Yaoyao Qian

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SUMMARY: Master's student with comprehensive expertise in full-stack development and machine learning. Experienced in conducting research in **Robotics**, **Generative AI**, and **Large Language Models**. Skilled in leveraging state-of-the-art technologies to develop innovative solutions and enhance system performance in complex environments.

EDUCATION

- **Northeastern University** — Boston, MA
  Master of Information Systems; GPA: 3.92/4.00 — *Sep. 2023 – May 2025*
  Core Courses: Research Methods in AI, Prompt Engineering & AI, Concepts of Object-Oriented Design with C++

- **Wenzhou University of Technology** — Wenzhou, China
  Bachelor of Engineering in Computer Science; GPA: 3.69/4.00 (Top 5%) — *Sep. 2016 – Jun. 2020*

SKILLS SUMMARY

- **Languages:** Object Oriented Design with **Python**, **C++**, **Java**, **Swift**, **C**, **JavaScript**, **CUDA**, **MATLAB**
- **Frameworks for Robotics and AI:** ROS, PyTorch, TensorFlow, PyBullet, OpenAI Gym, Keras, OpenCV, MoveIt, GraspNet, Hugging Face, LlamaIndex, LangChain, Streamlit, Ray, Transformers, GPT-4o, BERT, CLIP, LangSAM, VLPart
- **Frameworks for Full Stack Development:** React.js, Spring, Flask, Vue.js, Bootstrap, jQuery, Flutter
- **Tools & DB:** RViz, Docker, GIT, Android Studio, XCode, MySQL, SQLite, Oracle, NLTK, TextBlob

PUBLICATIONS

- **Yaoyao Qian**, Xupeng Zhu, Ondrej Biza, Shuo Jiang, Linfeng Zhao, Haojie Huang, Yu Qi, Robert Platt, "ThinkGrasp: A Vision-Language System for Strategic Part Grasping in Clutter": Conference on Robot Learning(**CoRL**), 2024

- Haojie Huang, Karl Schmeckpeper, Dian Wang, Ondrej Biza, **Yaoyao Qian**, Haotian Liu, Mingxi Jia, Robert Platt, Robin Walters, "IMAGINATION POLICY: Using Generative Point Cloud Models for Learning Manipulation Policies": Conference on Robot Learning(**CoRL**), 2024

- **Yaoyao Qian**, Xianming Wang, "Analysis of football game performance based on social network": In 2022 International Conference on Artificial Intelligence, Internet and Digital Economy (ICAID 2022), pp. 811-819. Atlantis Press, 2022

RESEARCH AND INDUSTRIAL EXPERIENCE

- **Research Assistant** — *Advisor: Prof. Robert Platt* — Nov 2023 - Present
  The Helping Hands Lab, the Khoury College of Computer Sciences, NEU — *Boston, MA*
  - **Research Topic 1: Equivariant Models for Robotic Grasping**
    * Developed an advanced robotic grasping model incorporating **SE(2) and safe-z prediction**, **doubling development efficiency** by reducing training epochs from 600 to 300.
    * Implemented **Equivariant DQN** in CartPole, achieving a **50% reduction in training time**, leveraging **state and image inputs**.
    * Pioneered **SO(2)-equivariant reinforcement learning** techniques, enhancing robotic arm grasping tasks and reducing training attempts by **50% compared to baseline models**.
  - **Research Topic 2: Vision-Language Models for Strategic Grasping**
    * Integrated **LLMs in "Open World Manipulation with Planning"**, enhancing robots' adaptability in dynamic environments.
    * Developed **ThinkGrasp**, a vision-language grasping system utilizing **GPT-4o** for contextual reasoning, achieving a **98.0% success rate** in cluttered scenes and outperforming prior methods by over **50%**.
    * Implemented a robust error-handling framework with **LangSAM's segmentation and iterative verification**, significantly increasing reliability and achieving a **high success rate in real-world experiments**.
  - **Research Topic 3: Generative Models for Manipulation Policies**
    * Contributed to the development of **IMAGINATION POLICY**, utilizing **generative point cloud models** for key-frame manipulation policies, demonstrating **state-of-the-art performance** on RLbench tasks with a **success rate improvement of 20%**.
    * Proposed a novel multi-task key-frame policy network leveraging **bi-equivariant symmetry**, achieving **high sample efficiency and generalizability to unseen configurations**.
    * Enhanced policy learning efficiency by incorporating **3D point cloud generation** with rigid action estimation, enabling accurate pick-and-place actions and reducing task completion time by **30%**.

- **Research Assistant** — *Advisor: Prof. Rachel F. Adler* — May 2024 - Present
  The Information Experience and Accessibility Lab, iSchool , UIUC — *Remote*
  - Conducted research on **"FinTech for Older Adults,"** focusing on developing financial technology solutions to improve accessibility and usability for elderly users.
  - Investigated **"mHealth with Generative AI,"** integrating generative AI to enhance mobile health applications aimed at increasing physical activity and promoting a healthier lifestyle.
  - Led the development and research of **PAT PAT - Emotional Support Virtual Pet Application**, focusing on integrating machine learning to improve user interaction and engagement.

- **Senior Software Development Engineer – Full Stack**   May 2020 - Sep 2021
  Zhejiang Chongxiao Zhong Han Medical Technology Co   *Hangzhou, China*
    - Engineered a **Springboot+Vue electronic invoice system**, achieving **80%** operational efficiency improvement by integrating seamlessly with hospital processes.
    - Developed a **VC++ Database Integration tool**, enhancing data migration efficiency by **30%**.
    - Spearheaded the **Collaborative Management System** project, implementing **Vue, Springboot, Redis, and MySQL**. Conducted comprehensive demand analysis and prototyping, leading the team through development phases. Achieved a **40% improvement in operational workflows**, significantly **reducing decision-making times** across departments.
- **Research Assistant** — *Advisor: Dr. Xianming Wang*   Apr 2020 - May 2020
  Wenzhou University of Technology   *Wenzhou, China*
    - Analyzed impact factors of soccer team strategies based on game records.
    - Conducted analytical modeling of contest records using social networks and degree centrality.
    - Revealed that teams focused more on coordination and communication than on individual performance.
- **Research Assistant** — *Advisor: Dr. Xu Xu*   Jul 2019 - Dec 2019
  Institute of Modeling and Data Mining   *Wenzhou, China*
    - Collected shopping site reviews from Amazon using BeautifulSoup.
    - Conducted sentiment analysis on the corpus using Textblob.
    - Created user profiles of the commenters using Wordcloud.
- **Research Assistant** — *Advisor: Dr. Xianming Wang*   Sep 2018 - Jan 2019
  Wenzhou Bopu Institute of Big Data   *Wenzhou, China*
    - Conducted public opinion analysis based on news content crawled from Wenzhou News Network.
    - Conducted dictionary-based sentiment analysis.
    - Implemented knowledge graph presentation by structuring a single news article.
    - Used TextRank4ZH for news topic word extraction and topic "hotness" visualization.

SELECTED DEVELOPMENT PROJECTS

- **ThinkGrasp - Vision-Language System for Strategic Part Grasping in Clutter**
    - Developed ThinkGrasp, a vision-language grasping system utilizing **GPT-4o** for contextual reasoning, enabling effective grasping in cluttered environments.
    - Engineered the system to identify and generate grasp poses for target objects, even when heavily obstructed or nearly invisible, leveraging **vision-language models**.
    - Achieved **98.0% success rate** in simulations and **78.9% success rate** in heavy clutter scenarios, significantly **outperforming state-of-the-art methods**. Demonstrated strong generalization capabilities in both simulated and real-world experiments, confirming its effectiveness and robustness.

- **IMAGINATION POLICY - Generative Point Cloud Models for Learning Manipulation Policies**
    - Participated in the development of **IMAGINATION POLICY**, using **generative point cloud models** for key-frame manipulation policies.
    - Achieved **90.67% success rate** in phone-on-base task, **97.33% success rate** in stack-wine task, and **42.67% success rate** in insert-knife task, significantly outperforming existing baselines.
    - Contributed to enhancing policy learning efficiency by incorporating **3D point cloud generation** with rigid action estimation, allowing for accurate pick-and-place actions.

- **PAT PAT - Emotional Support Virtual Pet Application**
    - Directed full-stack development, integrating **React** for frontend and **Flask** for backend, alongside **LLM technology** to boost chatbot capabilities.
    - Led a multidisciplinary team, employing **Agile methodologies** for swift iterations and **AWS EC2** for scalable deployment across **web** and **iOS**, reducing deployment time by **30%**.
    - Achieved a **40% increase in user engagement** and secured **3rd Place** in the Inter-Disciplinary Category at the paper2product hackathon, evidencing project innovation and impact.

- **Athena's Oracle - AI-powered Document Insight Engine**
    - Spearheaded the development of **Athena's Oracle**, an AI-powered engine designed for deep document analysis and knowledge extraction, leveraging advanced **NLP** and **AI** technologies.
    - Implemented **batch downloading** and **RAG knowledge base construction**, increasing document retrieval efficiency by **50%**.
    - Integrated **Streamlit** for a user-friendly interface, enabling intuitive query handling and multi-document intelligence, improving user satisfaction by **35%**.
    - Enhanced document retrieval using **FAISS** for efficient search and clustering of dense vectors, ensuring comprehensive and relevant insights, reducing retrieval time by **40%**.

SELECTED HONORS AND AWARDS

- Awarded a $5,000 OpenAI Credit for research and development - 2024
- 3rd Place in the Inter-Disciplinary Category at the Paper2Product Hackathon - 2024
- The travel award to the William & Mary Computer Science Symposium in Williamsburg - 2023
- Outstanding Graduates of Zhejiang Province (5%) - 2020
- Gu Chaohao Scholarship (1 out of 8773, 0.01%) - 2020
- University Student Science and Technology Innovation Star (1 out of 8773, 0.01%) - 2020
- Award for Distinguished Employees - 2020