Chengyuan Luo

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Education

Shanghai Jiao Tong University Shanghai, China
Bachelor's degree in French, minor in Information Technology *Aug 2021 – Jun 2025 (Expected)*

GPA: 4.13/4.3 (Minor), 4.01/4.3 (Overall)

Select coursework: Machine Learning (98/100), Mathematical Foundation for Artificial Intelligence (98/100), Data Structure (98/100), Probability and Statistics (98/100), Digital Signal Processing (98/100)

Honors and Awards:

- **Academic Scholarship (First Prize)** of SJTU-Paris Elite Institute of Technology (1/46), November 2024
- **Dean's Scholarship** of SJTU-Paris Elite Institute of Technology (1/73), September 2023
- **Meritouris Winner** in COMAP's Mathematical Contest in Modeling, May 2023
- **Gold Medal** in 46th International Collegiate Programming Contest (ICPC) Asia Regional Contest - Shanghai Site (rank 13/632) and Nanjing Site (rank 15/641), November and December 2021
- **Gold Medal** in 7th China Collegiate Programming Contest (CCPC) Weihai Site (rank 7/240), November 2021
- **Gold Medal** in China Computer Federation National Olympiad in Informatics Winter Camp (rank 18), August 2020

Research Experience

SJTU Machine Vision and Autonomous System Laboratory, Undergraduate Researcher *Dec 2024 – Present*
Advised by Prof. Junguo Lu, Shanghai Jiao Tong University

Project: Imitation Learning for Bipedal Locomotion

- ▷ Integration of imitation learning into humanoid robot control policies
- Pre-processed motion capture datasets to extract reference actions.
- Developed an efficient buffer to store reference actions with NVIDIA Warp during reinforcement learning.
- Modified the protocols of the reinforcement learning library `rsl_rl` for imitation learning.

People, AI, and Robotics (PAIR) research group, Undergraduate Researcher (online) *Aug 2024 – Jan 2025*
Advised by Prof. Animesh Garg, Georgia Institute of Technology.

Project 1: NVIDIA Isaac Sim/Lab Grasping Extension

- ▷ Implemented a universal grasping extension that can be easily adapted for various projects.
- Conceived a unified grasp representation protocol for grasping models and implemented the grasp API server.
- Wrote an Isaac Sim extension with a GUI that supports grasp visualization and execution.
- Adapted the code for NVIDIA Isaac Lab, using Warp for state machines in multiple environments for parallelization.

Project 2: Object Placement Simulation

- ▷ Implemented and Simulated an object placement pipeline and evaluated the success rate.
- Modified the AnyGrasp model to generate grasps for diverse objects.
- Planned the pick-and-place trajectory using CuRobo to avoid collisions.
- Adapted the NVIDIA Isaac Lab grasping program for parallel executions of trajectories.
- Executed 20,000+ pick-and-place experiments across various objects and tasks.
- Analyzed the predicted placement poses and the simulated results to compute metrics for evaluation.
- ▷ A paper has been submitted to RSS 2025 and is awaiting review.

SJTU Machine Vision and Intelligence Group, Undergraduate Researcher *Feb 2023 – Dec 2024*
Advised by Prof. Cewu Lu, Shanghai Jiao Tong University.

Project 1: Benchmarking grasping models

- ▷ Implemented an automatic framework to evaluate 2-finger grasp models using multiple metrics.
- Designed a novel framework for 2-finger grasp models to test their performance.
- Developed the grasp simulation based on the framework in Bullet and NVIDIA Isaac Lab environment.
- Implemented an entire pipeline for calibration and testing grasps in the real world using ROS and MoveIt Motion Planning Framework and conducted extensive experiments.

- Wrote a program to control a microcontroller unit using FreeRTOS for multithreading.
  - ▷ The framework can execute grasps automatically with little human intervention, and it can evaluate grasps comprehensively using multiple metrics.

Project 2: Inter-communication between robots

- ▷ For a project that required both controlling a moving robot and the robot arm mounted onto it.
- Developed several protocols for robot control to accomplish specific tasks more efficiently.
- Modified and re-wrote some of the ROS protocols of the robot arm and made them compatible with other ROS versions to facilitate communication with another robot.

SJTU Participation in Research Program, Team Member *Feb 2022 – Oct 2022*

Project: Grammatical and word freqeuncy analysis in French texts (A+)

- ▷ Analyze the frequency of key points in French grammar and vocabulary in mathematics and physics textbooks of SPEIT.
- Developed a pipeline to determine the tense and the mode of a sentence in French according to grammatical rules.
- Performed word frequency statistics and analysed the statistical results.
- ▷ Recieved an evaluation of A+, proposed advice for French language instruction on a seminar.

Work Experience

ABB Engineering (Shanghai) Robot Research Lab, Research Intern for 3D Vision *Jun 2024 – Aug 2024*

Project: Object detection and pose estimation

- ▷ Identified objects and calculated their poses in a specific workspace.
- Implemented a framework to detect and estimate poses of specific objects using fiducial markers.
- Improved the detection using 2D object detection and segmentation models.
- Designed an algorithm to estimate poses using edge detection for objects with specific shapes.
- Complemented an additional academic survey on deep learning 3D reconstruction methods.
- ▷ Completed the internship's objectives with detailed documentation and several tests of the project.

Course Projects

- **Optimization of basketball trajectory** for *Optimization Theory*: Implemented a differentiable physics simulator along with various gradient descent methods to optimize basketball trajectory for a game.
- **AI player for the Othello game** for *Mathematical Foundation for Artificial Intelligence*: Created an AI player using the minimax algorithm and alpha-beta pruning with heuristics scoring. It has beaten almost all opponents.

Extracurricular Activities

SJTU RoboMaster Team, Team Member *Oct 2022 – Aug 2023*

- Improved the detection of opponents' robots based on YOLO, aligned with the rule updates.
- Developed the detection for other contest apparatuses using YOLO and trained the neural network.
- Deployed the network on NVIDIA embedded AI computers and accelerated its efficiency using TensorRT.

SJTU-SPEIT Comprehensive Evaluation System Development Team *Jun 2022 – Present*

Project Manager and Full-stack Developer

- Developed the backend independently using Node.js and Express as framework and using SQL for database management.
- Developed the frontend using Vue.js and deployed the website on a cloud server.

Skills

- **Programming Languages**: C/C++, Python, JavaScript, SQL
- **Software/Frameworks**: Linux (Arch Linux, Ubuntu), ROS, OpenCV, Open3D, NVIDIA Isaac Sim and Lab, LaTeX
- **Languages**: Chinese, English (ETS TOEFL: 117, ETS GRE: 331 (V: 161, Q: 170) + 5.0), French (intermediate level)