

Chenyu Gao

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RESEARCH INTERESTS

Image processing, machine learning, and computer vision with application to medical imaging.

EDUCATION

Johns Hopkins University Aug 2020 – Present
Master of Science in Biomedical Engineering, advisor: Prof. Jerry Prince Baltimore, MD

Sun Yat-sen University Aug 2016 – June 2020
Bachelor of Science in Biomedical Engineering, GPA: 3.7/4.0 Guangzhou, China

EXPERIENCE

Graduate Research Assistant Dec 2020 – Present
Image Analysis and Communication Lab, Prof. Jerry L. Prince Baltimore, MD

- Conduct independent research to examine the effects of defacing algorithms, which are designed to protect patient privacy, on the post-processing of MR images.
- Learn to implement traditional and advanced deep-learning-based algorithms for tasks such as registration, segmentation, harmonization, super resolution, and so on.

Machine Learning Research Assistant Aug 2020 – May 2021
NeuroData Group, Prof. Joshua Vogelstein Baltimore, MD

- Extend the application of a homemade lifelong learning algorithm, [Progressive Learning](#), onto audio processing.
- Validate the omnidirectional knowledge transfer of the algorithm and visualize the result for publication.

Undergraduate Research Assistant Aug 2017 – June 2020
Sensor Technology and Biomedical Instruments Lab, Prof. Jun Wu Guangzhou, China

- Prototype the wound detection module of an electrospinning machine for skin wound healing, using YOLO.
- Design and synthesize bioactive materials for bone tissue engineering.
- Support research teams in bone tissue regeneration as the in-vivo technical specialist. Perform craniotomy on more than 50 rats with a survival rate above 92 percent.

PROJECTS

Shiny APP for Bird Recognition Using Convolutional Neural Network May 2021
Advisor: Prof. Brian S. Caffo

Build a [website](#) for bird image classification from scratch in 8 days independently. It is based on a residual convolutional neural network that was pretrained on ImageNet by Keras and transferred onto Caltech-UCSD Birds. ([demo](#))

Multimodal Brain Tumor Segmentation and Survival Prediction May 2021
Advisor: Prof. Jerry L. Prince

Implement a 3D U-net and a cascaded anisotropic convolutional neural network for brain tumor segmentation. Based on the segmentation result, extract radiomic features to train a regression tree ensemble model for survival prediction. The presentation was the 1st place winner in the final competition. ([demo](#))

Neural Decoding for Patients with Upper Limb Paralysis Apr 2021
Advisor: Prof. Gene Y. Fridman

Inspired by the experiment of Elon Musk's Neuralink, in which the monkey could play video games with its imagination, we implement two algorithms, Kalman Filter and Long Short-Term Memory Networks, for decoding 164-channel neural signals from a monkey controlling a cursor. ([demo](#))

Computational Medicine: i) Imaging & ii) Physiome Aug 2020 – Dec 2020
Advisor: Prof. Michael I. Miller, Prof. Tilak Ratnanather, Prof. Raimond L. Winslow, and Dr. Joseph L. Greenstein

i) Perform statistical analysis to demonstrate the association between Alzheimer's disease and frontal lobe volumes, which are quantified from T1-weighted MRI scans with multi-atlas segmentation method.

ii) Implement classical models to estimate cardiac output from arterial blood pressure using ICU physiologic data.

PUBLICATIONS & CONFERENCES

- [1] Linghao Jin, Chenyu Gao, Jerry L. Prince, Aaron Carass, **“Effects of defacing whole head MRI on neuroanalysis”**, *SPIE Medical Imaging Conference*, San Diego, California, United States, 21 Feb 2022
- [2] Jayanta Dey, Joshua Vogelstein, Hayden Helm, Will Levine, Ronak Mehta, Ali Geisa, Guido van de Ven, Emily Chang, Chenyu Gao, Weiwei Yang, Bryan Tower, Jonathan Larson, Christopher White, Carey Priebe, **“Omnidirectional Transfer for Quasilinear Lifelong Learning”**, [PREPRINT](#)
- [3] Lili Wang, Long Chen, Jiping Wang, Liying Wang, Chenyu Gao, Bo Li, Yuanzheng Wang, Jun Wu, Changyun Quan, **“Bioactive gelatin cryogels with BMP-2 biomimetic peptide and VEGF: a potential scaffold for synergistically induced osteogenesis”**, *Chinese Chemical Letters*, 26 Oct 2021

AWARDS & HONORS

Scholarship of Sun Yat-sen University for Outstanding Students	Sept 2019
Scholarship of Sun Yat-sen University for Academic Progress	Jan 2019
2 nd Prize: Guangdong Undergraduate BME Innovation Design Competition	Aug 2018

TECHNICAL SKILLS

Languages: Python, R, C++, Bash

Algorithms: see the growing list: [stay hungry, stay foolish](#)

Developer Tools: Git, Singularity, Docker, VS Code

Libraries: OpenCV, TensorFlow, PyTorch, Keras, scikit-learn, ANTs