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

PROJECTS

Workshop Paper **Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning** **bit.ly/geometric-peg-in-hole**

- 8-min Spotlight + Poster at Pretraining for Robot Learning Workshop @ CoRL 2023
- 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**

- 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 atrributes and relations

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

- 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 (NVISII)
- Implemented, trained, and evaluated a U-net-based model for instance segmentation of products

Class Project **Language Conditioned Multi-task Imitation Learning** **chahyon-ku.github.io/bcz-pytorch**

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

EDUCATION

9/2022 - 6/2024 **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

EXPERIENCE

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

9/2022 – 6/2023 **Graduate Research Assistant** **Robotics Perception Manipulation Lab, University of Minnesota**

- Evaluating Robustness of Visual Representations for Object Assembly Task Requiring Spatio-Geometrical Reasoning (First Author Workshop Paper)

3/2022 – 9/2022 **Undergraduate Research Assistant** **Robotics State Estimation Laboratory, University of Washington**

- Evaluating SORNet on a Geometric and Spatial (GeoSpa) Reasoning Dataset
- University of Washington-Amazon Robot Manipulation Project

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.