Aoxiang Fan

+86 13554417225 • aoxiangfan@gmail.com
aoxiangfan.github.io

Research Interests

I am broadly interested in many topics of computer vision and graphics. Previously I have been focused on the matching problem in computer vision (related fields: image matching, graph matching. point cloud registration, shape matching, etc). Currently I am working on 3D vision and geometry learning with deep learning and optimization techniques.

Education

École Polytechnique Fédérale de Lausanne (EPFL), EDIC **2022 incoming**
Ph.D. in Computer Science

Wuhan University (WHU), Multi-Spectral Vision Processing Lab **2018-2021**
M.Eng. in Information and Communication Engineering, advised by Prof. ***Jiayi Ma*** *GPA:3.91/4.00*
Master Thesis (in Chinese): A Study of Robust Algorithms in Image Matching and Its Applications

Wuhan University (WHU), Electronic Information School **2014-2018**
B.Eng. in Electronic Information Science and Technology *GPA:3.50/4.00*

Publications

1. **Geometric Estimation via Robust Subspace Recovery**
Aoxiang Fan, *Xingyu Jiang, Yang Wang, Junjun Jiang, Jiayi Ma*
Proc. European Conference on Computer Vision (ECCV), 2020

2. **Coherent Point Drift Revisited for Non-Rigid Shape Matching and Registration**
Aoxiang Fan, *Jiayi Ma, Xin Tian, Xiaoguang Mei, Wei Liu*
Proc. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022

3. **Image matching from handcrafted to deep features: A survey**
Jiayi Ma, Xingyu Jiang, ***Aoxiang Fan****, Junjun Jiang, Junchi Yan*
International Journal of Computer Vision (IJCV), 2021

4. **Efficient Deterministic Search with Robust Loss Functions for Geometric Model Fitting**
Aoxiang Fan, *Jiayi Ma, Xingyu Jiang, Haibin Ling*
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021

5. **Smoothness-Driven Consensus Based on Compact Representation for Robust Feature Matching**
Aoxiang Fan, *Xingyu Jiang, Yong Ma, Xiaoguang Mei, Jiayi Ma*
IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2021

Research Projects

Novel Morphing Model for Shape Matching and Registration from an Extrinsic Perspective
Supervised by Prof. ***Jiayi Ma*** *Ongoing*

- *Background:* Non-rigid shape matching and registration is a long-standing topic in computer vision and graphics, which aims to find one-to-one point correspondences between two natural shapes (typically human bodies).
- *Expected Contribution:* This ongoing study is intended to investigate a better morphing model to develop a potentially more accurate method for shape matching and registration.

A Signal Decomposition Approach for Implicit Neural Representation with Deep Networks
Supervised by Dr. ***Ji Zhao*** *Ongoing*

- *Background:* Implicit neural representation has recently drawn significant attention from researchers due to its remarkable performance in modeling and expressing complex signals (images, 3D models, etc), which has a vast range of application in many computer vision tasks.
- *Expected Contribution:* In this research, we attempt to investigate a new architecture for implicit neural representation based on signal decomposition, which potentially leads to more efficient training and better expressing power of deep networks.

Deep Learning of Feature Matching in the Perspective of Graph Matching
Supervised by Prof. ***Jiayi Ma*** *Perspective*

- *Background:* In the field of image feature matching, the emergence of the SuperGlue method which uses a trained network in place of plain nearest neighbor matching, has significantly improved the capacity of many practical applications and encouraged a number of new works.
- *Expected Contribution:* Since the network of SuperGlue essentially considers a linear assignment problem in its matching process, in this research, we intend to incorporate the graph matching (quadratic assignment) perspective to design a novel network for the task of image feature matching.

Research Internship

TuSimple-Autonomous Trucking Technology, Beijing
Supervised by Dr. ***Ji Zhao*** *and Dr.* ***Naiyan Wang*** *November 2020-March 2021*

- Improved the localization accuracy of the autonomous vehicle by developing an outlier-resilient method for landmark-based 2D-image to 3D-point-cloud alignment.

English Level

TOEFL score: 108

- **Reading: 29**
- **Listening: 28**
- **Speaking: 26**
- **Writing: 25**

GRE score: 326 + 4.0

- **Verbal Reasoning: 158**
- **Quantitative Reasoning: 168**
- **Analytical Writing: 4.0**

Technical Strengths

- **Programming Skills:** Python, C/C++, MATLAB, LaTeX
- **Operating Systems:** Windows, Linux
- **Deep Learning Framework:** PyTorch

Awards

- **Second Prize Winner of the 17th China Post-Graduate Mathematical Contest in Modeling in 2020**
- **Recipient of National Encouragement Scholarship of China in 2017**