

# Jie Liang

COMPUTER VISION · MACHINE LEARNING · CLUSTERING · ADVERSARIAL LEARNING

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## Education

### Nankai University

Tianjin, China

**Master Candidate** IN COLLEGE OF COMPUTER AND CONTROL ENGINEERING, CV LAB

Sep. 2016 - PRESENT

- Advisor: **Jufeng Yang**, Associate Professor, Nankai University
- Mentor: **Ming-Ming Cheng**, Professor, Nankai University
- Mentor: **Ming-Hsuan Yang**, Professor, University of California at Merced
- Mentor: **Paul L. Rosin**, Professor, Cardiff University

### Ocean University of China

Qingdao, China

**Bachelor** IN SCHOOL OF MATHEMATICAL SCIENCE, INFORMATION AND COMPUTING SCIENCE

Sep. 2012 - Jun. 2016

- Major classes: Advanced Algebra, Optimization, Numerical Analysis, Object Oriented Programming, etc

## Skills

**Programming** Python, C/C++

**Tools** Matlab, Tensorflow, Caffe, OpenCV, LaTeX, Linux

## Publications

### Clinical Skin Lesion Diagnosis using Representations Inspired by Dermatologist Criteria

CVPR 2018

JUFENG YANG (ADVISOR), XIAOXIAO SUN, **Jie Liang**, PAUL L. ROSIN

- Recognizing skin disease images using interpretable features, showing superior performance against deep architectures.

### Automatic Model Selection in Subspace Clustering via Triplet Relationships

AAAI 2018

JUFENG YANG (ADVISOR), **Jie Liang**, KAI WANG, YONG-LIANG YANG, MING-MING CHENG

- Automatically estimating the number of clusters and grouping samples with a greedy strategy

### Understanding Image Impressiveness Inspired by Instantaneous Human Perceptual Cues

AAAI 2018

JUFENG YANG (ADVISOR), YAN SUN, **Jie Liang**, YONG-LIANG YANG, MING-MING CHENG

- Evaluating image property using hybrid deep or hand-craft representations for classification and recommendation

## Submitted Papers

### CONFERENCE

2018.03 **Sub-GAN: An Unsupervised Generative Model via Subspaces**, Coauthors: Jufeng Yang, Hsin-Ying Lee and Ming-Hsuan Yang *Submitted to ECCV*

### JOURNAL

2017.10 **Subspace Clustering via Good Neighbors**, Coauthors: Jufeng Yang and Ming-Hsuan Yang *Submitted to TPAMI*

2017.08 **Dynamic Match Kernel with Deep Convolutional Features for Image Retrieval**, Coauthors: Jufeng Yang, Paul L. Rosin and Ming-Hsuan Yang *Submitted to TIP*

## Experiences

### Reviewer

CVPR 2018

EMERGENCY REVIEWER

- Recommended and nominated for **CVPR Distinguished Reviewer Awards** by Prof. Ming-Hsuan Yang, who serves as an AC of CVPR

## Volunteers

Tianjin, China

### ORGANIZING AND RECEPTION

- Computational Visual Media Conference (CVM 2017); China Conference on Computer Vision (CCCV 2017)

## Honors & Awards

### SCHOLARSHIP & HONOR

2014 **National Motivational Scholarship**, first class

China

2015 **Outstanding Student Honor**, Valuable honor in OUC

China

### AWARDS

2015 **China Undergraduate Mathematical Contest in Modeling**, First Class Award at the provincial level

China

## Projects

### 1. Sparse Subspace Clustering

CVLab

#### IDEA & REFERENCE INVESTIGATION & CODING & PAPER WRITING

Jul. 2016 - PRESENT

- Based on the *similarity matrix* derived by optimizing a **self-representation** problem
- Exploring comprehensive **regularization term** by computing the trade-off between *sparsity* and *grouping effect*
- Getting SOA result on all evaluated datasets, submitting to **TPAMI**
- Proposing a greedy strategy to simultaneously estimate the number of clusters and grouping, inspired by the **block-diagonal** structure of similarity matrix
- Designing a **triplet** relationship and two rewards, getting SOA result and saving **30%** time consumption, accepted by **AAAI 2018**
- Trying to extend it to large-scale unsupervised applications, e.g., millions-scale image clustering, with greedy neighboring strategy

### 2. Generative Adversarial Networks

CVLab

#### IDEA & REFERENCE INVESTIGATION & CODING & PAPER WRITING

Apr. 2017 - PRESENT

- Simultaneously learning the **subspaces** of ambient space and conducting the **adversarial training**, to conquer the training instability and mode collapse
- **Generator** takes eigenvectors of subspaces as constraint, **discriminator** predicts both realness and subspaces for each sample
- Incorporating a **clusterer** to iteratively update both the clustering assignments and the eigenvectors of subspaces
- Designing a unified optimization function for **joint training** of the three modules, submitted to **CVPR 2018**

### 3. Low-Level Vision Application of Adversarial Training

CVLab

#### IDEA & REFERENCE INVESTIGATION & CODING & PAPER WRITING

Dec. 2017 - PRESENT

- Utilizing the adversarial training strategy to **optimize** various low-level vision problems, e.g., semantic segmentation, super resolution, style transfer, image deblurring, etc
- Modifying network **implementation** of various tasks in TensorFlow

### 4. Clinical Skin Lesion Recognition

CVLab

#### CODING & PAPER WRITING

Apr. 2017 - Dec. 2017

- Designing comprehensive features inspired by **human knowledge**, i.e., Dermatologist criteria, to improve the recognition
- Based on SD-198 dataset with 3000+ training images of **198 diseases**
- Comparing with various basic low-level representations and deep features, achieving SOA result, accepted by **CVPR 2018**
- A **web application** for recognizing clinical skin diseases is released for public welfare

### 5. Deep Content based Image Retrieval

CVLab

#### REFERENCE INVESTIGATION & CODING & PAPER WRITING

Apr. 2017 - Dec. 2017

- Designing a semantic-constrained framework with dynamic match kernels, incorporating global similarity from **deep CNN features**
- Exploring optimized combination of **post-processing** modules, e.g., local descriptors aggregation, graph based re-ranking, to enhance the performance. Getting the SOA result and submitting to **TIP**
- Also show best performance on retrieval tasks with 1 million + image distractors
- Eliminated **99.88%** negative matches per query and saved **88%** time consumption (0.89s/7.33s) due to the **dynamic** strategy

### 6. Image Property Exploration

CVLab

#### REFERENCE INVESTIGATION & CODING & PAPER WRITING

Apr. 2017 - Oct. 2017

- Measuring image property with quantitative visual features, which includes both **low-level** and **deep** semantic representations
- Utilizing **feature fusion** techniques, e.g., multi-kernel learning, etc, to generate hybrid representation for classification
- Designing an enhanced recommendation system which can **re-rank** the candidates based on the evaluation of impressiveness