Ju-Seung Byun

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Research Interests

Reinforcement Learning (Robustness, RLHF, RLAIF)

Education

The Ohio State University, Columbus, OH, USA .....Aug 2019 - Present

- Ph.D. student in Computer Science (Advisor: Andrew Perrault), GPA: 3.77/4.0

University of Southern California, Los Angeles, CA, USA .....Aug 2017 - June 2019

- Master in Computer Science, GPA: 3.61/4.0

Inha University, Incheon, South Korea .....Mar 2010 - Aug 2017

- Bachelor in Computer Science, GPA: 3.87/4.5
- Minor, Mathematics

Publications

- **(Ongoing Work) Enhancing Chain-of-Thought Reasoning Using Reinforcement Learning with Nuanced Feedback**
  Reinforcement Learning AI Feedback (RLAIF) project: We aim to enhance a multimodal language model through the utilization of more nuanced feedback (sentence-level feedback), not ranking-based feedback.
- **(Preprint) Symmetric Reinforcement Learning Loss for Robust Learning on Diverse Tasks and Model Scales**
  Ju-Seung Byun, Andrew Perrault
  arXiv 2024 Paper Code
- **(Preprint) Reinforcement Learning for Fine-tuning Text-to-speech Diffusion Models**
  Jingyi Chen, **Ju-Seung Byun**, Micha Elsner, Andrew Perrault
  arXiv 2024 Paper
- **(Preprint) Normality-Guided Distributional Reinforcement Learning for Continuous Control**
  Ju-Seung Byun, Andrew Perrault
  arXiv 2023 Paper Code
- **SalsaBot: Towards a Robust and Generalizable Embodied Agent**
  Chan Hee Song, Jiaman Wu, **Ju-Seung Byun**, Zexin Xu, Vardaan Pahuja, Goonmeet Bajaj, Samuel Stevens, Ziru Chen, Yu Su
  Embodied AI Workshop at CVPR 2023 Paper
- **Training Transition Policies via Distribution Matching for Complex Tasks**
  Ju-Seung Byun, Andrew Perrault
  ICLR 2022 Paper Code Video
- **Proximal Policy Gradient: PPO with Policy Gradient**
  Ju-Seung Byun, Byungmoon Kim, Huamin Wang
  arXiv 2020 Paper Code

- **Development of application that removes moving objects from pictures**
  Ju-Seung Byun, Min-ho Kim, Byung Seok Shin
  Korea Information Processing Society (KIPS) Jeju, Korea, 2017 Fall.

Academic Experience

OSU, Amazon Alexa Prize SimBot Challenge .....April 2022 - April 2023

- Developing a user-centric embodied agent that engages with users from diverse backgrounds, utilizing Automatic Speech Recognition (ASR) to accomplish household-related games

USC, Computer Graphics and Immersive Technologies Laboratory .....Feb 2018 - Dec 2018
Master Student (Adviser: Ulrich Neumann)

- Participating in Core 3D Project
  - Developed 3D Viewer for Skeleton Structure System Buildings
  - Hole Filling Resulting from Plane Detection RANSAC
  - Rectify DEM Data through Deep Learning

Course and Personal Projects

- Implementation of Simple Inverse Kinematic Chains Link .....Apr 2018
- Ray Tracing with CUDA Link .....Apr 2018
- 2D Particle System and Smoothed Particle Hydrodynamics for Water Simulation Link .....Mar 2018
- Simulating a Catmull-Rom Spline Roller Coaster Link .....Mar 2018
- Jell-O Cube Simulation with Objects and User Interaction Link .....Feb 2018
- Implement Simple Cloth Simulation with Ball Link .....Dec 2017

Inha University, Computer Science Media Lab .....Mar 2015 - Aug 2017
Undergraduate Intern (Adviser: Byung Seok Shin)

- Participated in Lab Seminar Related to Computer Graphics
- Developed Image Viewer for Medical Picture

Work History

ArC-AI, Google Internship, Mountain View, CA .....May 2022 - Aug 2022

- Google Software Engineering Intern Ph.D.
- Enhancing PII Abuse Detection with Machine Learning Augmented Analysis

Republic of Korea Army, Field Communication Unit .....May 2012 - Feb 2014

- Assignment: Signal Corpsman | Rank: Sergeant
- Served as Squad Commander for the last four months

Teaching assistants

OSU, Research Assistant .....Spring 2021 - Present

- STRIDES Lab (Advisor: Andrew Perrault)

OSU, CSE-5544 Introduction to Data Visualization .....Fall 2019 - Fall 2020

- Duties including office hours and grading projects

USC, CSCI-520 Computer Animation and Simulation (Grader) .....Spring 2019

- Evaluating three programming assignments in C/C++ and OpenGL

Computer Skills

Languages: C, C++, Java, Python, MATLAB, CSS, JavaScript, HTML
Tools & Libraries: OpenGL, Cuda, PyTorch