

Sarmad Idrees

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| [Google Scholar](#)

Research Interest

Physical AI, Humanoid robotics, Humanoid skill learning, Motion planning, Robot control

Education

Yonsei University, South Korea

February 2027 (expected)

Ph.D., Mechanical Engineering (GPA: 3.98/4.3)

Thesis: *Multi-Humanoid Load-Aware Collaborative Manipulation*

NED University of Engineering and Technology, Pakistan

February 2017

B.Eng., Industrial Electronics Engineering (GPA: 3.38/4.0)

Thesis: *Autonomous Multi-Mobile Robots Navigation System*

Work Experience

Graduate Research Assistant @ *Yonsei University, South Korea*

March 2020 – present

- Job Description:
 - Researching multi-humanoid load-aware manipulation, using LLM-based reward shaping in Reinforcement Learning to improve coordination when humanoids carry objects together in Isaac Sim.
 - Developed a humanoid skill learning method from a single failed human video by imitating the usable motion and completing the intended task.
 - Designed transformer-based 3D human motion pose prediction model for improved motion understanding.
 - Developed a vision-based concrete slump prediction system for concrete batching plants to reduce manual inspection, with potential extension to automated concrete crack detection workflows.
- Supervisor: [Prof. Jongeun Choi](#) (Professor, UC Berkeley PhD, MLCS Laboratory)

Computer Vision Researcher @ *Retrocausal.ai, U.S.*

October 2018 – February 2020

- Job Description:
 - Researched on single-camera based holistic 3D scene understanding for road scenes.
 - Extended YOLO/SSD object detectors for vehicle 6D pose estimation for real-time processing on mobile devices.
- Supervisor: [Dr. Zeeshan Zia](#) (Microsoft Research, ETH-Zurich PhD, Imperial College London postdoc)

Robotics Engineer @ *Intelligent Mobile Robotics Lab, Pakistan*

May 2017 – January 2018

- Job Description:
 - Implemented ROS (Robot Operating System) Navigation Stack on mobile robots.
 - Integrated different range sensors (e.g. ultrasonic sensors, LiDAR) for navigation on wheeled robots.
- Supervisor: [Prof. M. Bilal Kadri](#) (Professor, Head of Mechatronics Department, Oxford PhD)

Publications

- [1] **S. Idrees** and J. Choi. "Track-and-Complete: Learning Humanoid Skills from a Single Failed Human Video." *Neuro-Symbolic Embodied Intelligence Workshop, NeurIPS* (2026). [\[Paper\]](#) [\[Project Page\]](#)
- [2] H. Park, J. Chae, M. Park, S. Yoo, J. Suh, S. Park, **S. Idrees**, and J. Choi. "CoHuB: A Collaborative Humanoid Loco-Manipulation Benchmark." *8th Robot Learning Workshop, NeurIPS* (2026). [\[Paper\]](#) [\[Project Page\]](#)
- [3] **S. Idrees**, J. Choi, and S. Sohn. "AdvMT: Adversarial Motion Transformer for Long-term Human Motion Prediction." *International Journal of Precision Engineering and Manufacturing* (2026). [\[Paper\]](#)
- [4] **S. Idrees**, J. Kim, J. Choi, and S. Sohn. "Human Motion Prediction: Assessing Direct and Geometry-Aware Approaches in 3D Space." *IEEE Access* (2024). [\[Paper\]](#)
- [5] **S. Idrees**, J. A. Nugraha, S. Tahir, K. Choi, J. Choi, D. H. Ryu, and J. H. Kim. "Automatic Concrete Slump Prediction of Concrete Batching Plant by Deep Learning." *Developments in the Built Environment* (2024). [\[Paper\]](#)

Patents

- [P1] "Human Motion Prediction Method Using Differentiated Transformer."
차별화된 트랜스포머를 이용한 인간 동작 예측 방법
Korean Patent 10-2969077 (granted 2026), co-inventor.
- [P2] "Automatic Concrete Slump Prediction System by AI Deep Learning."
인공지능 딥러닝을 활용한 콘크리트 슬럼프 자동 예측 시스템
Korean Patent 10-2803019 (granted 2025), co-inventor.

Achievements & Service

- Received K-STAR Visa (F2-7s) recommendation letter from Yonsei University President.
- Served as a reviewer for the 8th Robot Learning Workshop: Is Physical AI Going Zero-Shot? (NeurIPS 2026).
- Selected for the National Grassroots ICT Research Initiative, an undergraduate final-year project (FYP) funding program of the Ministry of IT, Government of Pakistan (2016).

Research & Technical Skills

- **Humanoid learning:** multi-humanoid collaborative manipulation, motion imitation from video, reinforcement learning, and simulation in Isaac Sim.
- **Human motion analysis:** 3D pose prediction, Transformer models, adversarial training, physical consistency constraints, and comparative research synthesis.
- **Computer vision:** video classification, explainable AI, 6D vehicle pose estimation, and monocular 3D scene understanding.
- **Robotics:** ROS navigation, robotic arms and humanoids, and LiDAR and ultrasonic sensor integration.
- **Programming & tools:** Python, PyTorch, ROS, Isaac Sim, Isaac Lab, Git, Linux.
- **Languages:** English (IELTS 7.0), Korean (TOPIK Level 1).