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Mengwei Ren

Research Interests

Computer Vision, Machine Learning, Medical Image Processing.

Education

2018 - present **Ph.D.**, *Computer Science*, Tandon School of Engineering, New York University.
Advisor: Prof. Guido Gerig.
Relevant courses: Machine Learning, Deep Learning, Artificial Intelligence, Computer Vision, Probability and Statistics for Data Science, Theory of Computation.
GPA: 3.94/4

2014 - 2018 **B.S.**, *Computer Science*, School of Computer Science and Technology, East China Normal University.
Relevant courses: Algorithm Analysis and Design, Object Oriented Programming (C++), C Programming, Matlab Programming.
Thesis: 3D Deep Dense Descriptor for Volumetric Shapes with Adversarial Networks.
GPA: 3.69/4, Major GPA: 3.78/4, Rank: 1/103.

Research Experience

05/2022 -present **Student Researcher**, *Computational Imaging (Luma) Team*, Google Research.
Supervisor: Hossein Talebi, Mauricio Delbracio, Peyman Milanfar
- Image-conditioned diffusion models for image deblurring.
- Improved the domain generalization ability of the model towards unseen data.

05/2019 -present **Research Assistant**, *Visualization, Imaging and Data Analysis (VIDA) Lab*, NYU Tandon.
Supervisor: Guido Gerig
- Segmentation-aware feature modulation for unpaired image translation.
- Q-space conditioned structural to diffusion MRI translation.
- Spatiotemporal representation learning for longitudinal neuroimage analysis.
- (Ongoing) Improving conditioning mechanism for longitudinal analysis.
- (Collaborative) Generative adversarial registration towards improved conditional template.

05/2021 -09/2021 **Machine Learning Research Intern**, *PCT REC group*, Siemens Healthineers.
Supervisor: Marriappan Nadar
- Unsupervised susceptibility distortion correction of MR images with opposite PE directions.
- Experimented and improved baselines for fast correction of multimodal images.

08/2017 -07/2019 **Research Assistant**, *Multimedia and Visual Computing Lab*, NYU Tandon.
Supervisor: Yi Fang
- 3D shape representation learning;
- Monocular depth estimation;
- Object detection with multimodal data (RGB image, LiDAR point cloud).

Publications

Under Review **Mengwei Ren**, Mauricio Delbracio, Hossein Talebi, Guido Gerig, Peyman Milanfar, "Image Deblurring with Domain Generalizable Diffusion Models", 2022.

Journal paper **Mengwei Ren***, Neel Dey*, James Fishbagh, Guido Gerig, "Segmentation-Renormalized Deep Feature Modulation for Unpaired Image Harmonization", IEEE Transactions on Medical Imaging (**TMI**), 2021.

Conference paper **Mengwei Ren**, Neel Dey, Martin Styner, Kelly Botteron, Guido Gerig, "Local Spatiotemporal Representation Learning for Longitudinally-consistent Neuroimage Analysis", Thirty-sixth Conference on Neural Information Processing Systems (**NeurIPS**), **oral**, 2022.

Mengwei Ren*, Heejong Kim*, Neel Dey, Guido Gerig, "Q-space Conditioned Translation Networks for Directional Synthesis of Diffusion Weighted Images from Multi-modal Structural MRI", International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), **oral** presentation, 2021.

Neel Dey, **Mengwei Ren**, Adrian Dalca, Guido Gerig, "Generative Adversarial Registration for Improved Conditional Deformable Templates", International Conference of Computer Vision (**ICCV**), 2021.

Jing Zhu, Yunxiao Shi, **Mengwei Ren**, Yi Fang, "MDA-Net: Memorable Domain Adaptation Network for Monocular Depth Estimation", British Machine Vision Conference (**BMVC**), 2020.

Preprint **Mengwei Ren**, Liang Niu, Yi Fang, "3D-A-Nets: 3D Deep Dense Descriptor for Volumetric Shapes with Adversarial Networks", 2018 (B.S. degree thesis).

Awards & Activities

2019- **Reviewer**, ISBI (2019), NeuroImaging (2021), TMI (2022), Frontiers in Neuroimage (2022).

10/2022 **NeurIPS 2022 Scholar Award**, New Orleans.

08/2022 **Invited talk**, LUMA seminar, at Perception, Google Research.

07/2022 **Invited talk**, Computational Neuroimage Science Lab, at Stanford Research Institute.

04/2022 **Guest lecture on deep learning**, NYU CS-GY 6643 Computer Vision.

2020-2021 **Tandon School of Engineering (SOE) Fellowship**, NYU.

04/2021 **Invited lecture on deep generative models**, NYU CS-GY 6643 Computer Vision.

04/2021 **CRA-WP Grad Cohort for Women Workshop**, Virtual.

09/2017 **Shanghai Government Scholarship**, *China*, Top 3%.

09/2016 **Academic Excellence Scholarship**, *ECNU*, Top 4%.

09/2015 **Outstanding student**, *Department of Information and Technology*, ECNU.

Selected Academic Projects

2020 Neonatal segmentation for over 100 subjects without expert labels via style transfer.

2019 Adversarial visual synthesize of 3D shapes and 2D images via disentangled representation.

2018 Deep reinforcement learning (deep Q-learning) on Pacman.

Skills

Programming (Order by frequency) Python, Shell, C/C++, MATLAB, Javascript, HTML.

Libraries (Deep Learning) Pytorch, Tensorflow; (NeuroImaging) FSL, ITK-SNAP, ANTs, 3D Slicer.

Language English (fluent), Chinese (native).