

LIXUAN CHEN

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EDUCATION

ShanghaiTech University

Sep. 2021 - Exp July 2024

M.S.E in Computer Science, GPA 3.63/4 (Major: 3.73/4); Advisor: [Prof. Yuyao Zhang](#)

Core Course: Deep learning, Medical image processing and analysis, Digital Image Processing

ShanghaiTech University

Sep. 2017 - July 2021

B.E. Computer Science and Technology, GPA 3.39/4

RESEARCH INTEREST

• My research interests lie in the field of **computer vision** and **medical image processing**, from the perspective of **implicit neural representation**, **fetal brain reconstruction**, and **weakly/semi-supervised segmentation**.

PROJECTS

- **Longitudinal Brain Atlases Construction via implicit neural representation.**^{[1][4]} July 2021 - present
 - Existing longitudinal atlas construction methods averaged brain images on discrete time points independently, leading to temporal inconsistency issue.
 - Modeled the time inconsistency issue as a 4D image denoising task, and use implicit neural representation to construct continuous and noise-free longitudinal brain atlases.
 - Evaluated on two modalities of brain atlases (QSM and fetus atlases), and significantly improves temporal consistency while maintaining accurate representation of brain structures.
 - Extended to generate finer (i.g. 0.5-week interval) 4D atlases with higher spatial and temporal resolution.
- **Robust Self-supervised Volume Reconstruction for Fetal Brain MRI.**^[2] July 2021 - present
 - Due to slice misalignment and motion artifacts, the fetal brain MRI reconstruction is often corrupted.
 - Combined a comprehensive forward model and under-parameterized deep decoder structure to reduce network overfitting and image artifacts caused by slice misalignment and motion.
 - Outperformed SOTA methods (SVRTK, NiftyMIC, and SSGNN) by achieving superior results across five matrices (i.g. 24% improvement in PSNR) on both simulated and real clinical data.
- **Self-supervised Slice-to-Volume Registration Despite Fetal Motion.**^[3] July 2021 - present
 - Slice-to-volume registration (SVR), which corrects the slice misalignment, is essential for subsequent 3D volume reconstruction.
 - Incorporated the MRI acquisition model into the SVR network to accurately predict the spatial transformation aligning 2D slices to 3D volumes.
 - Achieved better SVR performance (i.e. lower MAE and RMSE value), and benefited the existing fetal brain MRI reconstruction methods.
- **Longitudinal Infant Brain MRI Segmentation.** March 2021 - May 2021
 - Investigated different segmentation model designs and extend DenseNet to 3D volumetric data to perform 3D volumetric segmentation.
 - Achieved dice similarity coefficient (DSC) of 90.325% of three brain tissues across five time points.

PUBLICATIONS

[1] **Continuous longitudinal fetus brain atlas construction via implicit neural representation** [\[Paper\]](#)

Lixuan Chen, Jiangjie Wu, Qing Wu, Hongjiang Wei, Yuyao Zhang

• Accepted by *MICCAI workshop PIPPI 2022* (**Best Paper Honorable Mention**)

- [2] **ASSURED: A Self-supervised Deep Decoder Network for Fetus Brain MRI Reconstruction**
*Jiangjie Wu, **Lixuan Chen**, Zhenghao Li, Lihui Wang, Rongpin Wang, Hongjiang Wei, Yuyao Zhang*
 • Accepted by *ISBI 2023*
- [3] **ALIGNER: A Self-supervised Slice-to-Volume Registration Network for Fetal Brain MRI Reconstruction**
*Jiangjie Wu, **Lixuan Chen**, Zhenghao Li, Lihui Wang, Rongpin Wang, Hongjiang Wei, Yuyao Zhang*
 • Submitted to *MICCAI 2023*
- [4] **COLLATOR: Consistent Spatial-Temporal Longitudinal Atlas Construction via Implicit Neural Representation**
***Lixuan Chen**, Jiangjie Wu, Qing Wu, Guoyan Lao, Hongjiang Wei, Yuyao Zhang*
 • Submitted to *NeuroImage*

EXPERIENCE

Bell Labs

Dec. 2020 - June 2021

Research Internship (Part-time); Supervisor: Dr. Chenhui Ye, Dr. Wenyi Xu, Dr. Fei Gao *Shanghai, China*

- Proposed a behavior recognition method based on meta-learning using WiFi channel state information(CSI).
- Enabled the model to rapidly adapt to new environments, as demonstrated through its performance on two public datasets and real-world data, in comparison to traditional supervised learning.

TEACHING

CS270: Digital Image Processing

2021 Fall

ADDITIONAL

- Programming: Python, C++, C, MATLAB, html, L^AT_EX
- Languages: Chinese (Native), English (Fluent)
- Framework: PyTorch