Chunlin Yu

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EDUCATION

ShanghaiTech University   Shanghai, China
M.Sc. in Computer Science, supervised by Jingya Wang;   *2022 – present*

ShanghaiTech University   Shanghai, China
B.E. in Computer Science, GPA: 3.60/4.00 (Major: 3.72/4.00);   *2018 – 2022*

PUBLICATIONS

- **Chunlin Yu**, Ye Shi, Jingya Wang. "Contextually Affinitive Neighborhood Refinery for Deep Clustering." Advances in Neural Information Processing Systems (**NeurIPS**), 2023. [Paper][Code]

- **Chunlin Yu**, Ye Shi, Zimo Liu, Shenghua Gao, Jingya Wang. "Lifelong Person Re-Identification via Knowledge Refreshing and Consolidation." Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI Oral**), 2023. [Paper][Code][Project Page]

- Yilan Dong, **Chunlin Yu**, Ruiyang Ha, Ye Shi, Yuexin Ma, Lan Xu, Yanwei Fu, Jingya Wang. "HybridGait: A Benchmark for Spatial-Temporal Cloth-changing Gait Recognition with Hybrid Explorations." Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), 2024. [Paper][Code]

- Xianing Chen, **Chunlin Yu**, Jialang Xu, Qiong Cao, Jingya Wang, Shenghua Gao. "OH-Former: Omni-Relational High-Order Transformer for Occluded Person Re-Identification." Arxiv, 2021.

RESEARCH TOPICS & EXPERIENCE

Reasoning-based 3D Affordance Grounding Using Large Multi-modal Model

Advisor: Jingya Wang   *2024-Now*

- (Background) Reasoning-based affordance grounding involves identifying interactive areas on objects within a 3D space, based on implicit user intentions expressed in natural language. This enables embodied agents to better understand and interact with their surroundings to complete various tasks.

- Improved the original 3D sparse point cloud affordance dataset by rendering and reconstructing high-density RGB point clouds from multiple views of the original object mesh, and generated corresponding complex reasoning instructions via GPT-4V.

- Introduced the 3D large multi-modal model ShapeLLM, which operates within a 3D-text aligned space and is fine-tuned using complex reasoning affordance datasets combined with LoRA.

- Leveraged GroundingDINO's zero-shot generalization capability in open-set object detection to enhance the generalization of the affordance model.

Multi-modal Hybrid Learning for Long-term Gait Recognition

Advisor: Jingya Wang   *2023 – 2024*

- Proposed a multi-modal fusion framework for gait recognition, effectively integrating features from the temporal branch (3D), appearance branch, and projection branch (3D projected silhouttes) for training.

- Integrated a canonical space alignment process within the spatial-temporal transformer, formulating 2D grid features as a reweighting of semantic-relevant 3D joint features. This facilitates the modeling clothes-irrelevant temporal relationships and enables pixel-level fusion of aligned 3D temporal branch features with appearance branch features.

- Collected the first in-the-wild benchmark CCGait for cloth-changing gait recognition, which incorporates diverse clothing changes, indoor and outdoor scenes, and multimodal statistics over 92 days.

- The relavant paper has been accepted by AAAI 2024.

Lifelong Learning for Person Re-Identification

Advisor: Jingya Wang   *2022 – 2023*

- Proposed a bi-directional transfer scheme with a dynamic memory model and adaptive working model, aimed at reducing forgetting of old tasks while enhancing performance on both new and previous tasks.
- Designed a knowledge-refreshing mechanism that uses new identities in the current task as negative classes to update the memory model gradually, fostering novel insights and refreshing old knowledge.
- Devised a dual-space consolidation scheme to enhance long-term stability and improve generalizability to unseen domains.
- The relevant paper has been accepted by AAAI 2023 (Oral).

Self-supervised Representation Learning and Clustering
Advisor: Jingya Wang   *2022 – 2023*
- Explored the potential for re-ranking within generic self-supervised learning (SSL) frameworks, aiming to develop a relation-based metric to uncover more accurate and informative neighbors. This was achieved using a parallelizable Graph Neural Network (GNN) approach.
- Developed an approximate silhouette score to identify challenging samples situated at class boundaries and in suboptimal neighborhoods, progressively incorporating these hard samples into the training process in a linear schedule.
- The relavant paper has been accepted by NeurIPS 2023.

Transformer-based Occluded Person Re-Identification
Advisor: Jingya Wang, Shenghua Gao   *2021-2022*
- Introduced higher-order self-attention mechanisms to address the issue of sparse activation in transformers, reconstructing first-order self-attention outputs into feature maps and processing them through a locally perceiving module built with convolutional neural networks (CNNs).
- Developed a local perception module composed of deformable convolutions and depthwise separable convolutions, enhancing the model's ability to capture local pedestrian features.
- Designed a feature separation loss to encourage diversity within intra-class local features and prevent the model from focusing on diverse regions.

Awards & Achievements

- ShanghaiTech University Outstanding Student, 2023. (Top 10% of candidates)
- ShanghaiTech Outstanding Undergraduate Thesis, 2022. (Among Top 10 of undergraduate theses)
- ShanghaiTech University Undergraduate Scholarship, 2019 (Top 2% of candidates)

Course Projects

- Developed a polynomial eigenvalue solver using a resultant-based approach for the Perspective-n-Point (PnP) problem with unknown focal length. [Report]
- Formulated a Branch-and-Bound (BnB) algorithm for point set registration in the presence of outliers. [Report]

Skills and Services

Programming: Python, C/C++, Matlab, SQL, CUDA
Reviewer: TS, CVPR
Machine Learning: Pytorch, Tensorflow, OpenCV, Numpy
English: CET-4(633), TOFEL(100)