

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] MoDA: Leveraging Motion Priors from Videos for Advancing Unsupervised Domain Adaptation in Semantic Segmentation.
Fei Pan, Xu Yin, Seokju Lee, Axi Niu, Sungeui Yoon, In So Kweon.
IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, 2024
Best Paper Award
Paper
- [2] 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
Highlight Poster (Acceptance Rate < 2.8%)
Paper | Code
- [3] Masking-augmented Collaborative Domain Congregation for Multi-target Domain Adaptation in Semantic Segmentation.
Fei Pan*, Dong He*, Xu Yin, Chenshuang Zhang, Munchurl Kim.
IEEE Intelligent Vehicles Symposium (IV), 2024
- [4] 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
- [5] 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
- [6] 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
- [7] 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

- [8] 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.
Oral Presentation (Acceptance Rate < 0.7%)
Paper | Code | Project Page
- [9] 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
- [10] 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.
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
- [3] 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

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

Robert Bosch Ph.D. Scholarship Robert Bosch GmbH Funding Awarded: €44,000 EUR (~ 47, 100 USD)	<i>Sept 2019 - Aug 2021</i>
Qualcomm Innovation Fellowship Qualcomm Inc. Funding Awarded: ₩4,000,000 KWR (~ 3, 000 USD)	<i>Dec 2020</i>
Goodix Technology Scholarship Goodix Technology Co., Ltd Funding Awarded: ¥5,000 RMB (~ 700 USD)	<i>Sept 2015</i>
Outstanding Student Xidian University	<i>Jul 2015</i>

ACADEMIC REVIEWS

CONFERENCE REVIEW

IEEE / CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023, 2024
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

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

Enhancing Robustness in Deep Learning: Insights from Unsupervised Domain Adaptation, Compound Domain Challenges, and Large Language Models.
2024 Machine Learning Conference, Eastern Michigan University, MI, April 13 2024

Zero-shot Building Attribute Extraction from Large-Scale Vision and Language Models.
NHERI Computational Symposium, UCLA Luskin Conference Center, CA, 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