

SeongHyeon MOON

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RESEARCH INTERESTS

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

- Integrating image and textual information for enhanced object detection, segmentation, and tracking.
- Applying LLMs to analyze DNA sequences, enhancing object detection and segmentation through biological data.

EDUCATION

MAY 2024	<i>Doctor of Philosophy - Computer Science</i>	New Brunswick, NJ, USA
SEP 2018	Rutgers, The State University of New Jersey Adviser: Mubbasir Kapadia Dissertation: Maximize Utilization of Support-Set for Few-shot Segmentation	
FEB 2017	<i>Master of Science - Mechanical Engineering</i>	Gwangju, KOR
MAR 2015	Gwangju Institute of Science and Technology (GIST) Adviser: Kwanghee Ko Thesis: Parameterization of Unorganized Cylindrical 3D-Point Clouds for Surface Fitting	
FEB 2015	<i>Bachelor of Science - Industrial and Information System Engineering (IISE)</i>	Seoul, KOR
MAR 2009	Seoul National University of Science and Technology (SeoulTech) Graduated with the highest honor (Rank 1/45)	

WORK EXPERIENCE

PRESENT	<i>Brookhaven National Laboratory (BNL)</i>	Upton, NY, USA
JUL 2024	Research Associate in the Foundation Model Group of AI Dept. <ul style="list-style-type: none">• Topic: Vision Language Model to track pathogen and Mamba LLM to process DNA• VLM and LLM training optimizations on multiple GPUs and fine-tuning for DNA and protein sequence	
AUG 2023	<i>Roblox</i>	San Mateo, CA, USA
MAY 2023	Research Intern in Roblox AI. <ul style="list-style-type: none">• Topic: Real-Time Mody Movement Tracking• Enhance the performance and accuracy of the human pose estimation model	
AUG 2022	<i>NEC Laboratories America</i>	Princeton, NJ, USA
MAY 2022	Research Intern in Machine Learning Dept. <ul style="list-style-type: none">• Topic: Multi-camera Multi-object Tracking• Devised a new association method combining visual features with location information	
AUG 2020	<i>DeepMotion</i>	San Mateo, CA, USA
JUN 2020	Research Intern in Research Group. <ul style="list-style-type: none">• Topic: Controlling a humanoid model using reinforcement learning• Hierarchical reinforcement learning was utilized and trained a high-level policy to control a complex human agent to move a specific location	
AUG 2019	<i>AutoDesk</i>	Toronto, ON, CAN
JUN 2019	Software Engineer Intern in Autodesk Research. <ul style="list-style-type: none">• Topic: Human behavior simulation in a building• Combined the two frameworks (SyDEVs and SteerSuite) and made an open-source C++ framework(SyDEVs-Building) generating 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 in the department of IISE, Seoul National University of Science and Technology, 2015
- High G.P.A., Seoul National University of Science and Technology, 2010

SKILLS

Python, C++, C, Java, Pytorch, OpenCV, OpenGL, Unity, Ubuntu, Solidity, MATLAB, 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] | ***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
- [9] | ***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
- [8] | ***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
- [7] | ***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
- [6] | ***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
- [5] | ***A2X: An Agent and Environment Interaction Benchmark for Multimodal Human Trajectory Prediction***
Motion, Interaction and Games (MIG 2021)
Samuel S Sohn, Mihee Lee, Seonghyeon Moon, Gang Qiao, Usman Muhammad, Sejong Yoon, Mubbasir Kapadia
- [4] | ***Deep Integration of Physical Humanoid Control and Crowd Navigation***
Motion, Interaction and Games (MIG 2020)
Brandon Haworth, Glen Berseth, Seonghyeon Moon, Petros Faloutsos, Mubbasir Kapadia
- [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