

Ashwin Vazhappilly

Date of Birth: 19.06.1998

Freiburg im Breisgau, Germany

LinkedIn — GitHub — Portfolio

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SHORT SUMMARY

Software Engineer with 5+ years of experience building scalable, end-to-end systems used by 1M+ users and real-world ML deployments. I work across backend, mobile, embedded, and cloud, focusing on performance and reliability. Outside work, I build and run self-hosted systems and actively follow automotive and mobile technology.

EXPERIENCE

Working Student – Industrial Cybersecurity Engineer

Fraunhofer IOSB

Karlsruhe, Germany

July 2024 – Present

- **Execution Workflow Optimization:** Refactored the Batch Tab execution workflow and moved protocol initialization logic into backend API flows, reducing protocol-loading time from nearly 2 minutes to under 3 seconds.
- **Backend & Real-Time Integration:** Integrated FastAPI services and WebSocket-based communication to enable reliable GUI-to-backend data flow, live debugging, and execution orchestration across the testing platform.
- **Industrial Protocol Testing Features:** Developed custom fuzz map workflows, monitor handling, execution queue improvements, debug logging controls, and cross-protocol fuzzing support for industrial protocol testing.
- **Platform Stability:** Resolved 50+ engineering tickets covering crash fixes, QThread issues, connection handling, dashboard switching, DUT refresh logic, and execution-state failures, improving daily platform reliability.
- **UX & Workflow Improvements:** Implemented keyboard navigation, tab and arrow-key support, search filtering, discovery-flow refinements, and cleaner loading-state behavior to streamline operator workflows.
- **Legacy Modernization:** Migrated a large production Python desktop application from Qt5/PySide to PySide6/Qt6 and aligned the codebase with newer Python versions, improving long-term maintainability.

Working Student – Embedded & ML Engineer

Hahn-Schickard

Freiburg im Breisgau, Germany

July 2024 – Present

- **Embedded Firmware & BLE Streaming:** Developed Arduino and Nordic-based firmware for microcontrollers to acquire sensor data and stream it reliably over Bluetooth Low Energy for research deployments.
- **Desktop GUI & Data Collection:** Built Python desktop applications for BLE connectivity, live visualization, and reliable data logging, supporting 100+ participant sessions including unsupervised home-based recordings.
- **ML Pipeline Design:** Designed machine learning pipelines with feature engineering and multi-model fusion (supervised and unsupervised) for health-related signal analysis, achieving 80%+ average accuracy.
- **Cross-Platform Mobile Application:** Built a cross-platform Flutter application for iOS and Android with integrated ML inference, enabling responsive real-time prediction on mobile devices with low-latency multithreaded execution.
- **ML Deployment – Edge, Mobile & Server:** Deployed models via TensorFlow Lite on microcontrollers, on-device mobile inference, and FastAPI server environments. Models remain actively used by researchers and psychology teams, and were publicly showcased at Europa-Park Science Day.

Working Student – Software Engineer

livMatS

Freiburg im Breisgau, Germany

January 2023 – July 2024

- **Web Application Development:** Engineered Vue.js web applications for the dtool ecosystem with OpenAPI-aligned workflows, a custom landing page, pagination, and expanded test coverage.
- **Desktop GUI for Research Data:** Developed Python GTK desktop applications for FAIR research data management, improving accessibility and reliability through user-focused features and unit testing for tools used across research institutes.
- **CI/CD, Automation & Cloud Integration:** Automated release pipelines using GitHub Actions and Docker, supported cross-platform builds, Kubernetes-based orchestration via Minikube, and integrated Amazon S3 for scalable scientific data storage.

- **API & Third-Party Integration:** Built Python and FastAPI-based interfaces for third-party integrations, streamlining large-scale data discovery and management for scientists. The tooling was presented at a data management conference in Düsseldorf as one of the leading solutions from Germany.

Programmer Analyst

Chennai, India

Cognizant Technology Solutions

July 2021 – Sep 2022

- **Enterprise Application Development:** Built finance-domain software using C#, ASP.NET Core MVC, and dependency injection, contributing to robust enterprise web applications in agile delivery environments.
- **REST API Development & Containerized Delivery:** Developed and optimized REST APIs using ASP.NET Core with JSON-based integrations, while supporting delivery workflows with Docker and Kubernetes-based deployment practices.
- **Database Migration & Query Optimization:** Contributed to database migration from MongoDB to Neo4j using Entity Framework Core and LINQ, improving data modeling and query efficiency.
- **Performance & Security Engineering:** Optimized C# backend code for performance and implemented JWT-based authentication and authorization to strengthen secure access control and application responsiveness.

Intern

Chennai, India

Cognizant Technology Solutions

Mar 2021 – Jul 2021

- **Full-Stack Web Development:** Developed web applications using Angular, React, Bootstrap, and ASP.NET Core Web APIs, contributing to feature delivery across frontend and backend layers.
- **Backend Optimization & Code Quality:** Improved backend responsiveness using C#, Entity Framework Core, LINQ, and async/await patterns, while supporting code reviews and unit testing to maintain engineering quality.
- **Cloud Deployment:** Assisted with deployment and maintenance of applications on AWS for enterprise insurance use cases.

EDUCATION

Albert-Ludwigs-Universität Freiburg

Freiburg im Breisgau, Germany

Master of Science in Informatics / Computer Science

Oct 2022 – Present

- **Focus:** AI, Machine Learning, Software Engineering, Embedded Systems, Cognitive Load Analysis, and Stress Measurement.
- **Master Project (Grade: 1.0):** Developed a smart pen system using ML for cognitive load and stress analysis, including a GUI for data collection and sensor-based psychological analysis.

Universität Basel

Basel, Switzerland

Academic Exchange Semester

Sep 2024 – Mar 2025

- **Technical Focus:** Worked on reverse engineering, VPN networking, Git version control, proxy configuration, and system security topics, contributing multiple technical articles.

Sathyabama Institute of Science and Technology

Chennai, India

Bachelor of Engineering in Computer Science and Engineering, Grade: 1.6

Aug 2017 – May 2021

- **Capstone Project (Grade: 1.0):** Developed a secure React-based web application, achieving top honors. Founded and led coding communities with workshops and peer learning initiatives.

ACADEMIC ROLES

Teaching Assistant – WIC

Freiburg im Breisgau, Germany

University of Freiburg

Jun 2025 – Sep 2025

- **Course Assistance** Supported lectures, lab sessions, and exam invigilation for a graduate course on wearable and implantable systems. Created a hands-on assignment on BLE-based sensor data acquisition and TinyML inference using M5StickC Plus devices.
- **Software Development & Firmware** Developed a cross-platform PySide6 desktop app (GitHub) for streaming, recording, and segmenting IMU sensor data via BLE. Wrote Arduino firmware enabling BLE communication and deployed on-device TinyML models for real-time activity prediction.
- **DevOps & CI/CD** Configured GitHub Actions for automated builds and release artifacts across Windows, macOS, and Linux, simplifying student access and reproducibility.

VOLUNTEERING

Elected Student Representative (SENI)

Thomas Morus Burse Studierendenwohnheim

Freiburg im Breisgau, Germany

Oct 2024 – Oct 2025

- **Digital Transformation:** Built and deployed a PHP-based web application for the gate duty (Pforte) system, enabling 300+ daily student users to check status, sign up for shifts, and streamline communication. Digitized community workflows by creating online forms and anonymous feedback tools.
- **Technical & Event Support:** Provided full technical setup for community events including sound, lighting, registrations, and live coordination. Designed promotional posters and managed social media to increase resident engagement.
- **Leadership & Community Engagement:** Consecutively elected for 2 semesters. Organized events such as the Christmas Market, Music Festival, and Silent Disco, demonstrating strong initiative, independent working, leadership, communication, and time management skills.

PUBLICATIONS & TECHNICAL WRITING

dtool and dserver: A flexible ecosystem for findable data Co-authored research paper published in PLOS ONE on lightweight, decentralized data management using dtool and dserver for FAIR data practices.

Personal Technical Blog Write about tech, cybersecurity, audio engineering, homelabbing, and automobiles at vazhappilly.eu.

SKILLS

Core Engineering Python, C++, TypeScript, C#, FastAPI, Flask, ASP.NET Core, REST APIs, WebSockets

Application Development PySide6, Flutter, Vue.js, React, Angular, Python GTK

Machine Learning TensorFlow Lite, Feature Engineering, Model Deployment, Edge/On-device/Server Inference

Databases Neo4j, MongoDB, MySQL, SQL Server, Supabase

DevOps & Infrastructure Docker, Kubernetes, GitHub Actions, GitLab CI, Linux, Prometheus, Grafana

Cloud AWS S3, AWS, Azure, GCP

Testing & Quality PyTest, Unit Testing, Integration Testing, Debugging, Profiling

Domains Industrial Cybersecurity, Embedded Systems, Mobile ML, Scientific Software, Homelab Infrastructure

PROJECTS

M5Stick BLE Data Logger & SmartPen ML System (Python, PySide6, BLE, TensorFlow Lite) Built an end-to-end system for streaming IMU data over BLE, performing real-time feature extraction, and running on-device ML inference. Designed for TinyML workflows and used for interactive data collection and analysis.

Portfolio Website with AI Blog Automation (Docker, FastAPI, OpenClaw) Developed a self-hosted portfolio with an automated blog pipeline that generates posts, fetches images, and publishes updates via a local AI workflow. Integrated messaging-based control for lightweight content management.

AshRates (Flutter, Firebase) Built a cross-platform finance application with secure Firebase authentication and real-time data handling, delivering a clean UI for installment calculations and financial tracking.

Docker Port & Service Dashboard (FastAPI, Docker) Created a home lab dashboard to track running services, port mappings, and container status, simplifying system monitoring and management across multiple services.

Selected Additional Projects (Rust, Full-Stack) Developed utilities and applications including a Rust-based file extraction tool, Firebase integration library, and full-stack social platform using ASP.NET Core and React.

PROFESSIONAL DEVELOPMENT

Hackathon Achievements Finalist in Angel Hack 2019 Bangalore (4th/42) and Smart India Internal Hackathon (4th/65).

Certifications Neo4j Certified Professional (Credential ID: 17385816) and Microsoft Certified Azure Fundamentals (Credential ID: H969-6628).