

Qiwei Dong

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Education

University of California, San Diego	2015.09 – 2019.06
Bachelor of Science in Cognitive Science and Computer Science	GPA: 3.94/4.0
Northwestern University	2019.09 – 2021.06
Master of Science in Neurobiology	GPA: 3.88/4.0

Theses & Presentations

- Dong, Qiwei., Sombeck, Joseph., & Miller, L. E. (2021) Use of a markerless pose estimation method in the analysis of somatosensory cortical area 2 neural responses to 3D reaching movements. Northwestern University.
- Dong, Qiwei., Ahmadi, Sia., & Leutgeb, Jill. (2019) Developing and Implementing a Closed-Loop Sharp Wave Ripple Detection and Stimulation Algorithm in the CA3 Hippocampal Subregion. University of California, San Diego.
- Dong, Qiwei., Siddharth, Siddharth., Jung, Tzyy-Ping. (2018) Investigation of EEG and PPG Data for Subjects with Visual Height Intolerance. Fourth annual symposium of Chancellor's Research Excellence Scholarships. University of California, San Diego.

Research Experience

Miller Laboratory of Limb Motor Control, Northwestern University | Lee Miller 2019.09 – 2021.09

- Analyzed the proprioceptive response to 3D reaching movements, aimed to understand the electrophysiological properties of neurons in the primary somatosensory cortex (S1) during unconstrained reaching movements.
- Built an experiment pipeline to record and process reaching activities. Extracted landmarks on the arm using a markerless motion tracking software called DeepLabCut.
- Generated estimated coordinates of these landmarks with the transfer learning model from DeepLabCut using minimal training data (~300 frames to cover all the videos for each monkey and each task), and quantitatively optimized the model performance.
- Performed 3D reconstruction of these landmarks, which were used as a reference to build whole-arm kinematics. Designed evaluation metrics to assess the 3D reconstruction accuracy.
- Prepared manuscript for submission describing the encoding characteristics of S1 neurons during unconstrained reaching movements.

Swartz Center for Computational Neuroscience, University of California, San Diego | Tzyy-Ping Jung 2017.01 – 2019.06

- Investigated the Electroencephalography (EEG) signals and body posture changes for subjects with fear of heights. Aimed to explore the neural and physiological correlations of visual height intolerance.
- Designed novel experiment paradigm using high-density dry EEG headset and Photoplethysmography (PPG) armband synchronized with VR headset, eye tracker, and body position tracker. Built the experiment environment in Unity.
- Preprocessed the pilot neural data with low-band noise filtering, artifact removal, and task segmentation. Analyzed the data using EEGLAB toolbox in MATLAB.

Leutgeb Laboratories, University of California, San Diego | Jill K. Leutgeb 2018.09 – 2019.06

- Studied the function of sharp-wave ripples (SWR) in rat hippocampal CA3 region for working memory in spatial tasks. Aimed to prove that dentate network activity is necessary for generating hippocampal SWR.

- Used a real-time, closed loop signal processing platform to design and implement a quick-responding sharp-wave ripple detection and interruption application.
- Evaluated the application using single-cell recordings from hippocampus, results showed high accuracy in detecting SWR signals, and low false positive rate with noises.

San Diego Supercomputer Center | Mai Nguyen

2018.04 – 2019.06

- Analyzed the unsupervised classification performance of a deep learning-based analysis pipeline on high-resolution satellite images. The project, funded by UNICEF, aimed to identify undocumented schools in Liberia.
- Improved and evaluated the classification accuracy of the image classification pipeline used in the project. Used a modified ResNet to extract features on each tile of the satellite imagery, and K-Means algorithm to help classify terrain types.
- Implemented and maintained an end-to-end data processing and deep learning experimentation pipeline.

Skills

- **Programming Skills:** Python, MATLAB, Java, C, C++, C#
- **Technical Skills:** PyTorch, Tensorflow, Keras, Scipy, Scikit-Learn, Pandas, Numpy, Matplotlib, Git, OpenCV, Docker, Kubernetes, CUDA, Unity, Arduino, Eagle

Courses

- Brain Computer Interface, Bioelectronics, Statistical Analysis, Linear Algebra, Modeling & Data Analysis, Mathematical Algorithms and Systems Analysis, Robot Systems Implementation