BATCHAYA YACYNTE

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SUMMARY

M.Eng. candidate in AI Engineering and Autonomous Systems building real-time perception and autonomy systems for UAVs and mobile robots, from embedded event-based vision at Fraunhofer IVI to closed-loop visual UAV repositioning in an Airbus Helicopters consortium. First-author IEEE publication. Seeking robotics and computer vision roles in Germany, available from 1 January 2027.

TECHNICAL SKILLS

- **Programming Languages:** C++ (C++17), Python, MATLAB
- **AI & ML:** PyTorch, TensorFlow, OpenCV, ONNX
- **Robotics & Simulation:** ROS/ROS2, Gazebo, Unreal Engine 5, Unity, closed-loop control
- **Embedded & Hardware:** NVIDIA Jetson, DVS/Event Cameras, Mobile Robots, UAVs, ArduPilot, MAVLink
- **CAD & Engineering Tools**: Fusion 360, Autodesk, SimScale, KiCad, Simulink
- **Development Tools**: Git, Linux, Docker, Jira
- **Spoken Languages:** English (Native), French (Native), German (Working proficiency / B2).
- **Work Authorisation:** Eligible for EU Blue Card or the 18-month post-study job-seeker permit.

PROFESSIONAL EXPERIENCE

Airbus Helicopters Consortium - AImotion Bavaria | Ingolstadt, Germany Apr 2025 - Present
Graduate Research Assistant and ***Master's Thesis***

- Built a real-time closed-loop monocular repositioning system that returns a UAV and its gimbal camera to the exact viewpoint of a stored reference image after coarse GNSS positioning (C++17, ONNX/CUDA, ~15 Hz).
- Built the Unreal Engine 5 validation environment from Google 3D Tiles, with a continuous image-stream pipeline, UAV control over UDP, and dynamic sky, rain, snow and fog for repeatable testing.
- Implemented SuperPoint + LightGlue matching with sub-pixel refinement and per-match uncertainty feeding a PNEC rotation estimator; exported the networks to ONNX for deployment across devices.
- Designed saturating vehicle and gimbal control laws and validated the full loop in 234 simulation trials across six weather conditions; first real-drone tests cover the gimbal loop.
- Reached 0.15° rotation error and ≈2 px view alignment in clear-weather simulation, converging in ~31 s per run.

Fraunhofer IVI - Vehicle Technologies | Dresden, Germany Apr 2025 - Mar 2026
Graduate Research Assistant (Part-time)

- Contributed to KoSiNuS, a collaborative research project developing AI-based perception and safety frameworks for autonomous mobile agricultural machinery.
- Designed and implemented an event-based optical flow pipeline for real-time Time-to-Collision estimation, deployed on an NVIDIA Jetson embedded platform with a ROS-integrated Dynamic Vision Sensor.
- Outperformed three state-of-the-art methods (UnFlow, EV-FlowNet, Shiba et al.) on the MVSEC benchmark with 2.33 px AEPE, processing 3.5 M events/s single-threaded on a Jetson Orin.

Institut Digital Engineering (IDEE), Center for Robotics | Schweinfurt, Germany Oct 2022 - Sep 2024
Bachelor's Thesis

- Developed a GPS-free monocular visual-inertial odometry system for autonomous drone navigation, validated in simulation, in the lab, and in real flights.
- Achieved 0.94% translation error on KITTI and 5.32% on a real DJI Tello (OptiTrack ground truth).
- Published peer-reviewed findings in the proceedings of the REM 2024 conference (IEEE Xplore digital library).

Robotics Internship

- Developed CAD, LiDAR and wheel-odometry sensor models for a mobile-robot digital twin in Unity, calibrating simulated sensor noise against real captured data.

PROJECTS

Autonomous Surface Area Mapping Drone Jul 2024 - Mar 2025

Personal Project

- Designed and hand-built a ~25×25 cm UAV using Betaflight F405 V3 and Radxa A7A hardware.
- Developed a stereo-vision pipeline from depth estimation and contour detection to geometric area computation, producing topographic and plat-map outputs.

Deep Visual-Inertial Odometry Pipeline Oct 2025 - Feb 2026

Course Project, Grade: 1.0

- Built a deep learning-based visual-inertial odometry system for GPS-free 6-DoF robot localization, fusing monocular camera and IMU data end-to-end using CNNs.
- Achieved 0.038 m and 1.42 m average trajectory error on EuRoC MAV and KITTI respectively across indoor and outdoor environments.

Autonomous Navigation via Deep Q-Networks Mar 2025 - Jul 2025

Course Project, Grade: 1.3

- Built and trained a deep reinforcement learning agent for autonomous mobile robot navigation in cluttered environments, using DQN and a custom reward function in a Pygame/Gymnasium environment.
- Achieved ~92% collision-free trajectory completion across randomised map configurations.

EDUCATION

Technische Hochschule Ingolstadt, Germany Mar 2025 - Nov 2026 (Expected)

M.Eng. in AI Engineering and Autonomous Systems

Technische Hochschule Deggendorf, Campus Cham, Germany Oct 2024 - Feb 2025

M.Sc. in AI for Sensors and Actuators

- Transferred to TH Ingolstadt after one semester.

Technische Hochschule Würzburg-Schweinfurt, Germany Mar 2020 - Aug 2024

B.Eng. in Mechatronics Engineering

PUBLICATION

Batchaya, Y. D., et al. “Getting Started With a Simple Visual-Inertial Odometry,” REM 2024 (IEEE).
DOI: 10.1109/REM63063.2024.10735689