

# Jie Liang

COMPUTER VISION · MACHINE LEARNING · LOW-LEVEL VISION · ADVERSARIAL LEARNING · CLUSTERING

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## Educations

### Nankai University

Tianjin, China

**Master Candidate** IN COLLEGE OF COMPUTER SCIENCE, CV LAB

Sep. 2016 - Jun. 2019

- Advisor: **Jufeng Yang**, Associate Professor, Nankai University
- Mentor: **Ming-Hsuan Yang**, Professor, University of California at Merced
- Mentor: **Ming-Ming Cheng**, Professor, Nankai University
- Mentor: **Paul L. Rosin**, Professor, Cardiff University
- Current Research Interest: **Image-to-Image Translation** with Disentangled Representations

### Ocean University of China

Shandong, 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
- GPA: 3.13/4.0 (top 15% in class)

## Publications

### Sub-GAN: An Unsupervised Generative Model via Subspaces

ECCV 2018

**Jie Liang**, JUFENG YANG, HSIN-YING LEE, KAI WANG, MING-HSUAN YANG

- Disentangling high-dimensional data into subspaces, generating samples from the low-dimensional embedding

### Dynamic Match Kernel with Deep Convolutional Features for Image Retrieval

TIP (2018)

JUFENG YANG, **Jie Liang**, HUI SHEN, KAI WANG, PAUL L. ROSIN, MING-HSUAN YANG

- Designing dynamic match kernel with deep CNN features, eliminating 99.88% negative matches per query

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

CVPR 2018

#### Criteria

JUFENG YANG, 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, **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

AAAI 2018

#### Perceptual Cues

JUFENG YANG, 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

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

Status: Major Revision

Submitted to **TPAMI**

2018.09 **A Unified Framework Based on Triplet Relationships for Joint Model Selection and Subspace Clustering**, Coauthors: Jufeng Yang Ming-Ming Cheng and Paul Rosin. Status: In Peer Review

Submitted to **TIP**

# Experiences

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## Reviewer

CVPR 2018, ACCV 2019

- Received the **Outstanding Reviewer Award** from CVPR 2018

## Internship

Beijing, China

TOUTIAO AI LAB (JUN. 2018 - SEP. 2018)

- Exploring **Photo/Video Enhancement** Problem for CVPR 2019

## Volunteers

Tianjin, China

ORGANIZING AND RECEPTION

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

# Honors & Awards

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## 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

# Skills

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

**Tools** TensorFlow, MXNet, PyTorch, Matlab, OpenCV, LaTeX, Linux

# Projects

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## 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, submitted 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 in **AAAI 2018**
- Extending the framework to large-scale unsupervised applications, e.g., millions-scale image clustering, with greedy neighboring strategy, submitted to **TIP**

## 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, accepted in **ECCV 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, etc
- Exploring Image-to-Image Translation by **Disentangling representations** for both content and attributes, enhancing photos with different styles

### 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 in **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 accepted in **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, accepted in **AAAI 2018**
- Designing an enhanced recommendation system which can **re-rank** the candidates based on the evaluation of impressiveness