Tianyi Ye Email: tye5@jh.edu   Phone: (667)910-3344

EDUCATION

Johns Hopkins University   **Baltimore, MD, US**
MSE in Biomedical Engineering   *Sept 2021-May 2023*
GPA: 3.73/4.0

Sichuan University   **Chengdu, China**
BSc in Nuclear Engineering and Technology   *09/2016-05/2020*
Major GPA: 3.64/4.0   Overall GPA: 3.64/4.0   Rank: 9/90
Excellent Graduate with bachelor's degree 10/2019   1st-class Individual Scholarship   10/2019
"Outstanding Student" 12/2018   1st-class University-level Comprehensive Scholarship11/2018
3nd-class University-level Comprehensive Scholarship 11/2017

RESEARCH EXPERIENCES

Johns Hopkins University *(Supervisor: Prof. Ji Yi)*   **Baltimore, MD, US**
Project: Simultaneous Denoising and Segmentation for Retina Visible Light OCT Images   *11/2021-now*

- Created dataset with Matlab-preprocessed raw vis-OCT volume, annotated retinal surfaces with clinical collaborators via ImageJ and Python
- Adopted supervised noise to label strategy and an unsupervised noise-to-noise strategy with UNet to reduce the speckle noise of vis-OCT image (Pytorch)
- Adopted self-supervised noise to void strategy and used UNet to estimate the pixel from the area containing only information of content to reduce the speckle noise of vis-OCT image (TensorFlow)
- Proposed a jointly self-denoising and segmentation method based on ResUNet that achieved visually better denoising results than self-denoising alone. It significantly improved segmentation performance by a 2% higher Dice coefficient for certain retinal layers (GCL, IPL and INL) when available annotation drops to 25%. (TensorFlow)

Tsinghua University *(Supervisor: Prof. Yanan Sui)*   **Beijing, China**
Project: AutoEncoder Based Deepfake for Parkinson's Disease (PD) Patient Privacy Protection and Face Information Reservation   *03-07/2021*

- Preprocessed video used for PD diagnosis provided by our cooperative hospital through face detection (dlib), cropping, and resizing, data cleaning and augmentation, to create training data for deepfake
- Merged the output of the trained model to original frames to form the face-swapped videos
- Evaluated the regenerated video via video naturalness, face recognition, expert evaluation conducted by human, object key point similarity (OKS) and eye/mouth dynamics conducted by supervision by registration (SBR) algorithm
- Developed a batch processing program with SBR algorithm to detect all frames of subjects for landmark detection and calculation of Eye Aspect Ratio (EAR) and Mouth Aspect Ratio (MAR), thereby conducting automatic data cleaning and eye/mouth dynamics analysis

Shanghai Jiao Tong University *(Supervisor: Prof. Qiu Huang)*   **Shanghai, China**
Project: Unsupervised Sparse View CT Artifacts Disentanglement based on CycleGAN   *09/2020-01/2021*

- Classified, evaluated, and preprocessed CT datasets
- Implemented CycleGAN to perform unsupervised artifacts disentanglement of sparse view CT images (Pytorch)
- Compared UNet and ResNet for supervised sparse view CT artifacts reduction (Pytorch)

Institute of Nuclear Science and Technology, Sichuan University *(Supervisor: Prof. Ning Huang)*   **Chengdu, China**
Project: Development of Large-area Multi-feature X-ray photoelectron spectroscopy (XPS) Surface Analysis Apparatus 02/2019-05/2020

- Simulated the energy deposition of photons in Si slices after photons passing through the Be window via Geant4
- Developed signal and data processing program with Python code for imaging and elemental composition analysis in PyMca (Python)

COMPUTER SKILLS

Python, Matlab, Pytorch, TensorFlow

COURSE PROJECTS

Retinal Vessel Segmentation Using Different Attention Mechanisms   **03-05/2022**

- Combined UNet with Spatial-wise attention mechanism, channel-wise attention mechanism, and their combination, to adjust the weight of the feature maps extracted by the encoders in UNet and focus on those of tiny vessels in the retina
- Compared Dice/Precision/Recall score of the aforementioned 3 methods and carried out visualization

Automatic Segmentation of Cone-beam CT (CBCT) Image in Distal Tibiofibular Joints Injury Analysis   **03-05/2022**

- Used the square version dice loss to replace the original binary cross entropy loss
- Develop an attention block in U-Net that combines spatial and channel-wise relationships of the feature maps on different levels
- Created thickened CBCT dataset and adopted 3-D UNet, to leverage the information of neighboring slices in 3D volume and increase the precision of segmentation

Cervical Cell Classification via Traditional Machine Learning (SVM/KNN) and Deep Learning Methods 10-12/2021

- Implemented SVM and KNN in Matlab for Cervical Cell Classification
- Compared the classification accuracy with SVM, KNN and VGG16 with attention blocks