

# Fei Pan

Research Fellow of CSE, University of Michigan

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**Research Interest:** My passion is to create a general AI system for computer vision tasks that is to proof to be robust, versatile, and unified among all the tasks. My current research focuses on high-level computer vision models such as detection and segmentation and their adaptability and generalization to novel domains. Besides, I am also interested in generative models including diffusion models and large-scale vision and language models.

## EDUCATION

### KAIST

Ph.D. in Electrical Engineering | Advisor: In So Kweon

Thesis: Geometric-guided Domain Adaptation for Semantic Segmentation

Mar 2018 - Aug 2023

### KAIST

M.S. in Electrical Engineering | Advisor: Chang D. Yoo

Thesis: Deep Recursive Segmentation Networks

Mar 2016 - Feb 2018

### Xidian University

B.S. in Telecommunications Engineering | Class Rank: 1/41

GPA: 3.7/4.0

Aug 2011 - Jul 2015

## EXPERIENCE

### University of Michigan

Research Fellow | Advisor: Stella X. Yu

Sep 2023 - Current

### Bosch Robert GmbH

Research Internship | Advisor: Yu Gao

May 2021 - Nov 2021

### Visbody Co., Ltd

Internship | Advisor: Shaoyi Yang

Aug 2015 - Feb 2016

## PUBLICATIONS

### CONFERENCE PROCEEDINGS

- [1] ImageNet-D: Benchmarking Neural Network Robustness on Diffusion Synthetic Object  
Chengshuang Zhang, **Fei Pan**, Junmo Kim, In So Kweon, Chengzhi Mao.  
*IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024  
Paper | Code
- [2] Masking-augmented Collaborative Domain Congregation for Multi-target Domain Adaptation in Semantic Segmentation.  
**Fei Pan\***, Dong He\*, Xu Yin, Chengshuang Zhang, Munchurl Kim.  
*35th IEEE Intelligent Vehicles Symposium (IV)*, 2024
- [3] Zero-shot Building Attribute Extraction from Large-Scale Vision and Language Models.  
**Fei Pan**, Sangryul Jeon, Brian Wang, Frank Mckenna, Stella Yu.  
*IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2024  
Paper | Code | Poster
- [4] ML-BPM: Multi-teacher Learning with Bidirectional Photometric Mixing for Open Compound Domain Adaptation in Semantic Segmentation.  
**Fei Pan**, Sungsu Heo, Seokju Lee, In So Kweon.  
*European Conference on Computer Vision (ECCV)*, 2022.  
Paper | Poster
- [5] Attentive and Contrastive Learning for Joint Depth and Motion Field Estimation.  
Seokju Lee, Francois Rameau, **Fei Pan**, In So Kweon.  
*IEEE / CVF International Conference on Computer Vision (ICCV)*, 2021  
Paper | Code
- [6] Two-phase Pseudo Label Densification for Self-training based Domain Adaptation.  
Inkyu Shin, Sanghyun Woo, **Fei Pan**, In So Kweon.  
*European Conference on Computer Vision (ECCV)*, 2020.  
Paper
- [7] Unsupervised Intra-domain Adaptation for Semantic Segmentation through Self-Supervision.  
**Fei Pan**, Inkyu Shin, Francois Rameau, Seokju Lee, In So Kweon.  
*IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.  
Paper | Code | Project Page

- [8] Variational Prototyping-Encoder: One-Shot Learning with Prototypical Images.  
Junsik Kim, Tae-Hyun Oh, Seokju Lee, **Fei Pan**, In So Kweon.  
*IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2019.*  
Paper | Code
- [9] Driver Drowsiness Detection System Based on Feature Representation Learning Using Various Deep Networks.  
Sanghyuk Park, **Fei Pan**, Sunghun Kang, and Chang D. Yoo.  
*Asian Conference on Computer Vision (ACCV) Workshop on Driver Drowsiness Detection from Video, 2016.*  
Paper

#### JOURNAL ARTICLES

- [1] CCTV-Calib: a Toolbox to Calibrate Surveillance Cameras Around the Globe.  
Francois Rameau, Jaesung Choe, **Fei Pan**, Seokju Lee, and In So Kweon.  
*Machine Vision and Applications, 2024*  
Paper | Code

#### PREPRINT & WORKING PAPERS

- [1] OpenSlot: Real-World Open Set Recognition with Object Centric Learning.  
Xu Yin, **Fei Pan**, Yuchi Huo, Zixuan Xie, Sungeui Yoon.  
*IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024 (Under Review)*
- [2] Fine-grained Background Representation for Weakly Supervised Semantic Segmentation.  
Xu Yin, Woobin Im, Dongbo Min, Yuchi Huo, **Fei Pan**, Sungeui Yoon.  
*Under Review, 2024*
- [3] Leveraging Motion Priors from Videos for Advancing Unsupervised Domain Adaptation in Semantic Segmentation.  
**Fei Pan\***, Xu Yin\*, Seokju Lee, Sungeui Yoon, In So Kweon.  
*Under Review, 2024*
- [4] Labeling Where Adapting Fails: Cross-Domain Semantic Segmentation with Point Supervision via Active Selection.  
**Fei Pan**, Francois Rameau, Junsik Kim, In So Kweon.  
*arXiv:2206.00181, 2022*

## PROJECTS

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#### NATURAL HAZARD ENGINEERING

**AI/ML for Structure Feature Inference** | Research & Software Dev. *Sept 2023 - Current*  
 Funded by: National Science Foundation, United States  
 Goal: Development of AI/ML tools to infer the features of buildings and terrains.  
 My Work: Experiment with large language models to infer building features, with a proof-of-concept study on classification and segmentation.

#### INTELLIGENT TRANSPORTATION SYSTEMS

**Robust Vehicle Detection from Multi-camera Views** | Research Internship *May 2021 - Nov 2021*  
 Funded by: Robert Bosch GmbH  
 Goal: New algorithms for domain adaptation in various utilization environments with fusion of multiple visual data.  
 My Work: Developing a new framework of domain adaptation for multiple perception tasks in driving scenes, with a specific focus on vehicle detection from multiple views from CCTV cameras in road scenes, considering the domain gaps among multiple cameras and diverse weather conditions

**Shared Sensing for Cooperative Cars** | Project Member *May 2021 - Nov 2021*  
 Funded by: Robert Bosch GmbH  
 Goal: Developing new technologies toward the collaboration between a swarm of vehicles and CCTV cameras.  
 My Work: Conducting static background using background subtraction algorithms; to build a CNN-based segmentation model for road mark detection.

#### AUTONOMOUS DRIVING

**Driver Assistant Active Safety** | Project Member *Apr 2016 - Feb 2017*  
 Funded by: National Core Research Center of South Korea  
 Goal: Build a learning-based high-performance vision algorithm for active safety driver assistance.  
 My Work: Participating in creating drowsiness labeling dataset, and building a CNN-based algorithm for detecting the drowsiness status of the drivers.

## SCHOLARSHIP & AWARDS

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### **Robert Bosch Ph.D. Scholarship**

Robert Bosch GmbH | Funding Awarded: €44,000 EUR (~ 47,100 USD)

*Sept 2019 - Aug 2021*

### **Qualcomm Innovation Fellowship**

Qualcomm Inc. | Funding Awarded: ₩4,000,000 KWR (~ 3,000 USD)

*Dec 2020*

### **Goodix Technology Scholarship**

Goodix Technology Co., Ltd | Funding Awarded: ¥5,000 RMB (~ 700 USD)

*Sept 2015*

### **Outstanding Student**

Xidian University

*Jul 2015*

## ACADEMIC REVIEWS

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### CONFERENCE REVIEW

*IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024*

*IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023*

*IEEE / CVF International Conference on Computer Vision (ICCV), 2023*

*IEEE / CVF Winter Conference on Applications of Computer Vision (WACV), 2022*

*Neural Information Processing Systems (NeurIPS) Workshop: Self-Supervised Learning Theory and Practice, 2021*

*The International Conference on Machine Learning (ICML) Workshop: Self-Supervised Learning for Reasoning and Perception, 2021*

### JOURNAL REVIEW

*IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2023*

*Image and Vision Computing, 2023*

*Neurocomputing, 2023*

*Computer Vision and Image Understanding, 2023*

*Pattern Recognition Letters, 2022*

*Neurocomputing, 2022*

## ACADEMIC SERVICES

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### TEACHING EXPERIENCE

Advanced Topics in Deep Learning for Robotics and Vision: Domain Adaptation

*Teaching Assistant, 2021*

Deep Learning for Computer Vision: Generative Adversarial Learning

*Teaching Assistant, 2020*

### TALKS & KEYNOTE SPEAKINGS

Zero-shot Building Attribute Extraction from Large-Scale Vision and Language Models.

*NHERI Computational Symposium, UCLA Luskin Conference Center, Feb 1 2024*

Unsupervised Intra-domain Adaptation for Semantic Segmentation through Self-Supervision.

*Oral Presentation at CVPR, Jun 16 2020 (Remote)*

Driver Drowsiness Detection System Based on Feature Representation Learning Using Various Deep Networks.

*The ACCV Workshop on Driver Drowsiness Detection from Video, Taipei, Nov 24 2016*

### STUDENT MENTORING

Brian Wang, Master Student at CSE, University of Michigan