
CHAHYON KU

Master's Student in Robotics

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SUMMARY

I am a self-motivated master's student with research interests in 3D computer vision for robotics, especially for object understanding and visuomotor policy learning.

SKILLS

Languages: Python, C/C++, Java

Technologies: PyTorch, Wandb, ROS, PyBullet, Blender

EDUCATION

9/2022 - 5/2024 **Master of Science in Robotics** University of Minnesota

- Coursework: Robot Vision, Deep Learning for Perception and Manipulation
- Research: Imitation Learning for Manipulation, Object-centric Representations

9/2018 - 6/2019 **Undergraduate Exchange Program** Tsinghua University

- Coursework: Machine Learning, Natural Language Processing, Time Series Analysis

9/2016 - 8/2022 **Bachelor of Science in Computer Science** University of Washington

- Coursework: Artificial Intelligence, Machine Learning, Computer Vision, Natural Language Processing
- Research: Object-centric Representations, Instance Segmentation

PUBLICATIONS

Chahyon Ku, Carl Winge, Ryan Diaz, Wentao Yuan, Karthik Desingh. Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning. *International Conference on Robotics and Automation (ICRA) 2024*.

RESEARCH EXPERIENCES

Conference Pub. **Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning** <https://sites.google.com/view/geometric-peg-in-hole>

- Accepted and to be presented at ICRA 2024
- Presented as 8-min Spotlight + Poster at CoRL 2023 Pretraining for Robot Learning Workshop
- Proposed and implemented a novel dual-arm robotic manipulation task involving the assembly of parts with a specific geometric relationship, modeling real-world tasks such as capping a bottle
- Evaluated the performance of pretrained vision encoders through imitation learning in simulation and real

Undergrad. Res. **Evaluating SORNet on a Geometric and Spatial Reasoning Dataset** [chahyon-ku.github.io/sornet-geospa](https://github.com/chahyon-ku/sornet-geospa)

- Undergraduate research at UW Robotics and State Estimation Lab (PI: Postdoc Scholar Karthik Desingh)
- Extended *SORNet: Spatial Object-Centric Representations for Sequential Manipulation* (CoRL 2021) to predict the geometric and spatial relations as predicates from RGB images
- Generated simulated images of elementary shapes in various configurations (supported, contained, etc.)
- Performed comparative analysis on sensitivity to unseen object attributes and relations

Undergrad. Res. **University of Washington-Amazon Robot Manipulation Project**

- Undergraduate research at UW Robotics and State Estimation Lab (Mentor: PhD Candidate Yi Li)
- Worked on building a system of UR16 and RGBD camera to pick objects from Amazon pods
- Generated simulated RGBD images of randomized bins using the Google Scanned Objects (NVIDIA)
- Implemented, trained, and evaluated a U-net-based baseline for instance segmentation of products

Class Project **Language Conditioned Multi-task Imitation Learning** [chahyon-ku.github.io/bcz-pytorch](https://github.com/chahyon-ku/bcz-pytorch)

- Reimplemented *BC-Z: Zero-Shot Task Generalization with Robotic Imitation Learning* in PyTorch
- Generated data, trained, and evaluated on novel tasks built using RLBench

PROFESSIONAL EXPERIENCES

6/2023 - 9/2023 **Intern, Perception** Zoox

- Developed a novel computer vision model for improving autonomous driving behavior around pedestrians
- Identified the problem and mined 1 million relevant samples using proprietary C++/Python codebase
- Designed and conducted experiments to present findings in documents and presentations
- Communicated with various teams on the AI stack for feedback and smoother integration onto the vehicle

TEACHING EXPERIENCES

9/2023 – 5/2024 **Graduate Teaching Assistant**

University of Minnesota

- CSCI 5551 Introduction to Intelligent Robotics
- Adapted the kineval-stencil framework by Professor Chad Jenkins to fit contents of the course
- Implemented solutions and improved the autograder with detailed error messages.
- Created a new homework assignment combining previous assignments in kinematics, path planning, and state machines to simulate a mobile pick-and-place task.

4/2022 – 6/2022 **Undergraduate Teaching Assistant**

University of Washington

- CSE 473 Artificial Intelligence
- Created and graded problem sets on search, markov decision processes, and reinforcement learning.