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

WORK EXPERIENCE

Present Jul 2024	***Brookhaven National Laboratory (BNL)*** **Research Associate** in the Foundation Model Group of AI Dept. • 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	**Upton, NY, USA**
Aug 2023 May 2023	***Roblox*** **Research Intern** in Roblox AI. • Topic: Real-Time Body Movement Tracking • Enhance the performance and accuracy of the human pose estimation model	**San Mateo, CA, USA**
Aug 2022 May 2022	***NEC Laboratories America*** **Research Intern** in Machine Learning Dept. • Topic: Multi-camera Multi-object Tracking • Devised a new association method combining visual features with location information	**Princeton, NJ, USA**
Aug 2020 Jun 2020	***DeepMotion*** **Research Intern** in Research Group. • 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	**San Mateo, CA, USA**
Aug 2019 Jun 2019	***AutoDesk*** **Software Engineer Intern** in Autodesk Research. • 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	**Toronto, ON, CAN**

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 Univerisity of Science and Technology, 2015
- High G.P.A., Seoul National Univerisity 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] **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