Dhagash **Desai**

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Education

Master's in Geodetic Engineering (Major in Mobile Sensing and Robotics) — *Bonn, Germany*

Universität Bonn | **GPA: 1.4** — *Oct. 2020 - Feb. 2024*

Bachelor's in Mechanical Engineering — *Jodhpur, India*

Indian Institute of Technology Jodhpur (IIT Jodhpur) | GPA:2.05 (converted) — *Jul. 2015 - May. 2019*

Skills

Programming	Python, C++
Tools	ROS2, Git, Linux, Docker, Gazebo
Frameworks	BehaviorTree.CPP, Navigation2, Pytorch, Tensorflow, OpenCV, Open3D, NumPy
Full Stack Development	React, Next.js, Javascript, REST API
Project Management & Collaboration	Jira, Confluence, Agile/Scrum

Work Experience

Computer Vision Engineer | **SmartAIs GmbH, Munich** — *May. 2025 - Present*

- Developed **real-time obstacle detection** using **modern C++**, running at **20 FPS** and deployed on **iPhone (edge device)** for **visually impaired users in outdoor environments**
- Built **automated risk evaluation pipeline** and conducted risk analysis and evaluation **according to Failure Mode and Effects Analysis (FMEA)** as well as implemented risk mitigations ensuring safety of the obstacle detection app
- Optimized Rerun-based visualization/debugging tools—achieving **10x memory reduction** and **improved C++ runtime performance**

Founding Robotics Software Engineer (Perception) | **Datacept GmbH, Germany** — *Feb. 2024 - May. 2025*

- Developed **ROS2 packages in C++** to enhance occupational safety using LiDAR data for precise detection and analysis
- Implemented custom **Nav2 and Behavior Tree plugins** to enable robust robot autonomy, including successfully setting up the Nav2 Stack on our robots
- **Optimized ROS2 package** in C++ for sensor-driven safety and obstacle detection, achieving improved **performance at sensor rate frequencies**
- Established **CI/CD pipelines** and **Docker** containers to streamline deployment and ensure consistent application delivery
- Designed and developed a responsive **Frontend application** using **React.js**, integrating **REST APIs** for tools such as **point cloud editing**, **zone generation for Nav2**, **inventory management**, and **authentication**

Master Thesis (Motion Prediction) | **Mercedes-Benz AG, Stuttgart** — *Feb. 2023 - Jan. 2024*

- Enhanced prediction model by considering factors like collisions, goal cost, and traffic rules
- Developed a decision cost module and integrated it into a **scene-consistent prediction** model for traffic scene evaluation

Internship (Object Detection) | **Bosch Automated Driving, Stuttgart** — *Jun. 2022 - Nov. 2022*

- Evaluated and improved **RADAR object detection** pipeline; devised Key Performance Indicators to address inter-class confusion
- Conducted in-depth analysis; adapted **LiDAR-based contrastive learning** techniques for the RADAR domain; implemented **PyTorch**-based data loaders for streamlined prototyping

Research Assistant (Instance Segmentation) | **Photogrammetry and Robotics, Bonn** — *May 2021 - Mar. 2022*

- Enhanced KPConv architecture with contrastive loss for **leaf instance segmentation** in sugar beet plants
- Conducted extensive benchmarking on prominent **point cloud segmentation and classification** architectures (PointNet, PointNet++, KPConv), contributing to a research project resulting in a **RAL'23** publication

Research Assistant (SLAM & Computer Vision) | **Robotics Research Center, IIIT Hyderabad** — *Jul. 2019 - Aug. 2020*

- Developed and enhanced a **visual place recognition (VPR)** pipeline for 180° opposite viewpoint detection using floor signatures, integrating them into a **SLAM** system for accelerated map reconstruction, culminating in a **VISAPP'20** publication

Projects

Visual Place Recognition (Computer Vision) | **Universität Bonn** — *Oct. 2021 - Apr. 2022*

- Devised a VPR pipeline utilizing the **Bag of Visual Words** (BoVW) approach, proficiently written in **C++**
- Independently constructed all components of the pipeline, including **k-means clustering**, computation of BoVW histograms, and creation of the BoVW dictionary, showcasing hands-on expertise

Video Future Frames Prediction (Computer Vision) | UNIVERSITÄT BONN *Oct. 2021 - Mar. 2022*

- Implemented an **autoregressive hierarchical encoder-decoder** model for future frame generation, augmented by lateral recurrent connections
- Benchmarked multiple recurrent models (**LSTMs and GRUs**) along with different feed-forward architectures (**ResNets and VGGNets**)

Game Theoretic Control for Multi-Robot Racing *Apr. 2021 - Sep. 2021*

- Executed **model-predictive-control** implementation for optimizing track progress, maintaining track boundaries, ensuring car-to-car collision avoidance, and achieving an optimal race-line trajectory
- Developed and implemented **Game Theoretic Control** (GTC) using the Iterative Best Response algorithm to enhance realism in multiplayer racing scenarios

Publications

Revisiting Fast and Accurate RGB-D Odometry for Real-World Use by Embracing Simplicity
Sumanth Nagulavancha, **Dhagash Desai**, Saurabh Gupta, Luca Lobefaro, Cyrill Stachniss, Ignacio Vizzo, Tiziano Guadagnino
European Confernce on Mobile Robotics (2025). 2025

High Precision Leaf Instance Segmentation for Phenotyping in Point Clouds Obtained Under Real Field Conditions
Elias Marks, Matteo Sodano, Federico Magistri, Louis Wiesmann, **Dhagash Desai**, Rodrigo Marcuzzi, Jens Behley, Cyrill Stachniss
IEEE Robotics and Automation Letters 8.8 (2023) pp. 4791–4798. 2023

Early Bird: Loop Closures from Opposing Viewpoints for Perceptually-Aliased Indoor Environments
Satyajit Tourani, **Dhagash Desai**, Udit Singh Parihar, Sourav Garg, Ravi Kiran Sarvadevabhatla, K. Madhava Krishna
VISAPP (2020). 2020