Qi Wang

Current role: Ph.D. Researcher

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Education

•Max Planck Institute for Biological Cybernetics *Germany, Oct 2019-now*

Ph.D. researcher, Advisors: Prof. Dr. Klaus Scheffler, PD. Dr. Gabriele Lohmann

•Eberhard Karl Universität Tübingen *Germany, Oct 2019-now*

Ph.D. Candidate, Graduate Training Center of Neuroscience

•Hong Kong Polytechnique University *Hong Kong, Sep 2017-Mar 2019*

MSc., Mechanical Engineering in Aeronautical Engineering GPA: 3.0/4.0

•Qing Hai University *China, Sep 2013-June 2017*

BSc., Mechanical Engineering GPA: 3.7/4.0

Projects

•Brain MRI surface rendering from volume using implicit neural representation(Deep Learning) *2023*

Render brain surface from MRI volumes without using ground truth mesh in training

– implicit representation used for rendering the surface of the brain MRI
– training without paired mesh ground truth, which is required in other works

•Stable GAN training for super-resolution on volumetric MRI data(Deep Learning) *2021*

We use super-resolution strategy to generate high-resolution MRI volumes, with the most indistinguishable details

– Stability in GAN dynamics, efficient convergence with small training sample size
– Our GAN model achieved best perceptual quality in both spatial and frequency domain, with a frequency-informed discriminator
– The best generalizability in OOD data than any other SR models for medical images

•Flexible segmentation network for brain MRI on various resolutions(Deep Learning) *2021*

A neural network model, trained on 3T MRI data using domain adaption, to segment 9.4T MRI data

– SOTA segmentation accuracy on 9.4T MRI data
– benchmarking existing ML based segmentation method as well as traditional segmentation tools for 9.4T MRI data

•Inductively coupled wireless MR detector for improving focal SNR(Neuroscience) *2020*

A wireless MRI coil with enhanced SNR for animal experiments in 14.1T scanner

– Developed wireless MR detector that allows flexible experiment design, e.g. concurrently optogenetic recording with MRI under ROI of the coil
– Analysis of laminar BOLD fMRI signal functional activity in somatosensory cortex

•Laminar-specific functional connectivity mapping with multi-slice fMRI(Neuroscience) *2020*

Multi-regional line-scanning fMRI paired with optical calcium signal recording, in 14.1T scanner

– Multi-slice BOLD fMRI is recorded concurrently with local neuronal calcium signal, via an optical fiber
– Neuro-vascular coupling studied in both task-evoked and spontaneous recording of brain states in rats

•Automated vision-based micro-surgical task execution through a robotic multi-arm system(Robotics) *2018*

The vision system adopted a segmentation network trained on RGB-D images

Technical Skills and Interests

Languages: Chinese(Native), Cantonese(Fluent), English(Fluent), German(Basic)
Developer Tools: C/C++, Python, Matlab, Rust, Julia, LaTeX
Frameworks: PyTorch, JAX, Caffe, distributed training
Areas of Interest: Generative models, stability of GAN, Score-matching models, Computational fluid dynamics, Optimal transport, Graph neural networks

Recent Publications(→SEE ALL PUBLICATIONS)

1. DISGAN: Wavelet-informed discriminator guides GAN to MRI image Super-resolution with noise cleaning

ICCV Workshop on Computer Vision for Automated Medical Diagnosis 2023 (submitted)

Wang, Q.; Mahler, L.; Steiglechner, J.; Birk, F.; Scheffler, K.; Lohmann, G. *2023*

2. A Three-player GAN for Super-Resolution in Magnetic Resonance Imaging

MICCAI Workshop on Machine Learning for Clinial Neuroimaging 2023

Wang, Q.; Mahler, L.; Steiglechner, J.; Birk, F.; Scheffler, K.; Lohmann, G. *2023*

3. Super resolution for ultra-high fields MR images augmentation improving 9T MR image segmentation

Medical Imaging with Deep Learning(MIDL) 2022, Zürich

Wang, Q.; Steiglechner, J.; Scheffler, K.; Lohmann, G. *2022*

4. Focal fMRI signal enhancement with implantable inductively coupled detectors

NeuroImage *2022*

Chen, Y.; **Wang, Q.**; Choi, S.; Zeng, H.; Takahashi, K.; Qian, C.; Yu, X. Joint first authors