adaptation", in The 16th European Conference on Computer Vision (**ECCV 2020**), **Co-first author**, Online, August 2020.

2. Xinpeng Xie, **Jiawei Chen**, Yefeng Zheng, "Generative Adversarial Network for Medical Image Domain Adaptation using Mutual Information Constraint", in The 23rd Medical Image Computing and Computer Assisted Intervention (**MICCAI 2020**), **Co-first author**, October 2020.

3. Xinpeng Xie, **Jiawei Chen**, Yefeng Zheng, "Instance-aware Self-supervised Learning for Nuclei Segmentation", in The 23rd Medical Image Computing and Computer Assisted Intervention (**MICCAI 2020**), **Co-first author**, Online, October 2020.

4. **Jiawei Chen**, Yuexiang Li, Yefeng Zheng, "Generative Adversarial Networks for Video-to-Video Domain Adaptation", in The Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI 2020**), New York, February 2020.

5. **Jiawei Chen**, Haibin Chen, Xin Zhen "Rectal Toxicity Prediction in Cervical Cancer Radiotherapy Using Support Vector Machine and Deformable Accumulated Surface Dose", in The 59th Annual Meeting of American Association of Physicists in Medicine (**AAPM**), Denver, July 2017. (**Oral Presentation, Science Council Session Award**)

Honors & Awards

2020	**Performance Evaluation in Tencent,** 3 stars, 3 stars, 5 stars, 4 stars (2018-2020)	*Tencent*
2020	**Tencent WeInnovate Awards,** The First Prize of Tencent WeInnovate Awards in June 2020	*Tencent*
2019	**Best Paper Award,** The International Workshop on Multiscale Multimodal Medical Imaging	*Shenzhen, China*
2017	**Science Council Session Award,** The 59th Annual Meeting of American Association of Physicists in Medicine	*Denver, U.S.*
2017	**National scholarship,** for postgraduates in Southern Medical University	*BME Dept., SMU*
2017	**First Prize,** Academic Scholarship in Southern Medical University	*BME Dept., SMU*
2016	**First Prize,** Academic Scholarship in Southern Medical University	*BME Dept., SMU*
2014	**First Prize,** Academic Scholarship in Southern Medical University	*BME Dept., SMU*

Skills

Programming	Python, C/C++, Matlab, LaTeX
Framework	Pytorch, Keras, Tensorflow
Languages	Chinese, English, Cantonese