

SHENGXIANG SUN

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EDUCATION

University of Toronto

Sep 2022 – (expected) Apr 2026

Honours Bachelors of Science in Computer Science

- **GPA: 3.83/4.00**
- **Relevant Coursework:** Machine Learning, Python, Probability, Calculus, Linear Algebra

RESEARCH EXPERIENCE

- **Visiting Research Student, National University of Singapore** Oct 2024 – Present
Topic: Autonomous Furniture Assembly by Reading IKEA Manuals with VLMs Advisor: **Prof. Lin Shao**
- **Full-Time Research Assistant, University of Toronto** May 2024 – Sept 2024
Topic: Uncertainty Quantification in VLMs for Robot Manipulation Advisor: **Prof. Florian Shkurti**
- **Undergraduate Research Intern, University of Toronto** Jan 2024 – Apr 2024
Topic: Neural-Symbolic Models for Complex Reasoning Tasks Advisor: **Prof. Xujie Si**

PUBLICATIONS & PATENTS

- 1 [RSS 2025 (Under Review)] Chenrui Tie*, **Shengxiang Sun***, Jinxuan Zhu, Yiwei Liu, Yue Hu, Jingxiang Guo, Haonan Chen, Ruihai Wu, Junting Chen, Lin Shao, “Manual2Skill: Learning to Read Manuals and Acquire Robotic Skills for Furniture Assembly Using Vision-Language Models”

RESEARCH INTERESTS

My research interests span **Robotics and 3D Computer Vision**, with a focus on **generalizable and safe robot manipulation**. I am particularly passionate about developing algorithms that enable robots to perceive, reason, and learn in complex and unstructured environments.

WORK EXPERIENCE

- Loblaw Digital** **Toronto (CA)**
Machine Learning Engineer Co-op - Generative AI Team Jan 2024 – Apr 2024
 - Enhanced an automated email reply system using Google’s Gemini Pro, Python, Docker, CI/CD, Few-Shot and Chain-of-Thought prompt engineering, which resulted in over 3400 correctly automated email replies per week.
 - Developed an end-to-end machine learning pipeline for enhanced shopping experience, with OpenAI’s GPT-4 Vision, Python, Pandas, SQL, Apache Airflow DAGs, and Google Cloud Platform, which automatically generated product descriptions for 154,286 products sold at Loblaws, Shoppers Drug Mart, and Joe Fresh
- New H3C Technologies** **Beijing (CN)**
Machine Learning Research Intern Jul 2023 – Aug 2023
 - Carried out literature reviews on diffusion models, resulting in 30-minute weekly presentations to 3 colleagues
 - Designed training & testing pipelines of Llama2, Dreambooth, InstructPix2Pix on MobaXterm and WebUI, by using PyTorch and HuggingFace, which doubled the team’s testing data outputs
 - Enabled automated downloads of Python dependencies with bash scripting, reducing installation steps by 40%

SCHOLARSHIPS & AWARDS

- **2024 Summer NSERC Math & Computer Science Research Award** (CA\$8000)
- **2023-2024 General In-Course Scholarship** (For maintaining a cumulative GPA of at least 3.7/4.0) (CA\$6000)
- **2023-2024 Dean List Scholar** (For maintaining a cumulative GPA of at least 3.5/4.0)
- **2022 Admission Scholarship** (For students admitted with an average of 95% or above) (CA\$3000)

RESEARCH PROJECT

Autonomous Furniture Assembly by Reading IKEA Manuals with VLMs

Advisor: Prof. Lin Shao, Assistant Professor, NUS, CS

Oct 2024 – Present

- Employed vision-language models to generate hierarchical furniture assembly plans from IKEA manuals, achieving a 300%+ improvement over previous baselines.
- Developed an automated pipeline in Blender to generate a dataset of over 10,000 furniture parts with connection points. Fine-tuned the QWEN-2.5B model using LoRA to accurately predict connection points between individual furniture components.

Uncertainty Quantification in VLMs for Robot Manipulation

Advisor: Prof. Florian Shkurti, Assistant Professor, University of Toronto, CS

May 2024 – Oct 2024

- Implemented algorithms to estimate the relationship between success rate and uncertainty in VoxPoser, ReKep, and MOKA frameworks, producing three diverse uncertainty quantification methods and 50+ samples
- Tested various 2D and 3D part segmentation models for downstream robotic tasks on High-Performance Computing Clusters with SLURM, resulting in 200+ segmentation samples
- Conducted literature reviews of 50+ papers on foundational models for robots, hierarchical image segmentation, and uncertainty quantification

Neural-Symbolic Models for Complex Reasoning Tasks

Advisor: Prof. Xujie Si, Assistant Professor, University of Toronto, CS

Jan 2024 – Apr 2024

- Performed literature review in Neural-Symbolic AI and Reasoning Shortcuts, resulting in a 40-minute presentation and a comprehensive review of Neural-Symbolic systems
- Assisted in solving AI safety & interpretability by fine-tuning Mask R-CNN with TensorFlow on Google Colab, increasing explainability by allowing the model to detect eyes, noses, and mouths, with an 89% accuracy

EXTRACURRICULAR EXPERIENCE

GenAI Genesis

Hackathon Winner - InterView Team github.com/InterView

March 30th, 2024 - March 31st, 2024

- **First-Place: Best AI in Safety & Responsible AI**
- Developed an AI interview helper for junior HR and hiring managers, using Google's Gemini Pro, LangChain for RAG, and Speech-To-Text API, which achieved 80% accuracy in real-time detection of biased interview questions

HackTheValley - 8

Hackathon Participant - QuickScan Team github.com/QuickScan

October 13th, 2023 - October 15th, 2023

- Trained a CNN and RNN model using TensorFlow, CUDA, cuDNN, and CTC loss function, achieving 83% accuracy in predicting and converting handwritten text to digital text

PROGRAMMING SKILLS & LANGUAGE SKILLS

Proficient Python, LaTeX, HTML

Familiar PyTorch, Linux, C, Java, Git

Chinese (Native), English (Fluent), French (Intermediate)