Haonan He

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Education

South China University of Technology, Guangzhou, China   Aug 2018 – Jul 2022

B.Eng. in Intelligence Science and Technology, GPA: 3.59/4.00 (top 20%)

Research (Supervised by Pengcheng Zhou in Shenzhen Institute of Advanced Technology)

Transformer-based methods for neural decoding   May 2021 – Present

- Develop two Transformer-based models to decode spike trains
- Examine Transformer's ability of dealing with large-scale long-range dependencies
- Design experiment to examine the existence of inter-neuron activities
- Write a manuscript to summarize these works

Machine learning algorithms for neural decoding   Mar 2021 – May 2021

- Apply various machine learning algorithms to neuronal data
- Compare decoding abilities of CNN, LSTM, GRU, XGBoost, SVM, etc.
- Write a Chinese survey to summarize these algorithms

Research (Supervised by Tianyou Yu in South China University of Technology)

Transfer learning for EEG signals   Oct 2020 – Feb 2021

- Modify Domain Adversarial Neural Network (DANN) to EEG signals
- Investigate domain adaptation theories
- Process EEG signals

Generative Adversarial Networks (GAN) for EEG signals   Mar 2020 – Jun 2020

- Use Wasserstein Conditional GAN (WCGAN) to generate labeled EEG signals
- Develop Convolutional Neural Networks (CNN) to decode EEG signals

Publication

Spatial-Temporal Transformer-based Methods for Neural Decoding, under review (first author)

Selected Practical Experiences

Development of a Raspberry Pi smart car   Apr 2021 – Jun 2021

- Design and manufacture body structure of the car
- Program on Raspberry Pi to implement auto-tracking
- Use OpenCV to identify colors and QR codes

Development of a 5-DOF robotic arm   May 2021 – Jun 2021

- Perform forward and inverse kinematics solution
- Imply eye-to-Hand coordination for visual servoing
- Develop Qt graphical user interface

Skills

Programming Languages: Python, C++, Matlab, HTML/CSS
Tools and Frameworks: PyTorch, Tensorflow, LaTeX, Qt