SeongHyeon Moon

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Research Interests

Keywords: *Computer Vision, Object Segmentation, Vision Language Model*

- Integrating visual and textual data to improve object detection, segmentation, and tracking.

Education

May 2024 – Sep 2018 | ***Doctor of Philosophy*** **- Computer Science** | **New Brunswick, NJ, USA**
Rutgers, The State University of New Jersey
Dissertation: Maximize Utilization of Support-Set for Few-shot Segmentation

Feb 2017 – Mar 2015 | ***Master of Science*** **- Mechanical Engineering** | **Gwangju, KOR**
Gwangju Institute of Science and Technology (GIST)
Thesis: Parameterization of Unorganized Cylindrical 3D-Point Clouds for Surface Fitting

Feb 2015 – Mar 2009 | ***Bachelor of Science*** **- Industrial and Information System Engineering (IISE)** | **Seoul, KOR**
Seoul National Univerisity of Science and Technology (SeoulTech)
Graduated with the highest honor (**Rank 1**/45)

Work Experience

Present – Jul 2024 | ***Brookhaven National Laboratory*** | **Upton, NY, USA**
Research Associate in AI Dept.
- Topic: Few-shot Segmentation with Vision Language Model (VLM)
- Achieved state-of-the-art performance on the Few-shot Segmentation (FSS) with a new novel way to extract feature information.

Aug 2023 – May 2023 | ***Roblox*** | **San Mateo, CA, USA**
Research Intern in Core AI.
- Topic: Real-Time Body Movement Tracking
- Improve the efficiency and precision of the human pose estimation model.

Aug 2022 – May 2022 | ***NEC Laboratories America*** | **Princeton, NJ, USA**
Research Intern in Machine Learning Dept.
- Topic: Multi-camera Multi-object Tracking
- Developed a novel association technique that integrates visual features with location data.

Aug 2020 – Jun 2020 | ***DeepMotion*** | **San Mateo, CA, USA**
Research Intern in Research Group.
- Topic: Controlling a humanoid model using reinforcement learning
- Hierarchical reinforcement learning was applied to train a high-level policy that directs a complex human agent to navigate to a specific location.

Aug 2019 – Jun 2019 | ***AutoDesk*** | **Toronto, ON, CAN**
Software Engineer Intern in Autodesk Research.
- Topic: Human behavior simulation in a building
- Integrated SyDEVS and SteerSuite into an open-source C++ framework, SyDEVS-Building, for simulating human behaviors in an office building.

Honors & Awards

- Andrew Kim Memorial Foundation Fellowship, **Northeast Regional Conference (NRC), 2024**
- Korean Government Scholarship (Tuition and Stipend), Gwangju Institute of Science and Technology, 2015, 2016
- Graduated with the highest honor from the department of IISE at Seoul National University of Science and Technology, 2015
- High G.P.A., Seoul National Univerisity of Science and Technology, 2010

Skills

Python, C++, C, Pytorch, OpenCV, Unity, Ubuntu, etc.

Selected Publications

Journal Articles *Equal contribution

[3] ***JOIN: an integrated platform for joint simulation of occupant-building interactions***
Architectural Science Review, 2019
*Seonghyeon Moon, *Davide Schaumann, Muhammad Usman, Rhys Goldstein, Simon Breslav, Azam Khan, Petros Faloutsos, and Mubbasir Kapadia

[2] ***Dynamic Correction of Image Distortions for a Kinect-Projector System***
Journal of WSCG, 2018
Jihoon Park, Seonghyeon Moon, and Kwanghee Ko

[1] ***A point projection approach for improving the accuracy of the multilevel B-spline approximation***
Journal of Computational Design and Engineering, 2018
Seonghyeon Moon and Kwanghee Ko

Conference Papers *Equal contribution (Top conferences are highlighted in red)

[10] ***FCC: Fully Connected Correlation for Few-Shot Segmentation***
Under Review
Seonghyeon Moon, Haein Kong, Muhammad Haris Khan, Yuewei Lin

[9 ***Judging from Support-set: A New Way to Utilize Few-Shot Segmentation for Segmentation Refinement***
Under Review
Seonghyeon Moon, Qingze Liu, Haein Kong, Muhammad Haris Khan

[8] ***Learning from Synthetic Human Group Activities***
Conference on Computer Vision and Pattern Recognition (CVPR 2024) - 24% Acceptance rate
Che-Jui Chang, Danrui Li, Deep Patel, Parth Goel, Honglu Zhou, Seonghyeon Moon, Samuel S. Sohn, Sejong Yoon, Vladimir Pavlovic, Mubbasir Kapadia

[7] ***MSI: Maximize Support-Set Information for Few-Shot Segmentation***
The 19th International Conference on Computer Vision (ICCV 2023) - 26% Acceptance rate
Seonghyeon Moon, Samuel S Sohn, Honglu Zhou, Sejong Yoon, Vladimir Pavlovic, Muhammad Haris Khan, Mubbasir Kapadia

[6] ***HM: Hybrid Masking for Few-Shot Segmentation***
The 17th European Conference on Computer Vision (ECCV 2022) - 28% Acceptance rate
Seonghyeon Moon, Samuel S Sohn, Honglu Zhou, Sejong Yoon, Vladimir Pavlovic, Muhammad Haris Khan, Mubbasir Kapadia

[5] ***Harnessing Fourier Isovists and Geodesic Interaction for Long-Term Crowd Flow Prediction***
The 31st International Joint Conference on Artificial Intelligence (IJCAI 2022) - 15% Acceptance rate
Samuel S Sohn, Seonghyeon Moon, Honglu Zhou, Mihee Lee, Sejong Yoon, Vladimir Pavlovic, Mubbasir Kapadia

[4] ***MUSE-VAE: Multi-Scale VAE for Environment-Aware Long Term Trajectory Prediction***
Conference on Computer Vision and Pattern Recognition (CVPR 2022) - 25% Acceptance rate
Mihee Lee, Samuel S Sohn, Seonghyeon Moon, Sejong Yoon, Mubbasir Kapadia, Vladimir Pavlovic

[3] ***Laying the Foundations of Deep Long-Term Crowd Flow Prediction***
The 16th European Conference on Computer Vision (ECCV 2020) - 27% Acceptance rate
Samuel S Sohn, Honglu Zhou, Seonghyeon Moon, Sejong Yoon, Vladimir Pavlovic, Mubbasir Kapadia

[2] ***Toward a Multi-Level and Multi-Paradigm Platform for Building Occupant Simulation***
Symposium on Simulation for Architecture and Urban Design (SimAUD 2019)
*Seonghyeon Moon, *Davide Schaumann, Muhammad Usman, Rhys Goldstein, Simon Breslav, Azam Khan, Petros Faloutsos, Mubbasir Kapadia

[1] ***Parameterization of unorganized cylindrical point clouds for least squares B-spline surface fitting***
25th Conference in Central Europe on Computer Graphics, Visualization and Computer Vision (WSCG2017)
Seonghyeon Moon, Jin-Eon Park and Kwanghee Ko