Vedant Chavan *Computer Vision & AI Engineer*

- ✉ vedantchavan097@gmail.com
- 📍 59555 Lippstadt, Germany
- in linkedin.com/in/vedant-chavan-97ml/
- ☎ +49 151 43560223
- 🔗 vedantsanjaychavan.de/
- ⌨ github.com/vedantchavan004

Profile

Computer Vision & AI Engineer with expertise in 3D perception, sensor fusion, and spatial data processing for robotics and autonomous systems. Experienced in stereo vision, point-cloud reconstruction, and GPU-optimized model deployment using PyTorch, CUDA, and ONNX. Passionate about developing scalable, real-time AI that bridges the physical and digital worlds.

Education

10/2021 – 03/2025 Rosenheim, Germany	**M.Eng. Engineering Sciences - Mechatronics,** *Technischen Hochschule Rosenheim* Focus: Industrial Image Processing, Robotics, Real-Time Systems, Advanced Control Systems
09/2020 – 04/2021 Pune, India	**PG Diploma - Advanced Computing,** *Centre for Development of Advanced Computing (CDAC)* Focus: Data Structures, Software Engineering, Database Technology, Linux
06/2015 – 09/2019 Vellore, India	**B.Tech - Mechanical Engineering,** *Vellore Institute of Technology*

Experience

03/2024 – 11/2024
Lippstadt, Germany

Hella GmbH & Co. KGaA (FORVIA HELLA), *Master's Thesis - Stereo Vision for Adaptive Headlight Systems*
- Developed and deployed a **custom lightweight stereo-CNN** for robust depth estimation under low-light, glare, and high-contrast conditions.
- Designed and tuned **camera calibration and filtering pipelines**, improving image stability and consistency in safety-critical environments.
- Conducted **image quality and sensor-drift analysis** using controlled temperature and vibration tests to ensure calibration robustness.
- Used **synthetic UE5 camera data** to simulate illumination artifacts and edge cases, accelerating validation and tuning cycles.
- Optimized the **ONNX Runtime inference pipeline**, achieving a **40% latency reduction** for real-time deployment.

Stack: Python, C++, PyTorch, OpenCV, ONNX Runtime, Unreal Engine 5, Docker

08/2023 – 02/2024
Lippstadt, Germany

Hella GmbH & Co. KGaA (FORVIA HELLA), *AI Research Intern - Intelligent Perception (ADAS)*
- Developed and validated **image processing and geometric algorithms** for real-time perception systems.
- Performed **systematic image quality analysis** to identify noise, illumination artifacts, and failure modes in production camera data.
- Optimized **YOLOv8 detection pipelines for low-light and high-glare conditions**, achieving **up to 30% mAP improvement under adverse imaging scenarios**.
- Conducted **dataset QA and failure analysis**, improving robustness and reliability before system integration.
- Collaborated with software and system teams to **integrate, test, and verify perception algorithms** in production workflows.

Stack: Python, OpenCV, YOLOv8, RoboFlow, Stereo Calibration, Docker

Technical Skills

3D Perception: Stereo Vision │ Multi-Sensor Fusion │ Triangulation │ Calibration │ 3D Reconstruction │ Point Cloud Processing │ SLAM

Deep Learning: 2D/3D Detection │ Tracking │ Segmentation │ Anomaly Detection

Frameworks & Tools: PyTorch │ TensorFlow │ OpenCV │ ONNX Runtime │ CUDA │ Unreal Engine 5 │ COLMAP │ Open3D │ Docker

Programming: Python (advanced) │ C++ (intermediate) │ Bash │ MATLAB

Optimization & Deployment: TensorRT │ Quantization │ AWS │ CI/CD (GitHub Actions)

Generative AI / LLMs: LangChain │ FAISS │ Streamlit │ Hugging Face │ Prompt Engineering

Selected Projects

06/2025 – 07/2025
3D Reconstruction: SLAM-Enhanced Neural Fields (3DGS),
Python, COLMAP, SLAM, Gaussian Splatting, Open3D
- **Engineered** a robust initialization and mapping pipeline: Utilized **COLMAP** (Structure-from-Motion) to generate a dense, geometrically accurate initial point cloud.
- **Integrated** this initial structure with **MASt3R-SLAM** (VIO) for real-time tracking, enabling the continuous refinement of the **Gaussian Splatting (3DGS)** scene representation.
- **Optimized** the GPU data transfer between the SLAM/3DGS components using **C++/PyTorch** bindings to ensure high-fidelity, low-latency updates required for dynamic scenes.
- **Validated** global consistency and precision using rigorous reprojection metrics, proving the system's deployability.

05/2025 – 06/2025
Visual Inspection & Anomaly Detection – Quality Control, *PyTorch, PaDiM, OpenCV, NumPy*
- **Implemented** an unsupervised anomaly detection system (**PyTorch + PaDiM** algorithm) tailored for quality control of challenging glossy/reflective components.
- **Developed** custom pre-processing techniques to stabilize against brightness variation and reflections common in production environments.
- Achieved **99% pixel-level accuracy** on defect detection and successfully **reduced manual inspection effort**.

10/2022 – 03/2023
Robotic Bin-Picking, *Python, TensorFlow, OpenCV, YOLO, RGB-D Sensors*
- **Developed** a Multi-Sensor Fusion pipeline (RGB-D + YOLO) for **6D pose estimation**, handling data from multiple streams in a **real-time** robotic context.
- Implemented robust **calibration** logic, achieving sub-centimeter precision critical for reliable deployment (addressing extrinsics/intrinsics).
- **Improved** stability against partial visibility and **occlusion** by integrating filtering and depth-based refinement, ensuring robustness.

02/2025 – 03/2025
RAG Chatbot with Modular LLM Pipeline,
FastAPI, LangChain, FAISS, Embeddings, Context Windows, Streamlit
- **Designed and built** an embedding-based Retrieval-Augmented Generation (RAG) assistant using FAISS and a modular **LangChain** pipeline for internal knowledge search.
- **Deployed** the final system via a **FastAPI** endpoint, automating document retrieval and context management for internal teams.
- Cut document lookup time from minutes to seconds.

Languages

English
C1 (fluent)

German
B1 (Intermediate)

Certificates

- Oracle Cloud Infrastructure 2025 Certified Generative Al Professional
- Generative Deep Learning with TensorFlow (2025)
- Advanced Computer Vision with TensorFlow (2025)
- Stanford Machine Learning (2022)