Wenqi Ge

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EDUCATION

Southern University of Science and Technology   Shenzhen, China
M.Sc. *in Electronic Science and Technology* **GPA: 3.53/4**   *Sep. 2022 – Present*
- Advisor: Chair Prof. Hong ZHANG

Hefei University of Technology (Magna Cum Laude)   Hefei, China
B.Eng. *in Computer Science and Technology* **GPA: 3.77/4.3, rank: 5/155 (Top 3%)**   *Sep. 2018 – Jun. 2022*
- Related Courses (A/A+): Linear algebra, Advanced Mathematics, Data Structure(excellence class), Probability Theory and Mathematical Statistics, Discrete Mathematics, Machine Learning

RESEARCH INTERESTS

My research interests involve **social aware task planning**, **human-robot interaction**, **robot learning** and **scene understanding** for robots. The ultimate goal is to develop autonomous agents that can perceive, understand, and interact with the physical world with the same level of intelligence as humans.

PUBLICATIONS

[1] **Wenqi Ge**, Chao Tang, Hong Zhang.
Commonsense Scene Graph-based Target Localization for Object Search.
Accepted to International Conference on Intelligent Robots and Systems (**IROS**), 2024, Oral
[Paper] [Website]

[2] Chao Tang, Dehao Huang, **Wenqi Ge**, Weiyu Liu, Hong Zhang.
GraspGPT: Leveraging Semantic Knowledge From a Large Language Model for Task-Oriented Grasping.
Robotics and Automation Letters (**RAL**), 2023
[Paper] [Website]

RESEARCH EXPERIENCE

Robotics and Computer Vision Laboratory   SUSTech, China
Task-Oriented Grasping (TOG) Generalized by LLMs   *Oct. 2022 − Sep. 2023*
Graduate Research, team member, supervised by Prof. Hong Zhang
- Proposed a TOG framework using open-ended semantic knowledge from LLMs for zero-shot generalization to novel grasp tasks beyond the dataset.
- Built and trained a custom design Transformer to map the extensive knowledge from LLMs to new grasp tasks, get **29.69%** improvement in novel tasks. [Pub1]

Object Search with Commonsense in Scene Graph   *Feb. 2023 − Nov. 2023*
*Graduate Research, **leader**, supervised by* Prof. Hong Zhang
- Proposed a Commonsense Scene Graph (CSG) to model the search environment, encoding commonsense knowledge prompted from LLMs in nodes and links to capture human preferences.
- Modeled target search as a link prediction problem in CSG, creating a custom GNN-Transformer that improved link prediction by **21.84%** and final search success by **25.15%**. [Pub2]

Human Intention Aware Robot Navigation with LLM-Enhanced RL   *Apr. 2024 − present*
Master's thesis project, supervised by Prof. Hong Zhang
- Developed a framework for user-friendly path planning, enabling robots to consider human intentions, such as avoiding the space between a user and the TV when the person is watching.
- Added a scene understanding module to the DRL network, enabling it to consider human-environment interactions for intention-aware navigation. [Demo]

Intelligent Vision and Automation Lab   Georgia Institute of Technology, GA
Continual Learning for Obj Search with Commonsense and User Habits   *Mar. 2024 − Jun. 2024*
Graduate Research, team member, collaboration online with Dr. Ruinian Xu

- Expanded on my prior work by incorporating user habits in addition to commonsense. Developed a continue learning framework to improve object localization efficiency based on individual user preferences.

Tencent RoboticsX (AI Lab) — Tecent, China
Active Constraint-Aware Object Search in Clutter with LLMs — *Mar. 2024 − Aug. 2024*

Research Intern, supervised by Dr. Bidan Huang and Prof. Hong Zhang

- Formulated the object search problem as a POMDP and developed a pipeline that leverages VLMs to propose object likely locations, using physics-based simulations to evaluate the feasibility of these proposals.
- Designed realistic scenes in IsaacSim with diverse daily objects, evaluating the framework's performance in both simulation and real-world experiments to demonstrate its effectiveness. [Demo]

HONORS & AWARDS

Outstanding Graduate (2% Schoolwide)	*Jun. 2022*
Second Class of the Merit Student Scholarship (2% Schoolwide)	*2019 - 2022*
First Prize, Anhui Province College IoT Application Innovation Competition (5/98)	*Dec, 2021*
First Prize, The National Undergraduate Engineering Training Competition (2/32)	*Sep, 2021*
Second Prize, The National College Students' Robotics Competition ROBOMASTER (16/300)	*Aug. 2021*
Second Prize, The National College Computer Competency Challenge, C++ Programming Competition (150/2000)	*Jan, 2021*
Second Prize, The National College Students' Robotics Competition ROBOMASTER (16/300)	*Aug. 2020*
First Prize, Anhui Province Robotics Competition, Microcontroller and Embedded Systems Category (2/40)	*Nov, 2020*

SKILLS

Programming: Python, C++, JAVA, JavaScript, LaTeX, HTML, MATLAB

Software & Tools: Linux, ROS, PyTorch, IsaacSim, IsaacGym, Gazebo, pybullet

Developed System:

- Semantic Mapping with Relocation: built on ORB-SLAM3/FAST-LIO2 with concept-graph [Demo]
- Pick & Place: built on GraspNet in Isaacsim simulator and Franka Panda for real [Demo]

Robots: Franka Panda, CLEARPATH Jackal, hello robot Stretch

Language: English (current TOEFL 92), Chinese (Native)