Yicheng Duan
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Education

Case Western Reserve University, Cleveland, OH Aug. 2024 – Present
Master of Science in Computer Science. Current GPA: 4.0/4.0; Thesis direction: Embodied AI, VLA, VLN.
Coursework including: Machine Learning, Data Mining, Computer Vision, Machine Learning on Graph, Deep Generative Model.

University of Washington, Seattle, WA Sep. 2015 – Mar. 2020
Bachelor of Science in Applied Physics

Working Experience

VULab CWRU, Cleveland May 2025 – Present
Research Assistant

- Presented research findings on Vision-Language-Action (VLA) models at **10+** internal research meetings, leading to new insights and identified **4+** potential areas for future research; submitted one paper on benchmarking to ICLR 2026. Built and maintaining Opensource VLA evaluation system at https://vulab-ai.github.io/NEBULA-Alpha/ Arxiv 2510.16263.

ZHIPU.AI (Z.ai), Beijing May 2021 – Aug. 2024
Algorithm engineer, Part-time

- Developed models that enable metric-based document discovery and semantics-enhanced retrieval methods. These models were validated on **millions** of data entries and developed using Python, NumPy, the Neo4j Graph database, and MongoDB.
- Implemented plugins and **Retrieval-Augmented Generation (RAG)** pipelines with the company's Large Language Model (GLM) for **3+** B2B solutions, including **LLM-enhanced retrieval**, **text-to-video**, and **image-to-video generation**.
- Built **large-scale knowledge graphs** from journal articles and patents, comprising **over 90 million nodes** with an average degree of 12, to support metric computation and analysis.
- Nominated for **7+** patents focused on big data classification and identification, NLP, and GNN-related methods.
- Built and refactored a web application backend with optimized methods for executing asynchronous calculation tasks.
- Managed the **terabyte-scale** databases, including **MongoDB** to **Elasticsearch** migration and database migration to Alibaba Cloud. Deployed and maintained local cluster CPU/GPU/containers monitoring using **Grafana.**
- Implemented **in-memory** relational storage using **Redis** bitmaps and data stream processing using **RabbitMQ**. Designed and proposed a microservices architecture, boosting online system performance by **7x**.
- **Led and mentored** a team of 4 interns, driving consistent performance and fostering strong cross-functional collaboration with the data department.

Founder Securities Co., Ltd., Beijing Sep. 2020 – Dec. 2020
Quantitative analyst intern

- Developed quantitative trading strategies in Python, including a multi-factor model based on research reports and a statistical model targeting on northbound Hong Kong capital flows affecting the mainland A-share market.

Personal Project Experience

An Agentic Navigation Framework Utilizing Vision-Language Models, Cleveland Jan. 2025 – May 2025

- Designed and implemented a Vision-Language-based **navigation agent** leveraging Qwen 2.5-VL (7B) as a cognitive "main brain" with structured memory and reflective reasoning. Engineered custom system + user prompting strategies to enable contextual planning and semantic understanding for embodied tasks. Integrated and evaluated the framework within Habitat-Lab and Room-to-Room (R2R) environments, demonstrating improved instruction following and environment grounding. Arxiv 2506.10172

Enhancing Video Retravel Using VLM, Cleveland Oct. 2024 – Dec. 2024

- Designed and developed a scalable backend and database layer for an application focused on retrieving relevant videos based on video or image input. Responsibilities include engineering on VLM model Qwen 2-VL (7b), retrieval method, and Vector DB integration. Used Transformer, Neo4j, and Pinecone, etc. for implementation. Arxiv 2503.17415

Low-Rank Adaptation Defense with Robustness, Cleveland Oct. 2024 – Dec. 2024

- Developed and evaluated a LoRA-based defense pipeline for a ResNet-18 model to counter Feature Importance Attacks (FIA). Achieved a best validation adversarial accuracy of 98.60% within only 2 epochs, demonstrating rapid model robustness improvement. Used Pytorch for implementation.

Skills

Programming Languages: Python, Linux Bash. **ML Frameworks:** Transformer, Pytorch, Numpy, Scikit-learn, Triton **Database Management Systems:** MongoDB, Elasticsearch, Kibana, Neo4j, Pinecone, PostgreSQL, Redis. **Message Queues:** RabbitMQ, Kafka. **Container:** Docker, Grafana. **General**: API/REST, Flask, Django, SQL, GitHub, Agile, DevOps, Ansible, Profiling, AWS, CV, LLM, Product management, Leadership, SolidWorks, building drones.

Accomplishments

Patents May 2021 – Present
Document fining methods in large corpus: CN 114510584 B CN 114969251 A CN 115471483 A; Topic crusting: CN 116644338 B CN 116561605 B; Information Retrieval: CN 117216417 B ; Generating training patterns: CN 118277794 A;