Fanxu Min

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🎓 Education

Ocean University of China, Qingdao, China   09/2022 – Present
Master's Student in Computer Science, supervised by Prof. Junyu Dong.
GPA: 3.8/4.0, **Rank:** 3

Qufu Normal University, Rizhao, China   09/2018 – 06/2022
Bachelor of Computer Science
GPA: 3.2/5.0

🔍 Research Interests

Video Understanding, Biological Recognition, Human-Centered Vision, 3D Reconstruction, Medical Image Processing, and Underwater Vision.

🗄 Publications

1. **Fanxu Min**, Qing Cai, Shaoxiang Guo, Yang Yu, Hao Fan, Junyu Dong. "ZipGait: Bridging Skeleton and Silhouette with Diffusion Model for Advancing Gait Recognition", **Arxiv**, 2024.
2. **Fanxu Min**, Shaoxiang Guo, Hao Fan, Junyu Dong. "GaitMA: Pose-guided Multi-model Feature Fusion for Gait Recognition", *IEEE International Conference on Multimedia and Expo (ICME)*, *ORAL*, 2024.

⚑ Research Experiences

Research on Multi-modal Complementary Gait Recognition for Constrained Conditions in Real-world Scenarios

Led by: Junyu Dong, Qing Cai

Work 1: Correlation Establishment of Gait Modality Based on Conditional Generation

- Proposed a novel gait diffusion model **DiffGait** that reconstructs dense body silhouettes from sparse skeleton structures with just **1.9M** parameters and a rapid inference speed of **3628 FPS**.
- Introduced a gait feature fusion module **Perceptual Gait Integration (PGI)** through a two-stage process that refines silhouettes and extracts hybrid gait features.
- Developed a simple-but-effective model-based gait recognition architecture **ZipGait** which achieves **state-of-the-art** performance in both cross-domain and intra-domain setting.
- Authored literature paper "**ZipGait: Bridging Skeleton and Silhouette with Diffusion Model for Advancing Gait Recognition**" which is currently published on **Arxiv**.

Work 2: Feature Alignment and Redundancy Reduction in Multi-Modal Gait Information Fusion

- Proposed **Joint/limb-based Heatmap** by computing the Gaussian distribution of skeletal points to enhance the robustness and interoperability of the skeleton to address modality inconsistency.
- Designed **Co-attention Attention Model (CAM)** and **Mutual Learning Module (MLM)** to mitigate feature redundancy and interference and facilitate the interaction between the two modalities respectively.
- Developed a novel paradigm for multimodal gait recognition named **GaitMA** which achieves **state-of-the-art** performance across authoritative datasets: Gait3D, OU-MVLP, CASIA-B.
- Authored literature paper "**GaitMA: Pose-guided Multi-modal Feature Fusion for Gait Recognition**" which is published on **ICME 2024** and distinguishes with an **ORAL** nomination.

Research on In-situ Observation and Analysis System for Marine Phytoplankton

Led by: Junyu Dong, Yuezun Li

Work: Application of Multi-Object Tracking in Phytoplankton Observation

- Improved the detector by enhancing multi-scale fusion to boost its performance on small targets (tiny phytoplankton in the field of view).
- Optimized tracking strategies and analyze the impact of appearance features and IoU distance on the matching of phytoplankton in MOT
- Proposed the **PMOT2023 (Phytoplankton Multi-Object Tracking)**, a multi-video tracking dataset based on in-situ observation equipment, comprising **48,000** micrographs and including **21** species of plankton.
- Collecting a larger scale **PMOT++** dataset and incorporating **DINO** to learn the localized semantic features of phytoplankton motion, alleviating water currents, inconspicuous appearances, and random impurities.

Research on Low-Quality Face Recognition in Uncontrolled Complex Environments

Led by: Junyu Dong, Muwei Jian, Lam Kin-Man

Work: Face Recognition with Low-resolution, Non-uniform Lighting and Cross-view Face Images

- Constructed **matrix mapping** from **low-resolution** face images to their matching **high-resolution** counterparts, using the reconstruction of key facial features as constraints.
- Designed algorithms for compensating and enhancing face images under **non-uniform lighting conditions**.
- Utilized **3D face reconstruction** to generate frontal face images from **cross-view face images**.
- Developed a **face recognition system** for low-quality images in uncontrolled environments.

Development of High-Resolution 3D Optical Imagers for Underwater Environments

Led by: Junyu Dong, Hao Fan

Utilizing **vision-inertial navigation**, **underwater laser triangulation**, **binocular stereo vision**, and **photometric stereo** technologies to enable high-resolution 3D imaging of large, dynamic underwater scenes.

- Analysed texture loss and uneven illumination in underwater images, which compromise the accuracy of feature extraction and matching, thereby complicating visual localization.
- Proved the infeasibility of depth cameras underwater to facilitate the acquisition of underwater depth maps.

💬 Talks

- **IEEE International Conference on Multimedia and Expo (ICME) 2024:** GaitMA: Pose-guided Multimodel Feature Fusion for Gait Recognition. *Niagra Falls, Canada, 18. Jul. 2024*

⚙ Academic Service

- **Journal Reviewer:** IEEE Journal of Biomedical and Health Informatics (JBHI)
- **Conference Reviewer:** IEEE International Conference on Multimedia and Expo (ICME)

👥 Internship Experience

China Rehabilitation Research Center(Beijing Boai Hospital)   2023.02 - 2023.03

♡ Honors and Awards

- Academic Scholarship, awarded by Ocean University of China, 2024.
- Outstanding Graduate Student, awarded by Ocean University of China, 2023.
- Second Prize in Internet Plus, awarded by Ocean University of China, 2023.
- Excellence Award in the Challenge Cup, awarded by Ocean University of China, 2023.
- Outstanding Graduate, awarded by Qufu Normal University, 2022.
- Third Prize in National College Students Mathematics Competition, awarded by Shandong Province, 2021.
- Third Prize in Software Design Competition, awarded by Shandong Province, 2020.

ℹ Miscellaneous

- Programming: PYTHON, LATEX, C++, C, MATLAB, JAVA
- Languages: Chinese (native), English (IELTS: 6.0)
- Additional Emails: ✉ minfanxu@stu.ouc.edu.cn