Sungboo Yoon

Ph.D. Candidate, Department of Architecture & Architectural Engineering
College of Engineering, Seoul National University
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Research Interests

Construction Robotics, Human-Robot Interaction, Machine Learning

Education

- **Seoul National University** *2022 - Present*
  Ph.D. in Architectural Engineering Seoul, South Korea
  - Advisor: Dr. Changbum R. Ahn
- **Seoul National University** *2020 - 2022*
  M.S. in Architectural Engineering Seoul, South Korea
  - Thesis: "Challenges in Spatial Communication Using Deictic Gesture for Human-Robot Collaboration in Construction"
    Advisor: Dr. Moonseo Park
- **Seoul National University** *2014 - 2020*
  B.S. in Architectural Engineering Seoul, South Korea
  - Graduated with honors (Cum Laude)

Experience

- **Seoul National University,** ***Department of Architecture & Architectural Engineering*** **[🌐]** *Sep 2022 - Present*
  Graduate Research Assistant Seoul, South Korea
  - Human-Robot Interaction Design in Construction
- **Seoul National University,** ***Institute of Construction and Environmental Engineering*** **[🌐]** *Mar 2022 - Aug 2022*
  Research Associate Seoul, South Korea
- **Seoul National University,** ***Department of Architecture & Architectural Engineering*** **[🌐]** *Mar 2020 - Feb 2022*
  Research Assistant Seoul, South Korea
  - **Technical Development of Modular Construction in Mid-High Rise Building and Higher Productivity**
  - Developed an multi-objective optimization model for layout planning of heavy equipment
  - Developed the modular construction management and information system (MoMIS) and collected user feedback from site managers
- **Daewoo E&C [🌐]** *Dec 2018 - Jan 2019*
  Intern Seongnam, South Korea
- **Korean National Police Agency,** ***Public Security Division*** *Jul 2016 - Apr 2018*
  Sergeant Seoul, South Korea

Patents and Publications

J=Journal, C=Conference, N=Non-Referred Article, P=Patent, T=Thesis

[J.4] Lee, C., **Yoon, S.**, Park, M., & Ahn, C. R. (2024). **Interpreting Spatial Instructions for Effective Human-Robot Communication in Construction Environments**. *Journal of Construction Automation and Robotics*, 3(3), 6-13.

[J.3] **Yoon, S.**, Park, M., & Ahn, C. R. (2024). **LaserDex: Improvising Spatial Tasks Using Deictic Gestures and Laser Pointing for Human–Robot Collaboration in Construction**. *Journal of Computing in Civil Engineering*, 38(3), 04024012. **(Invited paper, Editor's choice)**

[J.2] **Yoon, S.**, Kim, Y., Park, M., & Ahn, C. R. (2023). **Effects of Spatial Characteristics on the Human–Robot Communication Using Deictic Gesture in Construction**. *Journal of Construction Engineering and Management*, 149(7), 04023049.

[J.1] **Yoon, S.**, Park, M., Jung, M., Hyun, H., & Ahn, S. (2024). **Multi-objective Optimization Model for Tower Crane Layout Planning in Modular Construction**. *Korean Journal of Construction Engineering and Management*, 22(1), 36-46.

[C.5] **Yoon, S.**, Shin, S., Lee, S., Park, M., & Ahn, C. R. (2024). **Evaluating Viewpoint Control Techniques in Virtual Reality Interface for Teleoperating Construction Welding Robots**. In *Proceedings of the 31st International Workshop on Intelligent Computing in Engineering*. **(Recognized as a top paper and invited to the special issue of the Advanced Engineering Informatics)**

[C.4] **Yoon, S.**, Lee, C., Lee, S., Park, M., & Ahn, C. R. (2024). **A Taxonomy of Extended Reality for Human-Robot Interaction in Construction Based on a Systematic Literature Review**. In *Proceedings of the 31st International Workshop on Intelligent Computing in Engineering*.

[C.3] **Yoon, S.**, Park, J., Park, M., & Ahn, C. R. (2024). **A Deictic Gesture-Based Human-Robot Interface for In Situ Task Specification in Construction**. In *Computing in Civil Engineering 2023* (pp. 445-452). **(Recognized as a top paper and invited to the special issue of the Journal of Computing in Civil Engineering)**

[C.2] Heo, C., Ahn, C. R., **Yoon, S.**, Jung, M., & Park, M. (2022). **Measuring the Impact of Supply Network Topology on the Material Delivery Robustness in Construction Projects**. In *The 9th International Conference on Construction Engineering and Project Management (ICCEPM)*.

[C.1] **Yoon, S.**, Kim, Y., Ahn, C. R., & Park, M. (2021). **Challenges in Deictic Gesture-Based Spatial Referencing for Human-Robot Interaction in Construction**. In *ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction* (Vol. 38, pp. 491-497). IAARC Publications.

[N.1] Ahn, C. R. & **Yoon, S.** (2022). **Intelligent Robots in Construction**. *Review of Architecture and Building Science*, Vol. 66, No. 10, 40-43.

[P.4] Ahn, C. R. & **Yoon, S.**, **Symbiotic Human-Robot Interface Using Augmented Reality for Shared Control and On-Site Work Instruction of Intelligent Construction Robots**. 10-2022-0094853, Date of Patent: July 29, 2022.

[P.3] Park, M., Ji, S., **Yoon, S.**, Ahn, S., Jeong, G., & Jung, W., **System and method for site management of modular construction**. 10-2022-0097873, Date of Patent: July 29, 2022.

[P.2] Park, M., Ji, S., **Yoon, S.**, Ahn, S., Jeong, G., & Jung, W., **System and method for managing lifting plan of modular construction**. 10-2022-0094855, Date of Patent: July 29, 2022.

[P.1] Park, M., Ji, S., **Yoon, S.**, Ahn, S., Jeong, G., & Jung, W., **System and method for managing modular construction project schedule**. 10-2022-0094854, Date of Patent: July 29, 2022.

[T.1] **Yoon, S.** (2022). **Challenges in Spatial Communication Using Deictic Gesture for Human-Robot Collaboration in Construction** (Seoul National University).

Honors and Awards

- **Editor's Choice Article** *May 2024*
  ASCE Journal of Computing in Civil Engineering [🌐]
  - Paper Title: "LaserDex: Improvising Spatial Tasks Using Deictic Gestures and Laser Pointing for Human–Robot Collaboration in Construction." Yoon, S., Park, M., and Ahn, C. R. (2024).
- **Graduate Fellowship** *2023*
  Foundation for Industrial Safety Partnerships
- **Graduate Fellowship** *2023*
  Engineering Research Foundation
- **Dean's List** *2022 - 2023*
  Seoul National University
- **Graduate Fellowship** *2020*
  Hanssem DBEW Research Foundation
- **Second Place Award** *2019*
  Graduation Exhibition, Seoul National University
- **Second Place Award** *2019*
  Mooyoung CM Competition, Mooyoung CM
- **Dean's List** *2022 - 2019*
  Seoul National University

Leadership Experience

- **Student Member** *2023 - Present*
  Data, Sensing and Analysis (DSA) committee, ASCE [🌐]
- **Student Member** *2022 - Present*
  American Society of Civil Engineers (ASCE)
- **Member** *2020 - Present*
  Korea Institute of Construction Engineering and Management
- **Member** *2020 - Present*
  Architectural Institute of Korea (AIK)

Teaching Experience

- **Research Mentor** *2022 - Present*
  Construction Engineering and Management Lab, Seoul National University
  - **Mentee: Chaeeun Lee** (M.S. student in Architectural Engineering)
  - **Mentee: Seungmin Shin** (M.S. student in Architectural Engineering)

Skills

- **Programming Languages:** Python, C++, C
- **Mathematical & Statistical Tools:** R
- **Other Tools & Technologies:** Unity, ROS
- **Research Skills:** Engineering