QINYANG SHOU

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RESEARCH EXPERIENCE

A diffusion model for quantitative CBF analysis Aug. 2023 - Present
University of Southern California, Lab of Functional MRI Technology (LOFT) Los Angeles, CA

- Devised a conditional latent diffusion model to impute missing calibration images in arterial spin labelling(ASL) data, achieving a high fidelity score with structural similarity index (SSIM) of 0.924
- Validated the imputed cerebral blood flow (CBF) data against acquired data from vendors, exhibiting minimal bias in CBF values and improved classification accuracy with a 10.3% AUC improvement

A Swin Transformer model for ASL image denoising Sept. 2022 - Feb. 2024
University of Southern California, LOFT Los Angeles, CA

- Extended the ResNet with Swin Transformer-based network to facilitate ASL image denoising, achieving a 50% reduction in scanning time while preserving a similar Signal-to-Noise Ratio (SNR)
- Augmented the baseline 2D model architecture by transforming it into a pseudo 3D framework that supports multi-channel input, leading to an increase in Signal-to-Noise Ratio (SNR) up to 30%
- Utilized a patch-based training strategy to couple with the shifted windowing scheme of Swin Transformer, boosting model performance with increased training sample size, while offering input size flexibility compared to traditional 3D Vision Transformers

A 3D CNN model for segmentation of penumbra in stroke Jul. 2018 - Dec. 2020
University of Southern California, LOFT Los Angeles, CA

- Employed a compact end-to-end 3D CNN architecture for penumbra area segmentation, attaining a patient-wise accuracy of 92%, and a generalized voxel-wise AUC of 0.958
- Devised and Implemented an auto-labelling tool exploiting the nature of stroke pixel connectivity, significantly enhancing the efficiency by automating the imaging data annotation process
- Conducted a thorough performance evaluation to demonstrate a consistent over-performance over traditional feature-based methods, with an up to 7% improvement in AUC score

SELECTED PUBLICATIONS

Deep learning detection of penumbral tissue on arterial spin labeling in stroke
Wang K, **Shou Q**, Ma SJ, ... & Wang DJ Stroke. 2020 Feb;51(2):489-97

Diffusion model enables quantitative CBF analysis of Alzheimer's Disease
Shou Q, Cen S, ... & Wang DJ Radiology AI, submitted

INTERNSHIPS

Subtle Medical, Inc Menlo Park, CA
Research Scientist Intern - Deep Learning May. - Aug. 2022

- Compressed a transformer-based Denoising Model to ResNet Architecture with knowledge distillation
- Boosted the model inference time by 35 X with trivial performance loss on the SNR metric
- Extended the single task model with transfer learning workflow to support multi-tasking models, outperforming the model trained directly on multi-task data

EDUCATION

University of Southern California - Viterbi School of Engineering Log Angeles, LA
Ph.D. in Biomedical Engineering Nov. 2024 (expected)
Shanghai Jiao Tong University Shanghai, China
B.S. in Biomedical Engineering July. 2019
Courses related Operating System, Software/Web Development, Data Structures & Algorithms

SKILLS

Languages *Proficient in* : C++ , Python, Matlab *Familiar with* : C, JavaScript, Shell Scripting
Technology PyTorch, Scikit-learn, OpenCV, PyTorch, MySQL, AWS RDS/Lambda/EC2/S3