# 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 deformable shape matching and 3D geometry learning with deep learning and optimization techniques.

## Education

**Wuhan University (WHU), Multi-Spectral Vision Processing Lab** **2018-2021**
*M.Sc. 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.Sc. 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. **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

3. **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

4. **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).
- *Contribution:* This ongoing study is intended to investigate a better morphing model to develop a potentially more accurate method for shape matching and registration.

**Deep unsupervised depth estimation and visual odemetry from monocular videos**
*Supervised by Dr.* ***Ji Zhao*** *Prospective*

- *Background:* The paradigm now for 3D geometry recovery from images has completely changed since dense and direct estimation is made possible by deep leaning techniques, even in an unsupervised manner.
- *Contribution:* In this research, we try to develop an outlier-resilient scheme for robust learning, to deal with the imperfect self-supervised signals in monocular videos (caused by illumination changes, moving objects, etc).

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

- *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.
- *Contribution:* Since the network of SuperGlue essentially condiers 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**