Zhipeng Bao

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Education

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Robotics — GPA:4.17/4.30 — *Aug. 2019 – Aug. 2021*
- **Coursework:** Computer Vision, Machine Learning, Intermediate Deep Learning, Convex Optimization

Tsinghua University — Beijing, China
Bachelor of Electronic Engineering — GPA:3.53/4.00 — *Aug. 2015 – July 2019*
- **Coursework:** Data and Algorithm, C++ Programming, MATLAB Programming, Digital Image Processing
- **Thesis:** Text-To-Speech Synthesis with Limited Data
- **Honor:** Comprehensive Excellence Award of Tsinghua University (2018)

Selected Publications

Zhipeng Bao, Yuxiong Wang and Martial Hebert. *Generative Modeling for Multi-task Visual Learning.* arXiv 2020 (Under Review).
Zhipeng Bao, Yuxiong Wang and Martial Hebert. *Bowtie Networks: Generative Modeling for Joint Few-shot Recognition and Novel-View Synthesis.* arXiv 2020 (Under Review).
Zhipeng Bao, Shaodi You, Lin Gu and Zhenglu Yang. *Single-Image Facial Expression Recognition Using Deep 3D Re-Centralization.* ICCV 2019 workshops.
Renmin Han, **Zhipeng Bao**, Xiangrui Zeng, Tongxin Niu, Fa Zhang, Min Xu and Xin Gao. *A Joint Method for Marker-Free Alignment of Tilt Series in Electron Tomography.* ISMB 2019.

Research Experience

Generative Modeling for Multi-task Visual Learning — June 2020 – Present
Carnegie Mellon University. Advisor: Prof. Martial Hebert — *Pittsburgh, PA*
- Considered a novel problem of learning a shared generative model for various visual perception tasks, and proposed a general framework named MGM, by coupling a discriminative multi-task network with a generative network.
- Evaluated MGM model on two standard multi-task benchmark, the experimental results shows MGM consistently outperforms both SOTA single-task and multi-task approaches.
- We further proposed a joint learning mechanism for MGM, which improved the performance of all the tasks by large margins. We also studied the scalability of MGM framework to more visual tasks.
- Submitted a paper to CVPR 2021 with me as first author. See the paper here.

Bowtie Networks for Joint Recognition and View Synthesis — Dec. 2019 – June 2020
Carnegie Mellon University. Advisor: Prof. Martial Hebert — *Pittsburgh, PA*
- Introduced a novel dual-task of few-shot recognition and novel-view synthesis.
- Proposed feedback-based bowtie networks that simultaneously learn 3D geometric and semantic representations with feedback.Also addressed the incompatibility issues between different modules by leveraging resolution distillation.
- The proposed framework significantly improved both view synthesis and recognition performance, especially in the low-data regime. It was flexible to incorporate other tasks such as style guided synthesis.
- Submitted a paper for ICLR 2021.

Marker-Free Alignment for Electron Tomographic Projections — July 2018 – Dec. 2018
Carnegie Mellon University. Advisor: Prof. Min Xu — *Pittsburgh, PA*
- Designed an adaptive deep learning model for electron projection feature extracting, which achieved a robust performance for low-quality images compared with classic features such as SIFT and SURF.
- Proposed an iterative algorithm for feature matching and patterns tracking for electron tomographic projections.
- Contributed to form a complete pipeline for 3D reconstruction with raw tomographic projections.

Single-image Facial Expression Recognition with Deep 3D re-alignment — Feb. 2018 – Sep. 2018
DATA 61, CSIRO. Advisor: Dr. Shaodi You — *Canberra, Australia*
- Introduced a 3D facial reconstruction method to re-align the still face image, which significantly reduced the influence of orientations and shadings for a wide range of facial expression recognition tasks.
- Proposed a novel triple-channel model for single image-based FER task using learning-based features, landmark features and 3D facial features to achieve a reliable expression detection.
- Evaluated the proposed model on three real-world databases (CK+, OULU-CASIA, and RAF dataset), with the experimental results proving the proposed model outperformed other state-of-the-art methods.

Technical Skills

Languages: Java, Python, C/C++, MATLAB, HTML, R
Tools & Frameworks: Git, SVN, Tensorflow, Pytorch, Latex, Keras, SQL, Jupyter Notebook, Linux Opration