

YUNCONG YANG

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EDUCATION

Columbia University

M.S. in Computer Science

- **GPA:** 4.00/4.33

New York, NY

Expected Graduation Dec 2022

Columbia University

B.S. in Computer Science: Intelligent Systems Track

- **GPA:** 4.05/4.33 (Top 5%) | Summa Cum Laude

New York, NY

Aug 2019 - May 2021

College of the Holy Cross

B.A. in Mathematics

- **GPA:** 3.92/4.00 | Summa Cum Laude

Worcester, MA

Aug 2016 - May 2021

PUBLICATIONS

1. **Yang, Y.***, Ma, J.*, Huang, S, Long, C., Lin, X., Han, G., Chang, S.F. *TempCLR: Temporal Alignment Representation with Contrastive Learning*. (ICLR 2023 under review).
2. **[Outstanding Paper Award, Featured Paper Presentation]** Fan, L., Wang, G., Jiang, Y., Mandlekar, A., **Yang, Y.**, Zhu, H., ... & Anandkumar, A. MineDojo: Building Open-Ended Embodied Agents with Internet-Scale Knowledge. In *Thirty-sixth Conference on Neural Information Processing Systems Datasets and Benchmarks Track*.
3. Ma, J., Han, G., Huang, S., **Yang, Y.**, & Chang, S. F. (2022, October). *Few-Shot End-to-End Object Detection via Constantly Concentrated Encoding Across Heads*. In *Computer Vision—ECCV 2022: 17th European Conference, Tel Aviv, Israel, October 23–27, 2022, Proceedings, Part XXVI* (pp. 57-73).

RESEARCH EXPERIENCE

Long-Video Understanding with Sequence-Level Contrastive Learning

Columbia University

Graduate Research Assistant | Advisor: Prof. Shih-Fu Chang

Feb 2022 - Now

- Analyzed the importance of temporal orders in long-video understanding context and explored the idea of utilizing order consistency exhibited in the paired video-paragraph sequences.
- Designed a pre-training strategy supervised by our new sequence-level contrastive learning objectives, which uses global temporal alignment scores as the similarity measure.
- Benefited from the temporal order information, our strategy achieves consistent performance gain on three different downstream tasks, including video-text retrieval, action step localization, and few-shot video action recognition.

Building Open-Ended Embodied Agents with Internet-Scale Knowledge

Nvidia

Research Assistant | Advisor: Prof. Yuke Zhu

Feb 2022 - Now

- Contributed to MineDojo, a new Minecraft-based reinforcement learning benchmark, which accesses internet-scale knowledge base and supports over 3000 open-ended tasks.
- Led the design of the whole task suite in MineDojo benchmark. The task suite covers all major features of the simulator and illustrates the open-ended nature of MineDojo.
- Introduced MineCLIP, a video-language model that outputs the correlation between video observations and the task prompt as a reward function. MineCLIP outperforms manual-designed dense reward functions in most evaluated tasks.
- Working on a follow-up research project on MineDojo about building open-ended embodied agents based on

the idea of "code as policies".

Few-Shot End-to-End Object Detection

Columbia University

Graduate Research Assistant | Advisor: Prof. Shih-Fu Chang

Sep 2021 - Mar 2022

- Assisted in designing a new objective that improves detection performance over each head in the sequence of heads of the end-to-end detection module.
- Conducted ablation studies on the performance of different regularization approaches.
- The strategy we proposed outperforms SOTA and the work was accepted by ECCV 2022.

PROJECTS

Adversarial Support Sets as Defense for Few-Shot Classification

Sep 2021 - Dec 2021

- Enhanced the effectiveness of adversarial training for few-shot classifier by attacking query-set and support-set simultaneously.
- Designed a support set attack that is more effective than SOTA attack and applied it to the adversarial training
- Increased baseline prototypical networks' performance on mini-imagenet both with and without the PGD attack.

Dynamic Grasping with Moving Obstacles

Sep 2021 - Dec 2021

- Tackled the problem of grasping a moving item by a 6-DOF robot arm with moving obstacles in the scene.
- Modeled the target item and obstacles as 3D bounding boxes in perception stage for real-time prediction of their future pose.
- Conducted ablation studies on the motion planning algorithm and RRT* was more effective than a simple reinforcement learning algorithm.

PROFESSIONAL EXPERIENCE

Sigmastar Technology

Shanghai, China

Machine Learning Engineer Intern

Jun 2021 - Aug 2021

- Designed low-precision quantization algorithms to improve model performance on edge AI chips for cameras.
- Experimented with Frequency-Aware Transformation to increase the 4-bit performance of a yolov5-based object detection model from 35.2 to 37.4 mAP on COCO2017 using PyTorch.
- Quantized object detection and classification pre-trained models to 8-bit and tested them to measure their decrease in accuracy and improvement in latency.

AWARDS & HONORS

- Outstanding Paper Award, *NeurIPS 2022 Datasets and Benchmarks Track*
- Summa Cum Laude, *Columbia University*
- Summa Cum Laude, *College of the Holy Cross*
- Student Member, *Phi Beta Kappa*
- Dean's List (8 semesters)