Yan Tai

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EDUCATION

University of Chinese Academy of Sciences (GPA 3.77/4.00) Sep 2020 - Jan 2024

Artificial Intelligence Master Beijing

Institute of Automation, Chinese Academy of Sciences (CASIA)

Supervisor: Prof. Jinqiao Wang

Research Interests: Multi-Modal, Seantic Segmentation, Object Detection, Anomaly Detection, etc.

Nanchang Hangkong University Sep 2013 - Jun 2017

Automation Engineering Bachelor Nanchang

RESEARCH EXPERIENCE

- **Yan Tai***, Weichen Fan*, Zhao Zhang, Feng Zhu, Rui Zhao, Ziwei Liu. Link-Context Learning in Multimodal LLMs (Submitted to AAAI2024)
  - We propose Link-Context Learning (LCL) , which goes beyond in-context learning by emphasizing "reasoning from cause and effect" to augment the learning capabilities of MLLMs
  - We propose ISEKAI dataset for LCL ability evaluating.
- Bingke Zhu, **Yan Tai**, Yingying Chen, Wei Zhou, Ming Tang, Jinqiao Wang. NextInd: Next Generation Pre-Trainer for Industrial Image Representation (Watting For Submit)
  - We present *Ind-2M*, a newly curated open-source dataset comprising approximately 2.2 million images specifically designed for industrial defect analysis.
  - We propose a novel approach for generating anomaly samples and introduce a pixel-level contrastive triplet loss.
  - We introduce *NextInd*, a large-scale pretraining model based on contrastive learning, which effectively enhances the detection accuracy of industrial defect detection tasks after fine-tuned on the corresponding datasets.
- **Yan Tai**, Bingke Zhu, Yingying Chen, Ming Tang, Jinqiao Wang. Pointrefine: Patch-attention Based Small Objects Segmentation Refiner (Waitting For Submit)
  - We propose a novel *sampling-and-optimization* process and a hierarchical optimization training scheme that achieves a Coarse-to-Fine optimization flow during the process of gradually retrieval the resolution.
  - We introduce a plug-and-play optimization module that enables low-cost optimization of trained segmentation models. This module demonstrates significant improvements, particularly in small area segmentation tasks.
- Jinqiao Wang, Yingying Chen, Bingke Zhu, **Yan Tai**, 2022. Image semantic segmentation methods, devices, electronic devices, and storage media. CN (Patent) ZL202111627261.2, filed December 29, 2021, and issued July 01, 2022.

PROFESSIONAL EXPERIENCE

SenseTime (Chinese: 商汤科技) May 2023 - Present

Research Intern Beijing

- ***Sensetime-Monolith* Multi-Modal Topic:** Optimizing the Multi-Modal Large Language Models (MLLMs)
  - *Mono-LongTail Target:* Exploring the Boundaries of Zero-Shot Capability in Long-Tail Object Detection by Investigating the combination of Open-Vocabulary Detection (OVD) Approaches and MLLMs
  - *Mono-Complex Semantics:* Exploring the Boundaries of Few-Shot Capability in Complex Event Understanding by Investigating the Combination of In-Context Learning (ICL) Approaches and MLLMs
  - *Mono-MLLM:* Training MLLM with Direct Detection BBoxes Output, Supporting Rapid Adaptation to Various Scenarios using Few-Shot Prompt Method
  - Completed:

- *Mono-LongTail Target:* The OVD+MLLM Zero-Shot approach achieved recall@fppi surpassing the baseline in 8 out of 31 business events, and came close to the baseline precision in 5 events
- *Mono-Complex Semantics:* We introduce a novel Training-Free Few-Shot ICL method, which surpasses the baseline precision in 32-shot scenarios across 19 different events in complex event tasks

Institute of Automation, Chinese Academy of Sciences (CASIA) Sep 2020 - Present

Master's Student Beijing

- ***RoadMainT* Highway Detection:** High Recall, Generalization, and Low Annotation Dependency Model
  - Building a Large-and-Multi-Scale Highway Defect Segmentation Dataset
  - Design an Anomaly Detection Model for Achieving High Recall Prediction
  - Design a Semantic Segmentation Model with Fusion of Two-Stage Features and Results, along with Novel Data Augmentation and Low-Quality Annotation Supervision Schemes
  - Propose a Plug-and-Play Segmentation Optimization Module for Small-Area Defects
- ***Huawei Cloud* Lightweight Portrait Matting:** Fully Automatic Portrait Matting Model for Mobile Devices
  - Designing a Lightweight Model for Fast Prediction of Coarse Segmentation Results
  - Proposing an Edge-Preserving Feathering Module for Generation of Alpha Matte
  - The algorithm has been applied to tasks such as video conference background replacement, ID photo background color change, and automatic face swapping for meme generation.
- More Tasks as ***Sunwoda* Battery Printing Inspection**, ***Oppein* Furniture Board Inspection**, etc.

Aqrose Technology (Chinese: 阿丘科技) Jul 2017 - Sep 2019

Machine Learning Engineer Shenzhen

- ***VIDI* Development:** General Industrial Machine Vision Software
  - Implementation of algorithms as template matching, edge detection, caliper tool, line/circle fitting, ect.
  - Modularizing the above-mentioned functionalities into draggable controls for customizable solutions
- ***AIDI* Development:** General Industrial AI Detection Software

Awards

Merit Student, University of Chinese Academy of Sciences

2022 Beijing Big Data Skills Competition - Paint Surface Inspection Track (First Prize)

SEED - The 2nd Jiangsu Big Data Development and Application Competition (21/475)

NAIC - Remote Sensing Image Segmentation (17/2207)

MISCELLANEOUS

- **Skills:** C++, Python, C#, etc.
- **Interests:** Drum kit, Fitness, Games(especially Zelda series)
- **Activities:** During my university years, I captured the joyful moments of dozens of couples as a wedding photographer