Moyang Li

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Education

Huazhong University of Science and Technology, Wuhan, China 09/2021 - 09/2022

M.E. in Artificial Intelligence, Grade: 92.38/100, GPA: 4.0/4.0

Huazhong University of Science and Technology, Wuhan, China 09/2017 - 06/2021

B.E. in Automation, Grade: 88.50/100, GPA: 3.92/4.0

Selected Projects

Novel View Synthesis with Sparse Inputs 08/2022 – 10/2022

- Proposed a geometric regularization loss by exploiting the multi-view consistency property to reconstruct the correct geometric structure for few-shot novel view synthesis based on neural implicit representation.
- Generated virtual unseen views around the sparse views at random, and minimized the appearances' difference between corresponding rays hitting the same 3D surface point with the assumption that the appearances of a 3D point's arbitrary visible projections should be consistent.
- Acquired the depth image of surface points through neural rendering and simultaneously inferred the depth image of those points through triangulation given the corresponding points' depth rendered in different views, restricted the inferred depth and rendered depth to be uniform.
- Achieved comparable performance on the real-world multi-view datasets DTU compared with the state-of-the-art approach InfoNeRF.
- Our proposed regularizer is also a plug-and-play method for boosting the performance of existing neural implicit representation techniques.

Class Imbalance Alleviation with Data Augmentation and Bias Compensation 01/2022 – 04/2022

- Utilized minority-favorable data augmentation strategies groups to generate balanced training sets by employing Mixup and CutMix.
- Compensated for the bias caused by class imbalance through a modification on standard cross-entropy loss, motivated by the optimal hyperplane for class-balanced Gaussian distribution.
- Introduced range loss to reduce the intra-class variations and enlarge the inter-class distance for imbalanced datasets. Increased the classification accuracy of tail classes by above 5-10% for varied imbalance ratios.
- Attained nearly state-of-the-art performance on imbalanced CIFAR-10 and CIFAR-100 datasets. Shaped the boundary of tail classes better, leading to clearer separation. Improved classification accuracy of tail class significantly and preserved the performance of the head class.
- Combined with FixMatch, the method could be extended to semi-supervised learning tasks, which is still in progress.

Transformer-based Emotion Recognition 12/2020 – 05/2021

- Applied Transformer-based model to an EEG-based emotion recognition task. Assigned attention weight to both the temporal domain and channels of EEG signals.
- Combined Transformer with the convolutional neural network to enhance the model's ability to simultaneously capture global and local features. Self-attention mechanism of the Transformer helped enlarge the receptive field and capture long-range dependencies, while CNN focused more on local regions.
- Discovered channels of EEG signals that are more relevant to the emotion recognition through the visualization of attention weights.
- Obtained better performance than traditional CNN-based models.

Stock Investment Software 09/2018 – 11/2018

- Designed the entire system structure, including user management module, stock trading module, stock quotation module and stock recommendation module.
- Analyzed the stock market in the past few days, calculated stock indicators based on the big size, price, turnover, etc., and provided reasonable suggestions for stock selection.
- Simulated stock exchanges based on real stock-exchange rules, designed user registration information database, managed transaction data, plotted real-time stock curves, and realized data management of stock watch lists.
- This project was implemented in C language, consisting of above 10000 lines of codes.

Experience

Computer Vision and Geometric Learning lab (CVGL), Westlake University — Hangzhou, China

Intern, Advisor: Prof. Peidong Liu — 06/2022 - Present

- Implemented 3D reconstruction on various scenarios based on neural implicit representation.
- Collected polluted images through dusty glass contaminated by dirt and dust, and reconstructed high-quality scenes without contamination.
- Investigated and implemented NeRF for the novel view synthesis using asynchronous event streams in RGB space.
- Proposed geometric regularization to mitigate the performance degradation of NeRF for novel view synthesis with only sparse inputs.

Selected Awards

- Outstanding Undergraduate at Huazhong University of Science and Technology 2021
- Third Prize of the 12th Central China University Students' Mathematical Modeling Invitational Competition 2019
- Science and Technology Scholarship 2019
- Grand Prize of C Programming Contest (1/318) 2018
- Study Excellence Scholarship (top 10%) 2018

Skills and Interests

Research Interests: 3D Reconstruction, Representation Learning, Explainable Machine Learning
Programming Languages: Python, C/C++, HTML, Matlab
Tools and Frameworks: LaTeX, PyTorch