Ashwin Nedungadi

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Summary

Ph.D. candidate at the Institute for Visual & Analytical Computing specializing in Multimodal Perception & Robotics. Proven track record of building real-world robotic systems for logistics and industrial bin-picking, leveraging synthetic data generation and monocular depth estimation pipelines. Passionate about advancing research in Embodied AI and trustworthy Human-Robot Interaction (HRI) through the convergence of Spatial Intelligence and Mixed Reality interfaces.

Research Interests – Spatial Understanding · Embodied AI · Neuromorphic Systems · HCI · 3D Perception · Mixed Reality

Education

- **Universität Rostock** — *Jul. 2025 – Present*
  Ph.D Computer Science — Rostock, Germany
- **Technische Universität Dortmund** — *Nov. 2020 – Feb. 2025*
  Master of Science (M.Sc.) in Robotics *(German GPA = 1.90)* — Dortmund, Germany
- **Sapienza Università di Roma** — *Feb. 2022 – Jul. 2022*
  Exchange Semester, M.Sc. in Artificial Intelligence & Robotics — Rome, Italy
- **Czech Technical University in Prague** — *Sep. 2016 – Feb. 2020*
  Bachelor of Science (B.Sc.) in Electrical Engineering & Computer Science *(German GPA = 1.60)* — Prague, Czech Republic

Experience

- **Universität Rostock[🌐]** — *Jul. 2025 – Present*
  Research Associate at Institute for Visual & Analytical Computing (VAC) — Rostock, Germany
  - Leading research in MultiModal LLMs, Egocentric Perception for Robotics, and Computer Vision as part of CORE Labs.
  - Collaborating with industry partners (Ramblr & NeoBIM) to develop Vision-Language Models (VLMs) that serve as intuitive interfaces for complex software and robotic systems.
  - Supervising student research groups and mentoring research assistants (HiWis) in deep learning and computer vision methodologies.
- **Fraunhofer IML [🌐]** — *Jan. 2024 – Jun. 2025*
  Research Assistant in Robotics & AI — Dortmund, Germany
  - **Master's Thesis:** Developed a perception method for real-time volume feedback in partnership with DB Schenker, directly enhancing logistics throughput.
  - Generated synthetic datasets (NVIDIA Isaac Sim) and curated real-world RGB-D data to fine-tune ViT and ConvNeXt depth-estimation networks.
  - Engineered a parallelized RGB-D processing pipeline (52% speedup) and deployed ROS nodes for calibrated LiDAR/stereo-camera integration.
- **Swisslog Robogistics Technology Center [🌐]** — *Sep. 2022 – Jan. 2024*
  Working Student, Computer Vision & Machine Learning — Dortmund, Germany
  - Developed an auto-annotation tool leveraging Meta's Segment Anything Model (SAM) to curate 600+ RGB-D scenes for the ItemPiQ bin-picking system.
  - Trained a Bag-of-Visual-Words material classifier achieving 70% accuracy on unseen parts with sub-7ms inference time.
  - Designed vision-based suction grasping algorithms for cluttered bins, conducting benchmarking of cameras and DL models to optimize performance.
- **Lehrstuhl für Fördertechnik (FLW), TU Dortmund / Fraunhofer IML [🌐]** — *Mar. 2021 – Dec. 2021*
  Working Student, Bin-Picking — Dortmund, Germany
  - Curated the **DoPose dataset** (COCO format) by engineering an ICP-stitching pipeline for Zivid 2 point clouds, and benchmarked Detectron2 for segmentation accuracy.
  - Prototyped low-level grasping routines (C++/Python) and deployed trajectory planning via KUKA MoveIt! on a two-finger gripper.
- **Multi-Robot Systems Group, Czech Technical University [🌐]** — *Jan. 2019 – Feb. 2020*
  Undergraduate Researcher in Robotics — Prague, Czech Republic
  - **Bachelor's Thesis:** Designed a novel UAV grasping mechanism and led flight-testing, securing **1st Place** at the MBZIRC 2020 Challenge II.
  - Engineered a closed-loop grasping system using ROS and embedded C/C++ (ATMega328) for real-time sensor fusion and aerial manipulation.

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

[S.1] Nithyanantham, B. K., Sesterhenn, T., Nedungadi, A., Peral Garijo, S., Zenkner, J., Bartelt, C., & Lüdtke, S. (2026). **MCP4IFC:IFC-based building design using large language models**. Accepted at 2026 EC^3 European Conference on Computing in Construction, Corfu, Greece.

[S.2] Nedungadi, A., Rest, C., & Stenzel, J. (2025). **Monocular Depth Estimation for Efficient Volume Reconstruction in Logistics**. (in preparation).

[C.1] Nedungadi, A., Wöhler, C., et al. (2023). **3D Models of the Martian Surface in Virtual Reality**. *AAS/Division for Planetary Sciences Meeting Abstracts*, 55, 212.04.

[J.1] Gouda, A., Nedungadi, A., et al. (2022). **DoPose: Dataset for Object Segmentation and 6D Pose Estimation (v1.0)**. Zenodo. DOI: 10.5281/zenodo.6103779.

[C.2] Nedungadi, A. S., & Saska, M. (2020). **Design of an Active-Reliable Grasping Mechanism for Autonomous Unmanned Aerial Vehicles**. In J. Mazal, A. Fagiolini, & P. Vasik (Eds.), *Modelling and Simulation for Autonomous Systems* (pp.162–179). Springer International Publishing.

SKILLS

- **Languages** Python, C++, C, Rust, MATLAB
- **Robotics & Perception** ROS2, MoveIt!, Nvidia Isaac Sim, SLAM, 3D Reconstruction, Monocular Depth Estimation, PCL, Zivid SDK
- **Libraries & Frameworks** PyTorch, Hugging Face Transformers, MCP, Detectron2, OpenCV, Open3D, scikit-learn, NumPy, Pandas, SciPy
- **DevOps & Tools** Docker, Git, CI/CD, CMake, Linux, Jupyter, Pinecone, MongoDB

HONORS AND AWARDS

1st Place, HACK:XR+AI Hackathon (TUM) – Won the "Immersive Realities" hackathon (1st/14 teams) with "AURA", an adaptive XR agent for communication disorders. Nov. 2025

1st Place, DLAB VCP Pitch (TU Dortmund) – Won startup pitch (1st/5 teams) proposing novel mixed-reality AI workflows for logistics operations. Jun. 2025

1st Place, Opt-In Hackathon – Recognized for outstanding achievement (1st/8 teams) for building a vision-based emotion recognition system for smart lighting. Mar. 2024

2nd Place, HackathonamRing – Honored for impactful AI public safety solution "Vocal Eye", a real-time voice intent recognition microservice. Jul. 2023

2nd Place, Image Denoising Challenge (TU Dortmund) – Demonstrated strong mathematical modeling skills by applying differential equations for image restoration of brain scans (2nd/80 students). Jun. 2022

1st Place, MBZIRC 2020 Challenge II – Part of the winning team in this high-profile international robotics challenge; designed the UAV grasping mechanism for bachelor's thesis. Feb. 2020

Merit Scholarship (CTU Prague) – Awarded to top students for academic excellence in the Faculty of Electrical Engineering (FEL). 2017-2018

Silver Award, Duke of Edinburgh's Program – Internationally recognized distinction for self-reliance and perseverance, achieved through sustained service, skill mastery, and wilderness expeditions. 2015

LEADERSHIP AND EXTRACURRICULAR

- **Participant – Digital Entrepreneurship Lab (2025 Cohort)** *Oct. 2024 – Jun. 2025*
  Technische Universität Dortmund [🌐]
  - Selected for a competitive innovation program to co-found a logistics venture utilizing 3D perception and Mixed Reality.
  - **Winner** of the final pitch competition for optimizing 1PL-3PL workflows with the "Packzilla" startup concept.
- **Vice President – Erasmus Student Network Dortmund** *Sep. 2022 – Jul. 2023*
  ESN Dortmund, ESN Germany [🌐]
  - Directed a team of 50+ volunteers to execute large-scale cultural events, significantly enhancing international student integration.
  - Steered board-level strategy for PR, partnerships, and recruitment; managed budget allocation for semester programs.
- **President – Fachschaft Automation & Robotics** *Jan. 2022 – Jan. 2023*
  Technische Universität Dortmund [🌐]
  - Elected representative for M.Sc. students, acting as the primary liaison to faculty and industry partners.
  - Spearheaded onboarding for 60+ incoming students and initiated a monthly newsletter to drive community engagement.

LANGUAGES, INTERESTS & AFFILIATIONS

Languages: English (C1), German (B1), Spanish (A2), Italian (A1)
Interests: Hiking, Competitive Poker, SCUBA Diving, Reading, Painting
IEEE Member: ID 101285207