

PRANESH SELVARAJ

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WORK EXPERIENCE

FULLSTACK & DEVOPS ENGINEER

April 2024 - May 2026

University of Siegen (ZIMT)

Siegen, Germany

- Developed and maintained full-stack web platforms end-to-end (TypeScript, Vue.js with Composition API, Node.js/Express, MongoDB/PostgreSQL/Redis), redesigning backend services and NoSQL/SQL schemas, cutting query latency ~40%
- Designed and built a Python/FastAPI-based real-time network security monitoring and alerting system spanning 8+ microservices, using WebSocket-based live data pipelines, Redis for caching and SQL for persistent storage, achieving <200ms alert latency
- Designed GitLab CI/CD pipelines and automated infrastructure workflows with Ansible, cutting deployment time ~60%; applied infrastructure-as-code principles to configuration management
- Implemented JWT-based authentication, RBAC/ABAC access-control, and LDAP integration across service boundaries; wrote automated test scripts integrated into CI/CD
- Architected and operated microservice infrastructure on Docker, Kubernetes, and OpenShift, sustaining 99.5%+ uptime in production with full monitoring and incident-response ownership
- Delivered 95%+ sprint completion rate driving features independently in an agile, cross-functional team

EDUCATION

M.Sc., HUMAN COMPUTER INTERACTION

April 2026

University of Siegen

Siegen, Germany

Thesis: AI-Assisted Web Development: Evaluating Figma-to-Code Accuracy and Efficiency (Published 2026)

B.Eng., ELECTRONICS AND COMMUNICATION ENGINEERING

May 2022

Sri Eshwar College of Engineering

Tamil Nadu, India

Thesis: God's Eye - Autonomous Hybrid UAV With Multi Rotor Propulsion System (IEEE Publication - ICACCS 2023)

PROJECTS

ENCLAVE - Local First AI Knowledge Platform

May 2026 – present

- Building an open source local-first, AI knowledge base multi-package monorepo — all data encrypted at rest, P2P sync over local Wi-Fi via mDNS discovery; no cloud dependency
- Integrating local LLM inference and an offline RAG pipeline for semantic knowledge retrieval
- Designing an agent-ready architecture supporting structured tool invocation and local-first AI workflows without cloud dependency
- Rust backend (Tokio/Axum) + CRDT-based conflict-free sync (Yjs); zero-trust peer model where receiving devices cannot read notes without the user's derived decryption key

CRYPTLEARN- AI-assisted Fullstack Cryptography E-learning Platform

Sept 2025 - April 2026

- Architected a production-grade REST API (routes → controllers → services → middleware) with JWT access/refresh token rotation (HttpOnly cookies), hashed refresh token storage, and three-tier RBAC
- Built an interactive React frontend with live cryptographic tooling (Caesar, Base64, SHA hashing, RSA via WebCrypto API) and a progress/analytics system tracking points, streaks, and badges per user

HILFEGESCHICHTEN - Legacy Platform Migration & UX Overhaul

May 2024 - Sept 2024

- Executed full-cycle migration of a PHP/Laravel prototype using phased parallel-run deployment, remediating vulnerabilities for 500+ active users while strengthening IAM and database security protocols
- Implemented access control, user management, database integration, and a timeline feed for sharing stories and requesting support
- Improved usability and accessibility for elderly and non-native demographics in Siegen, resulting in a 60% increase in usability test scores through ARIA-compliant interfaces, keyboard navigation, and streamlined user flows

KITCHEN VR SIMULATOR

Nov 2023 – Feb 2024

- Implemented real-time physics-based mesh slicing using controller Linecasts and velocity-estimated cut planes; generated sliced hulls with RigidBody, convex MeshCollider, and XR-grabbable geometry.
- Optimized runtime performance via FixedUpdate scheduling and LayerMask-scoped collision queries; tuned configurable physics parameters for consistent, reproducible demos
- Developed a Unity VR cross-platform immersive application with realistic slicing mechanics, physics-based interactions, and kitchen scenarios
- Integrated XR Interaction Toolkit features to improve interaction quality and user experience

SMARTCOASTER- Secure Multi-Service API

June 2023 - Sept 2023

- Designed service-to-service authentication between a resource-constrained IoT device and a POS backend using Python/Django and REST APIs — analogous to Zero Trust service identity patterns

- Integrated secure payment APIs with multi-transaction management, webhook callback handling, failure recovery and payment state tracking in a distributed, security-sensitive environment

GOD's EYE — Autonomous Aerial Vehicle (ROS + Embedded Linux)

Dec 2019 – July 2020

- Designed and built an autonomous UAV prototype integrating ROS (Melodic), embedded Linux, and Python/C++ processing pipelines for real-time sensor fusion, disaster identification and emergency alerting
- Validated a bio-inspired hybrid propulsion concept; reached finalist status at Smart India Hackathon 2020 competing against 1,000+ teams nationally.

SKILLS

AI & LLM: Programming languages: JavaScript/TypeScript, Python, C/C++, C#, SQL, HTML/CSS, YAML

Full-stack Development: SvelteKit, React, Vue.js, Next.js, Node.js, Express, REST APIs, FastAPI, Tailwind CSS, Django, Redis, PostgreSQL, MongoDB, SQL

DevOps & Infra: Linux, Docker, Kubernetes, Helm, GitLab CI/CD, Ansible, Jenkins, GitHub Actions, OpenShift

Hardware & Embedded Systems: ROS, Microcontroller Integration, Sensor Integration, Aerial Hardware, Fusion 360, 3D Modelling

AI & LLM: AIOps, Agentic Coding, MCP, Fine-tuning local LLMs, llama.cpp inference, OpenCode agents, Claude Code, Cursor, Copilot, prompt engineering, structured output design, LLM eval (thesis), RAG architecture

Other: Agile/Scrum, Test scripting, OAuth patterns, JWT, RBAC, ABAC, LDAP, payment API integration, event-based logging/monitoring

Systems: Rust (Tauri/Axum/Tokio), WebSockets, WebRTC, P2P networking, CRDT, encryption (AES-256-GCM, Argon2id)

Documentation: Git, Swagger, Latex, Figma

Spoken Languages: English (Fluent), German (B1–B2 Intermediate), Tamil (Native)

PUBLICATIONS

Selvaraj, P. (2026). AI-Assisted Web Development: Evaluating the Accuracy and Efficiency of Figma-to-Code AI Tools. Master's Thesis, University of Siegen, Human-Computer Interaction.

Venugopal, E., Ramesh, A., Sivakumar, P., & Selvaraj, P. (2023, March). Design of Hybrid UAV With Multi Rotor Propulsion System. In 2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS) (Vol. 1, pp. 1798-1802). IEEE. <https://doi.org/10.1109/ICACCS57279>