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 (NeRF).
- Generated unseen views around the sparse input views at random, minimized the appearances' difference between corresponding rays hitting the same 3D surface point.
- Rendered the depth of surface points through NeRF, inferred the depth of corresponding points through triangulation with depth information of 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 the minority-favourable data augmentation strategy through a modification on SMOTE to generate balanced training sets.
- Motivated by the optimal hyperplane for class-balanced distribution, modified standard cross-entropy loss to compensate for the bias caused by class imbalance.
- Introduced Range Loss to reduce the intra-class variations and enlarge the inter-class distance for imbalanced datasets. Achieved the average performance improvement for varied imbalance ratios on tail classes and whole testing samples by 18.27% and 6.5% respectively.
- Obtained clearer separation of samples and shaped the boundary of tail classes in feature space better. Improved the classification accuracy of tail classes significantly and preserved the performance of head classes.
- Combined with FixMatch, the method was extended to semi-supervised learning tasks.

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

- Applied the 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 emotion recognition through the visualization of attention weights.
- Attained classification accuracy of 82.17% and 76.48% for models with time domain attention and "channel attention" respectively.

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 curve, and realized data management of stock watch lists.
- This project was implemented in C language and included over 10,000 lines of code.

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.
- Corrected the rolling shutter effect of images by modelling cameras' motion trajectory. Optimized NeRF network and camera poses simultaneously.
- 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 sparse inputs.

Selected Awards

- Outstanding Graduate 2021
- Third Prize, 12th Mathematical Contest in Modeling in Central China 2019
- Science and Technology Scholarship 2019
- Grand Prize, 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