Fangyi Chen

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Research Interests

- Deep learning based computer vision for real-world AI applications
- Generic object detection, AI for retail

Education

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

Publications (Google Scholar)

[1] **Fangyi Chen**, Han Zhang, Kai Hu, Yu-kai Huang, Chenchen Zhu, Marios Savvides. *Enhanced Training of Query-Based Object Detection via Selective Query Recollection.* (to be appear) Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

[2] **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.

[3] 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.

[4] Chenchen Zhu, **Fangyi Chen**, Zhiqiang Shen, Marios Savvides. *Soft Anchor-Point Object Detection.* European Conference on Computer Vision (ECCV), 2020.

[5] **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.

[6] 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.

[7] **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.

[8] 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.

[9] 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.

[10] 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] US Patent App. 17/408,674 Few-shot object detection using semantic relation reasoning
[2] US Patent App. 17/386,879 Feature pyramids for object detection
[3] US Patent App. 17/425,293 System and method for detecting products and product labels
[4] US Patent App. 17/408,778 System and method for the automatic enrollment of object images into a gallery
[5] US Patent App. 17/630,737 System and method for solving missing annotation object detection

Professional Experience

Academic Service

- **Journal Reviewer:** IEEE TIP, Pattern Recognition, TGRS, Neural Computing, Visual Computer, Connected Science
- **Conference Reviewer:** CVPR 2023

Research Assistant @ 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