

Fangyi Chen

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Address: 4720 Forbes Avenue, Pittsburgh, PA, USA 15213

Research Interests

- Deep learning, Computer vision
- Multimodal large language model, Open-world scene understanding

Education

- Ph.D. Candidate in Electrical and Computer Engineering 2020-present
Carnegie Mellon University
Advisor: Dr. Marios Savvides
Pittsburgh, USA
- M.S. in Electrical Engineering 2017-2018
University of Pittsburgh
Pittsburgh, USA
- B.E. in Electrical Engineering and Its Automation 2013-2017
North China Electric Power University
Beijing, China

Publications ([Google Scholar](#))

- [1] **Fangyi Chen***, Han Zhang*, Zhantao Yang, Hao Chen, Kai Hu, Marios Savvides. RTGen: Generating Region-Text Pairs for Open-Vocabulary Object Detection. (*under review*)
- [2] **Fangyi Chen**, Han Zhang, Kai Hu, Yu-kai Huang, Chenchen Zhu, Marios Savvides. Enhanced Training of Query-Based Object Detection via Selective Query Recollection. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.
- [3] **Fangyi Chen**, Han Zhang, Zaiwang Li, Jiachen Dou, Shentong Mo, Hao Chen, Yongxin Zhang, Uzair Ahmed, Chenchen Zhu, Marios Savvides. Unitail: Detecting, Reading, and Matching in Retail Scene. *European Conference on Computer Vision (ECCV)*, 2022.
- [4] Chenchen Zhu, **Fangyi Chen**, Uzair Ahmed, Zhiqiang Shen, Marios Savvides. Semantic Relation Reasoning for Shot-Stable Few-Shot Object Detection. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.
- [5] Chenchen Zhu, **Fangyi Chen**, Zhiqiang Shen, Marios Savvides. Soft Anchor-Point Object Detection. *European Conference on Computer Vision (ECCV)*, 2020.
- [6] **Fangyi Chen**, Chenchen Zhu, Zhiqiang Shen, Han Zhang, Marios Savvides. NCMS: Towards Accurate Anchor Free Object Detection through l2 Norm Calibration and Multi-Feature Selection. *Computer Vision and Image Understanding (CVIU)*, 2020 Jul 27:103050.
- [7] Han Zhang, **Fangyi Chen**, Zhiqiang Shen, Qiqi Hao, Chenchen Zhu, Marios Savvides. Solving Missing-Annotation Object Detection With Background Recalibration Loss. *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2020.
- [8] **Fangyi Chen**, Chenchen Zhu, Marios Savvides. A Novel Collaborate Control Strategy for Enhanced Training of Vehicle Recognition. *The IEEE 90th Vehicular Technology Conference (VTC)*, 2019.
- [9] Ker-Jiun Wang, Kaiwen You, **Fangyi Chen**, Prakash Thakur, Michael Urich, Soumya Vhasure, and Zhi-Hong Mao. Development of Seamless Telepresence Robot Control Methods to Interact with The Environment Using Physiological Signals. *The 13th ACM International Conference on Human-Robot Interaction (HRI)*, 2018.
- [10] Ker-Jiun Wang, Anna Zhang, Kaiwen You, **Fangyi Chen**, Quanbo Liu, Yu Liu, Zaiwang Li, Hsiao-Wei Tung, and Zhi-Hong Mao. Ergonomic and Human Centered Design of Wearable Gaming Controller Using Eye Movements and Facial Expressions. *The IEEE International Conference on Consumer Electronics (ICCE)*, 2018.
- [11] Ker-Jiun Wang, Kaiwen You, **Fangyi Chen**, Zihang Huang, and Zhi-Hong Mao. Human-Machine Interface Using Eye Saccade and Facial Expression Physiological Signals to Improve the Maneuverability of Wearable Robots. *The International Symposium on Wearable & Rehabilitation Robotics (WeRob 2017)*, 2017.

Patents

- [1] WO-2022211995-A1 *System and method for using non-axis aligned bounding boxes for retail detection*
- [2] WO-2020210825-A1 *System and method for detecting products and product labels*
- [3] US-2022044073-A1 *Feature pyramids for object detection*
- [4] US-2022058425-A1 *System and method for the automatic enrollment of object images into a gallery*
- [5] US-2022262101-A1 *System and method for solving missing annotation object detection*
- [6] WO-2022173607-A1 *Fast object search based on the cocktail party effect*
- [7] WO-2022173621-A1 *System and method for improved few-shot object detection using a dynamic semantic network*
- [8] WO-2022109295-A1 *System and method for detecting and classifying abnormal cells*
- [9] US-2022058432-A1 *Few-shot object detection using semantic relation reasoning*

Professional Experience

Academic Service

- **Journal Reviewer:** IEEE TIP, Pattern Recognition, TGRS, Neural Computing, Visual Computer, Connected Science
- **Conference Reviewer:** CVPR 2023-2024, ICCV 2023, ECCV 2024, ICLR 2023, ICML 2023, NeurIPS 2024

Research Assistant (01/2020-present) & Research Associate III (2019) @ Cylab, CMU 02/2019-present

- **AI for Retail:** A real-time system for store management and automatic checkout. Lead a team for large-scale dataset collection and annotation. Develop RetailDet, a quadrilateral product detector that achieves top performance on three retail datasets, and a textually enhanced product matching algorithm that operates in a one-shot manner. The system is deployed in stores of the world's largest retailers. Research results are turned into patents.
- **Anchor-free object detection:** A progressive design of anchor-free object detection aims to address the inherently heuristic feature selection of anchor-based detectors. They are developed with novel ground-truth assignment strategies on feature map and across feature pyramid via multi-level feature selection, norm calibration, and soft-weighted training losses. Research results are turned into patents.

Selected Project @ ECE, UPitt 09/2017-03/2018

- **EXGbuds:** The development of a wearable device to measure eye movements and facial expressions to generate useful commands via non-invasive biosensors. The research result is adopted by EXGwear Inc.

Selected Project @ High Voltage Research Institute, NCEPU 04/2016-02/2017

- **IGBT:** Examining external insulation characteristics of Insulated Gate Bipolar Transistor. Design and creation of a low energy 100kV impulse generator for the polyimide electric breakdown experiment.

Skills

- Deep learning and computer vision
- Python, C++, Matlab, CAD
- Power system analysis

Awards

- Carnegie Institute of Technology Dean's Fellowship, Carnegie Mellon University 2020
- Best Hardware Hack, PITT-CTSI GitHub Major League Hacking 2018
- National Third Prize, Chinese National College Students Competition on Energy Economics 2015
- University Merit Student, NCEPU 2014