Jingyuan Li

+1 (412) 509 7858
jingyua1@andrew.cmu.edu, lijingyuandr1@gmail.com
https://christincha.github.io

Research Interest

Computational Neurosciecce, Machine Learning, Signal Processing, Cognitive Neuroscience.

Education

08/16-05/18 **Master, Electrical and Computer Engineering**, *Carnegie Mellon University, Pittsburgh, PA*, Courses: Machine Learning, Deep Learning, Reinforcement Learning., GPA:3.82/4.

11/15-04/16 **Internship, Biomedical Engineering**, *Tsinghua University, Beijing, China*.

09/12–05/16 **Bachelor, Biomedical Engineering**, *Huazhong University of Science and Technology, Wuhan, Hubei, China*, Courses: Linear algebra, Calculus, Probability theory, Anatomy and Physiology, GPA: 3.87/4.

Research Experiences

08/17-Present **Neural Representation Space Transformation by Modifying Connection in V2 Neurons**.
- Data: ECoG recordings from V2 of macaque monkey.
- Investigated functional connectivity based on Noise Correlation and Cross Correlation Histogram Analysis. We found connection was strengthened for co-activated neurons.
- Analyzed neural representation changes based on t-Distributed Stochastic Neighbor Embedding, Principal Component Analysis and sparsity analysis.

08/17-12/17 **Discrimination Ability of V1 and V2 Neurons on Cartesian Stimuli (macaque monkey)**.
- Applied Support Vector Machine decoding frequency and orientation of stimuli based on V1 and V2 neuron responses.
- Orientation accuracy, V2:78%, V1:48%, chance:16%. Frequency accuracy: V2:54%, V1:42%, chance:12.5% (20 neurons).

08/17-12/17 **Neural Network Models of Primary Visual Cortex**.
- Applied Convolutional Neural Network for fitting V1 neural responses of macaque monkey.
- Approved sparsity property of Neuron responses, by adding L1 Norm which improved prediction correlation from 0.599 to 0.63.

08/16-06/17 **Hierarchical Subcortical Sub-regional Shape Network Analysis**.
- Computed global and local efficiency of subcortical brain networks using graph theory[2].
- Segmented template surfaces for subcortical structure into multiple functionally distinct subregions to study functions of each region[3].

11/15–04/16 **Deep Networks for Lung Cancer Detection**.
- Auxiliary diagnosis for Lung cancer based on CT(Computer Tomography) images with semi-supervised Ladder network.

09/14–08/15 **A Near-Infraed Light Based Wearable Breast Cancer Detector**.
- Designed a DSP based imaging system based on near-infrared light detecting oxygenated and deoxygenated hemoglobin in breast tissue.

Course Project

08/17-12/17 **Deep Learning**.
- Implemented Stochastic Gradient Descent & Batch Normalization from scratch for FCN and RBM reaching the same performance as exiting framework (Pytorch).
- Sequence to Sequence prediction of 4-grams.

01/18-05/18 **Reinforcement Learning**.
- Implemented Deep Q Network (DQN) and Duling DQN on both CartPole-v0 and MountainCar-v0 environment.
- Applied Actor-critic network with Hindsight Experience Replay for robotic arm control in simulated environment and improved the performance with prioritized experience replay (PER).

01/18-05/18 **Volume and Shape Features based Alzheimer's Disease (AD) and Mild Cognition Impairment**.
- Compared difference machining learning techniques in Alzheimer's disease detection based on volume and shape features.
- Proposed Shape-Embedding network. Improved classification accuracy to 82.00% in the MCI vs HC classification.

Skills

Programming Python, MATLAB, C^{++}, R.

Software Tools Keras, TensorFlow, PyTorch, Numpy, Matplotlib, AWS, Git, Bash.

Publications

[1] Yujing Gong, Huijun Wu, Jingyuan Li, Nizhuan Wang, Hanjun Liu, and Xiaoying Tang. Multi-granularity whole-brain segmentation based functional network analysis using resting-state fmri. *Frontiers in neuroscience*, 12:942, 2018.

[2] Jingyuan Li, Yujing Gong, and Xiaoying Tang. Hierarchical subcortical sub-regional shape network analysis in alzheimer's disease. *Neuroscience*, 366:70–83, 2017.

[3] Xiaoying Tang, Na Chen, Siyun Zhang, Jeffery A Jones, Baofeng Zhang, Jingyuan Li, Peng Liu, and Hanjun Liu. Predicting auditory feedback control of speech production from subregional shape of subcortical structures. *Human Brain Mapping*, 2017.

Abstract Subcortical Surface Brain Network Abnormality in Alzheimer's Disease, 2017th Organization for Human Brain Mapping Conference.

Conference & Competition

- Canonical Computation in Brains and Machines, New York University, 2018.
- Society of Neuroscience, 2018.
- Brainhub NEUROHACKATHON, Carnegie Mellon University, 2018.