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Javed Ahmad

Research Interests:
- **Core Areas:** 3D Computer Vision, Deep Learning, and Multimodal 3D Scene Understanding
- **Robotics:** Motion Planning and Robotic Manipulation
- **3D Technologies:** Structure-from-Motion, Neural Radiance Fields, Gaussian Splatting, and SLAM

Experience

Postdoctoral Researcher

02/2025 – Present **Advanced Robotics, Istituto Italiano di Tecnologia (IIT), Italy**
- Leading research on immersive remote teleoperation of robots in collaboration with INAIL.
- Developing a novel SLAM system based on Gaussian Splatting for real-time 3D reconstruction

02/2024 – 01/2025 **Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia (IIT), Italy**
- Collaborated with CTE-Genova on autonomous 3D artifact scanning using robotic manipulators
- Designed synchronized motion planning pipelines for UR5e and UR3e robotic arms to scan artifacts using Artec 3D scanner and manipulate artifact trays
- Developed pose-tracking algorithms for complex-shaped artifacts

Doctoral Researcher

11/2020 – 12/2023 **Pattern Analysis and Computer Vision (PAVIS), Istituto Italiano di Tecnologia (IIT), Italy**
- Designed a novel LiDAR–camera fusion scheme, improving accuracy and robustness of 3D scene perception
- Contributed to 3D object localization from crowd-sourced images in the MEMEX Project
- Performed precise LiDAR–camera calibration procedures

Research and Teaching Assistant

07/2017 – 10/2020 **CACTUS Lab, Information Technology University, Pakistan**
- Worked on Structure-from-Motion (SfM) for 3D reconstruction of real-world scenes
- Applied machine learning to vibration signal processing for fault diagnosis in rotating machinery
- Teaching Assistant for: Machine Learning (Graduate), Calculus & Analytical Geometry, Power System Analysis (Undergraduate)

Education

11/2020 – 12/2023 **Ph.D. in Computational Vision, Automatic Recognition, and Learning**
Research Lab: Pattern Analysis and Computer Vision (PAVIS), Istituto Italiano di Tecnologia (IIT), Italy
University: University of Genoa (UniGe), Italy
Thesis Title: Multimodal 3D Scene Perception

2017 – 2019 **Master of Science in Electrical Engineering**
University: Information Technology University (ITU), Pakistan
Key Courses: Advanced Mathematics, Machine Learning, Control Systems Theory, Digital Signal Processing

2013 – 2017 **Bachelor of Science in Electrical Engineering**
University: University of Central Punjab, Pakistan
Key Courses: Signal Processing, Image Processing, Control Systems, Electronics

Technical Skills

Python: *Expert* — PyTorch, NumPy, Pandas, SciPy, and more

Computer Vision: *Expert* — GS Rendering, OpenCV, OpenGL, Open3D, MeshCat, Viser, Nerfstudio, BPY, Torchvision, MMCV

Deep Learning: *Expert* — Transformers, DINO, U-Net, and related architectures

Robotics Libraries: *Experienced* — Genesis, Pinocchio, Pyroboplan, UR-RTDE

Robotic Arms: *Experienced* — UR5e, UR3e

3D Perception: *Advanced* — MMDetection3D, LiDAR–Camera fusion techniques

Parallel Computation: *Experienced* — Franklin-HPC with NVIDIA Tesla V100, A100, A6000 GPUs

Other Tools: *Knowledgeable* — Blender, C++, MATLAB

Currently Exploring: NVIDIA Omniverse, Isaac Sim, MoveIt 2

Publications

IROS 2025 (Decision Pending) **Ahmad, J.**, et al. *DARS: A Dual-Arm Robotic System for Autonomous 3D Scanning of Artefacts*. [Project Page]

IEEE/ASME MESA 2024 **Ahmad, J.**, Frascella, S., Dassiè, F., et al. *Automated Artifacts Position and Orientation Estimation in Cultural Heritage*. 2024 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA). [Teaser] [Presentation] [IEEE Xplore DOI]

arXiv 2023 **Ahmad, J.**, Del Bue, A. *mmFUSION: Multi-modal Fusion for 3D Object Detection*. [arXiv Link] [Presentation]

ICIAP 2022 **Ahmad, J.**, Toso, M., Taiana, M., James, S., Del Bue, A. *Multi-view 3D Object Localization from Street-level Scenes*. International Conference on Image Analysis and Processing (ICIAP), 2022. [Springer DOI] [GitHub Code] [Presentation]

Machine Vision and Applications 2022 Castro, E., ..., **Ahmad, J.**, et al. *Fill in the Blank for Fashion Complementary Outfit Product Retrieval*. Journal of Machine Vision and Applications, 2022. [DOI: 10.1007/s00138-022-01359-x]

CVPR Workshop 2020 **Ahmad, J.**, Shamshad, F., et al. *Deep Unsupervised Deblurring Approach for Improving Crops Disease Classification*. CVPR Workshop on Agriculture-Vision, 2020. [Workshop Link]

Reviewer Activity

Reviewer for IEEE Robotics and Automation Letters (RA-L), ICRA 2025, and IROS 2025

Summer Schools

Jul 2023 **International Computer Vision Summer School (ICVSS)**, Sicily
School Theme: From Perception to Action
My Poster: 3D Scene Perception from Single to Multi-modalities [Poster]

Jul 2022 **Vision and Sports Summer School (VS3)**, Prague
Focused on advanced computer vision techniques for 2D/3D object recognition, multi-modal learning, and 3D neural rendering.

Jul 2021 **Vision Understanding and Machine Intelligence Summer School (VISUM)**, Porto
Winner — Project competition on fashion product retrieval using Deep Learning [Presentation]

Jul 2020 **Eastern European Machine Learning Summer School (EEML)**
Winner — 3D historic landmark reconstruction proposal in unconference research competition [Presentation]

Awards & Prizes

1st Prize Winner, Project Competitions at VISUM 2021 and EEML 2020

Merit-based Master's Fellowship awarded by Information Technology University (ITU), Pakistan

Community Service

Former member of Akhuwat Foundation, Pakistan, contributed to charity fundraising initiatives. Currently seeking new opportunities for meaningful community engagement.