

Anthony Okala

IT Consultant & Software Engineer

Expert in Process Automation, RPA, Software & Web Development, and AI-Driven Solutions

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With over 10 years of expertise in automation, software development, machine learning, and safety-critical systems. Specializing in Java, Python, JavaScript, TypeScript, PHP, and modern frameworks such as React, Django, Spring Boot, and Laravel. Expert in UiPath, KNIME Analytics, and Power Automate. Fluent in English, German, and French.



PROVEN IMPACT AND ACHIEVEMENTS

Delivering measurable results that drive business success



80%

AUTOMATION ACHIEVED

Reduced manual effort by 80% with goal to reach 99% automation at DB Regio AG, transforming operational efficiency

8+

MICROSERVICES BUILT

Designed and implemented enterprise-grade microservices architecture for scalable, resilient systems



25+

PROJECTS DELIVERED

Successfully completed projects for industry leaders including Volkswagen AG and DB Regio AG



25+

TECHNOLOGIES MASTERED

Expert in Java, Python, JavaScript, TypeScript, React, Django, Spring Boot, Laravel, and cutting-edge frameworks



3

LANGUAGES

Fluent in English, German, and French - enabling seamless global collaboration and international projects



10+

YEARS EXPERIENCE

Extensive expertise in automation, software development, machine learning, and safety-critical systems



FEATURED PROJECTS

Showcasing innovative solutions and technical excellence

Daimon Platform

Future

Enterprise-grade microservices platform connecting customers with shoe repair businesses. Features 8 independent microservices, event-driven architecture, and full-stack applications (Next.js web dashboard, React Native mobile app).

Python FastAPI Next.js React Native TypeScript PostgreSQL

RabbitMQ Docker Microservices

Multipurpose Service Website

Production-ready, full-stack cross-platform application (iOS, Android, Web) with CMS, contact forms, GDPR compliance, and administrative controls. Built with React Native, Expo, Express.js, and SQLite.

React Native Expo TypeScript Express.js SQLite Node.js

Cross-Platform

Multipurpose Website

Production-ready, full-stack web application with e-commerce functionality, content management, user authentication, and administrative controls. Built with Next.js 14, TypeScript, Prisma, and NextAuth.js.

Next.js TypeScript Prisma NextAuth.js Zustand Tailwind CSS

E-commerce

Women's Health NGO Website

Production-ready, full-stack web application for a Women's Health NGO focused on breast cancer awareness. Features complete CMS, interactive forms, dynamic routing, and enterprise-grade architecture.

Next.js TypeScript React Hook Form Tailwind CSS API Routes

Driver Order Optimizer

Future

Full-stack application for optimizing order management and daily planning for vehicle drivers (Fahrzeugüberführer). The system integrates with Google Maps API for routing calculations and provides an interactive dashboard for plan visualization, route planning, and order management.

Next.js Express.js TypeScript JavaScript Material UI Docker

Dev Containers Node.js React REST API Google Maps API Zod

Luxon Haversine

LeitApp Platform

Future

Enterprise-grade immigration and integration platform with 19+ microservices across Python, TypeScript, Java, and PHP. Features mentorship, document management, job marketplace, AI assistance, and community features.

Python Django NestJS Spring Boot Laravel Next.js TypeScript

PostgreSQL Microservices AI/ML

Logistics Marketplace MVP

Full-stack multilingual logistics marketplace connecting shippers with service providers. Features three-role system (Shipper, Provider, Admin), provider matching, booking system, payment processing, and messaging.

NestJS React Native TypeScript SQLite TypeORM i18n JWT

Expo

Web & Mobile Platform

Enterprise-grade corporate website with full legal compliance (DSG - Swiss Data Protection Act), responsive design, and advanced UX features. Built with Next.js 14, TypeScript, and modern web standards.

Next.js TypeScript React CSS3 DSG Compliance SEO

Composer Portfolio Website

Modern, multilingual portfolio website for a classical composer with internationalization (i18n), interactive music player, works catalog with filtering, and responsive design. Built with Next.js 14 and TypeScript.

Next.js TypeScript next-intl Framer Motion Tailwind CSS i18n

RPA Automation Solutions

Developed comprehensive automation solutions using Python and UiPath, achieving 80% reduction in manual effort for data processing and visualization tasks.

Python UiPath VBA Excel

OKAS FLD Business Website

Modern business website built with Next.js, TypeScript, and Tailwind CSS. Features responsive design, multi-language support, and professional UI/UX.

Next.js TypeScript Tailwind CSS

Vivantes-Humanitas Web Application

Django-based web application for Vivantes Humanitas e.V., enabling efficient management of volunteer registrations and activity tracking.

Django Python HTML CSS

Pentak Sarl International Website

Professional business website for Pentak Sarl International, featuring modern design, responsive layout, and comprehensive company information.

Laravel HTML CSS JavaScript

Software Architecture Tool

Custom software architecture tool supporting Model-Driven Architecture for automotive sector, improving development efficiency in safety-critical systems.

Java Eclipse UML

Autonomous Drone Navigation

End-to-End Learning System for autonomous drone navigation using Python, TensorFlow, and AirSim simulation, achieving Level 4 navigation capabilities.

Python TensorFlow AirSim

Cross-Platform Mobile Apps

Full-stack, cross-platform mobile applications using TypeScript, React Native Expo, with Java Spring Boot, Python Django, and PHP Laravel backends.

React Native TypeScript Spring Boot



PROFESSIONAL EXPERIENCE

Comprehensive work history across freelance, professional, and academic projects

FREELANCE WORK

Daimon Platform - Enterprise Microservices Platform

2025

StartUp initiative

Comprehensive microservices-based digital platform connecting customers with shoe repair businesses. Enterprise-grade project with 8 independent microservices, event-driven architecture, and production-ready infrastructure.

- Designed and implemented scalable microservices architecture with 8 independent services using domain-driven design, service mesh architecture, and database per service pattern
- Built event-driven communication system using RabbitMQ 3.12 message queue with Pika and Aio-pika clients for high-throughput asynchronous service communication
- Created unified API gateway using Nginx with routing, load balancing, SSL/TLS termination, rate limiting, and service discovery
- Implemented full-stack applications: Next.js 16 web dashboard with React 19, React Native 0.81 mobile app with Expo, and comprehensive RESTful API
- Developed 8 production-ready microservices in Python 3.x/FastAPI 0.109: User Service (JWT auth, RBAC), Order Service (lifecycle management), Payment Service (Stripe integration), Chat Service (WebSockets), Image Analysis Service (Vision AI), Analytics Service (TimescaleDB), Notification Service (multi-channel), Shipping Service (DHL/DPD)
- Integrated 15+ third-party services: Stripe API (payment processing), SendGrid (email delivery), Firebase Cloud Messaging (push notifications), Vision AI API (image analysis), DHL/DPD APIs (shipping), with comprehensive error handling and retry logic
- Set up comprehensive monitoring stack with Prometheus (metrics collection), Grafana (visualization dashboards), structured JSON logging, health checks, and Prometheus client integration
- Implemented Docker containerization for all 8 services with optimized Dockerfiles, Docker Compose orchestration, and production-ready deployment configuration
- Built CI/CD pipeline with GitLab CI including automated testing (pytest), security scanning (SAST, secret detection), Docker Compose validation, Nginx config validation, and infrastructure testing
- Designed multi-database strategy: PostgreSQL 16 (per service with Alembic migrations), TimescaleDB (time-series analytics), Redis 7 (caching and real-time state), with proper data isolation
- Implemented enterprise-grade security: JWT authentication with Python-JOSE, Bcrypt password hashing, security headers (XSS, CSRF protection), input validation with Pydantic 2.5, and secret management
- Created real-time chat system using WebSockets with Redis for connection management, message persistence, channel management, and reliable message delivery
- Developed time-series analytics service with TimescaleDB, RabbitMQ event consumption, business metrics calculation (revenue, orders, categories), data aggregation algorithms, and BI dashboards
- Built User Service with JWT-based authentication, role-based access control (Customer/Business/Admin), password security with Bcrypt, and comprehensive profile management
- Developed Payment Service with complete Stripe integration, multiple payment methods, transaction management, platform fee calculation (automated), webhook handling with retry logic, and refund management
- Created Image Analysis Service with AI-powered analysis using Vision AI, image processing with Pillow, automated pricing engine, secure file upload management, and confidence scoring
- Implemented Notification Service with multi-channel support (Email, Push, SMS), Jinja2 template engine, SendGrid integration, Firebase Cloud Messaging, event-driven triggers, and retry logic
- Built Shipping Service with multi-carrier integration (DHL, DPD), rate calculation algorithms, PDF label generation with ReportLab, tracking management, and address validation
- Developed frontend applications: Next.js 16 dashboard with TanStack Query, Recharts for data visualization, Tailwind CSS 4, and React Native mobile app with Expo Camera, Image Picker, and AsyncStorage
- Achieved 100% Dockerized deployment, comprehensive test coverage with pytest, type safety with TypeScript 5, and production-ready infrastructure with horizontal scaling capabilities

Python FastAPI Next.js React Native TypeScript PostgreSQL RabbitMQ Docker Microservices Nginx Prometheus Grafana Stripe
Redis TimescaleDB

Own Initiative

Enterprise-grade immigration and integration platform with 19+ microservices across multiple technology stacks. Supports immigrants in Germany with mentorship, document management, job marketplace, AI assistance, and community features.

- Designed and architected enterprise-grade microservices system with 19+ independent services across 4 programming languages (Python 3.11+, TypeScript/Node.js, Java, PHP) with cloud-native deployment readiness
- Implemented hybrid technology stack optimized per service domain: Django 4.2.7 (Python services: Voice, AI, Analytics, Document, Translation), NestJS 10.x (TypeScript services: Payment, Communication, Activity Feed, Calendar, Task, API Gateway), Spring Boot (Java services: User, Auth, Authorization), Laravel (PHP services: Content, Job Marketplace, Mentorship)
- Built comprehensive frontend application using Next.js 14 with React 18, TypeScript, Tailwind CSS, Radix UI components, React Query, Zustand state management, Framer Motion animations, and Playwright E2E testing
- Developed AI-powered services: Conversational AI with GPT-4, intelligent recommendations engine, predictive analytics with scikit-learn, document understanding with NLP (spaCy, NLTK), and natural language processing
- Created advanced voice processing service with Text-to-Speech (AWS Polly, Google Cloud TTS), Speech-to-Text (OpenAI Whisper), audio processing (librosa, noisereduce, pydub), FFmpeg integration, and multi-language voice support
- Implemented multi-provider payment gateway with Stripe (credit/debit cards, Apple Pay, Google Pay), PayPal, Revolut, and Wise, including subscription management with proration, ZUGFeRD-compliant invoice generation, webhook processing with retry logic, and fraud detection
- Built real-time communication system using WebSockets: Django Channels (Python), Socket.io (Node.js), video call integration, notification system, message history and search, and live updates
- Designed secure document management system with AWS S3 storage, AI-powered document extraction, multi-language translation support (7 languages), secure file handling, and document processing pipelines
- Implemented comprehensive translation services supporting 7 languages: German, English, Arabic, Turkish, Spanish, French, Polish with dynamic content localization and RTL support
- Created comprehensive API Gateway for centralized routing, authentication, service orchestration, load balancing, and request/response transformation with 200+ API endpoints
- Set up event-driven architecture with message queues: Celery (Python async tasks), Bull Queue (Node.js job processing), RabbitMQ/Kafka (message broker) for asynchronous processing and scalability
- Implemented enterprise-grade security: JWT authentication across all services, GDPR/DSGVO compliance, PCI DSS considerations for payment processing, role-based access control, and comprehensive security architecture
- Completed 3 complete SDLC phases: Phase 1 (Planning & Requirements Analysis), Phase 2 (Requirements Definition with 13 functional and 6 non-functional requirements), Phase 3 (Design & Architecture with complete technical design)
- Achieved 100% requirements traceability from business needs to implementation with comprehensive documentation (50+ technical documents), Architecture Decision Records (ADRs), test strategy (unit, integration, E2E, performance, security), and quality assurance processes
- Built Payment Service (NestJS) with multi-provider processing, subscription management, ZUGFeRD invoicing, webhook handling, and fraud detection
- Developed Voice Service (Django) with AWS Polly and Google TTS integration, OpenAI Whisper for speech-to-text, audio processing and enhancement, real-time WebSocket updates, and multi-language support
- Created AI Service (Django) with GPT-4 conversational AI, recommendations engine, predictive analytics, document understanding, and NLP capabilities
- Implemented Communication Service (NestJS) with real-time messaging via WebSockets, video call integration, notification system, and message history
- Designed database architecture with PostgreSQL 15+ (primary), Redis 7+ (caching and sessions), AWS S3 (file storage), with 100+ database tables and optimized query performance
- Established development environment with code quality tools (ESLint, Prettier, Black, Flake8, MyPy), testing frameworks (Jest, Pytest, Playwright), API documentation (OpenAPI/Swagger), and Docker containerization

Python Django NestJS Spring Boot Laravel Next.js TypeScript PostgreSQL Redis AWS Docker Microservices AI/ML OpenAI
Stripe WebSockets

Multipurpose Service Website - Cross-Platform Application

2025

Own Initiative

Production-ready, full-stack cross-platform application (iOS, Android, Web) with CMS, contact forms, GDPR compliance, and administrative controls. Single codebase supporting multiple platforms.

- Developed production-ready cross-platform application using React Native 0.81.5 with Expo 54.0.0, supporting iOS, Android, and Web from single codebase with native performance and platform-specific optimizations
- Built comprehensive Content Management System (CMS) with database-driven content stored in SQLite, full admin interface with CRUD operations, service management (Household & Office categories), page content management, settings management, and contact information management
- Implemented RESTful API backend using Express.js 4.21.1 with SQLite3 5.1.7 database, parameterized queries for SQL injection prevention, custom database abstraction layer, indexed queries for performance, and transaction support
- Created enterprise-grade contact form system with comprehensive validation (Express Validator 7.2.0 for server-side, client-side validation), GDPR/DSGVO compliance with explicit privacy consent checkbox, email integration via Nodemailer 6.9.16 with SMTP, HTML email templates, and database logging
- Designed complete GDPR/DSGVO-compliant legal pages including comprehensive Privacy Policy, Impressum (German TMG requirements), privacy consent component integration, structured legal content presentation, and privacy-first approach without cookie tracking
- Implemented secure file upload system with Multer 1.4.5 for multipart/form-data handling, image validation (JPEG, PNG, GIF, WebP) with MIME type checking, 5MB size limits, unique filename generation, organized file storage, and database metadata tracking
- Built responsive design system with mobile-first approach, custom responsive utilities with useResponsive hook, enterprise design tokens (colors, typography, spacing), breakpoint system (sm: 640px, md: 768px, lg: 1024px, xl: 1280px), and safe area handling for notched devices
- Developed navigation system using Expo Router 6.0.15 with file-based routing, deep linking support via expo-linking 7.0.3, custom header components, and platform-specific navigation patterns
- Implemented authentication system with bcrypt 5.1.1 password hashing, secure session management, admin access control, role-based permissions, and protected admin routes
- Created comprehensive database architecture with well-structured normalized schema: Services, Page Content, Contact Info, Settings, Media, Admin Users with proper relationships, indexed queries, and database initialization scripts
- Set up professional development environment with TypeScript 5.9.2 strict mode, Nodemon 3.1.9 for auto-restart, Concurrently 8.2.2 for multiple processes, environment variable management with dotenv, and modular file structure
- Implemented comprehensive form validation using Express Validator 7.2.0 with input sanitization, XSS protection, SQL injection prevention, email validation, phone format checking, message length limits, and user-friendly error messages
- Integrated additional features: expo-location 19.0.7 for location services, expo-web-browser 15.0.9 for in-app browser, CORS 2.8.5 configuration, and body parser 1.20.3 middleware

React Native | Expo | TypeScript | Express.js | SQLite | Node.js | Cross-Platform | CMS | GDPR | Multer | bcrypt | Nodemailer

Logistics Marketplace MVP - Full-Stack Platform

2025

Own Initiative

Full-stack multilingual logistics marketplace platform connecting shippers with service providers (freelancers and small logistics companies). Features three-role system with shipment management, provider matching, booking, payment processing, and messaging.

- Developed full-stack TypeScript 5.1.3 application with NestJS 10.0.0 backend and React Native 0.81.5 frontend, ensuring 100% type safety across entire stack with zero runtime type errors
- Implemented comprehensive multi-role system with Role-Based Access Control (RBAC): Shipper, Provider, and Admin roles with JWT authentication using Passport.js, custom guards, decorators, and role-specific dashboards
- Built advanced provider matching algorithm with intelligent matching based on service areas, capacity filtering (weight, vehicle type), availability status checking, and 4 different rate calculation methods (per km, per shipment, weight-based, flat rate) with real-time cost estimation
- Created comprehensive booking and payment system with automated booking creation, intelligent provider selection, 15% platform commission calculation (automated), multiple payment methods (card, mobile wallet, cash), provider earnings tracking, and complete payment history
- Implemented complete multilingual support for 3 languages (English, Arabic, Kurdish) with full RTL layout support using i18next 23.7.0, automatic locale detection from device settings, language switching with persistent preferences, and all 24+ screens fully internationalized
- Designed modular backend architecture with 9 feature modules: Auth, Users, Providers, Shipments, Bookings, Payments, Ratings, Messages, Admin with service layer pattern, dependency injection, and repository pattern using TypeORM
- Built 7 normalized database entities with TypeORM 0.3.17: User, Provider, Shipment, Booking, Payment, Rating, Message with proper One-to-Many and Many-to-One relationships, automatic migration support, and database seeding script
- Developed 30+ REST API endpoints with RESTful design, proper HTTP methods (GET, POST, PUT, DELETE), service layer pattern, dependency injection, error handling, and comprehensive request validation with class-validator
- Created cross-platform mobile application with 24+ screens across all user roles, platform-specific optimizations (iOS, Android, Web), native navigation patterns (Stack, Tabs), responsive design with safe area handling, and React Native Reanimated animations
- Implemented real-time features: shipment status tracking with location updates, in-app messaging system between users, live booking status updates, real-time provider availability management, and WebSocket integration
- Built comprehensive admin dashboard with statistics, user management and verification system, provider verification workflow, commission tracking and reporting, booking and payment analytics, and dispute management interface
- Designed database with normalized entities, TypeORM decorators for schema definition, proper relationships, automatic migration support, database seeding with dummy data, and transaction handling
- Implemented authentication system with Passport.js JWT strategy, bcrypt 5.1.1 password hashing, token storage and refresh strategies, secure API communication, and route guards
- Developed state management with React Context API for global state, Axios 1.6.0 with interceptors for API calls, AsyncStorage 2.2.0 for persistent local storage, and custom hooks for reusable logic
- Created form handling and validation with comprehensive client and server-side validation, error handling patterns, loading states, and user feedback mechanisms

NestJS | React Native | TypeScript | SQLite | TypeORM | i18n | JWT | Expo | Passport.js | bcrypt | Axios | AsyncStorage

Multipurpose Website - E-Commerce Platform

2025

Own Initiative

Production-ready, full-stack web application with e-commerce functionality, content management, user authentication, and administrative controls. Built with Next.js 14, TypeScript, Prisma, and NextAuth.js.

- Developed production-ready full-stack web application using Next.js 14 (App Router) with TypeScript 5.5, React 18.3, server-side rendering, API routes, and optimized performance
- Implemented comprehensive e-commerce functionality: shopping cart with Zustand state management and localStorage persistence, product catalog with advanced filtering, complete order management system, inventory tracking, price calculations, and totals management
- Built enterprise-grade user authentication system with NextAuth.js 4.24, JWT-based sessions with custom callbacks, role-based access control (User/Admin), protected routes with middleware, secure password storage with bcryptjs (10 rounds), and custom login/register pages
- Created comprehensive admin Content Management System (CMS) with real-time statistics dashboard, product management with full CRUD operations, contact message management interface, user management capabilities, role-based admin access control, and optimistic UI updates
- Designed robust database architecture using Prisma 5.19 ORM with SQLite (PostgreSQL-ready for production): User, Product, Order, Cart, ContactMessage, Page, Session, Account models with proper relationships, type-safe queries, and database migrations
- Implemented advanced state management with Zustand 4.5 including localStorage persistence middleware, optimistic UI updates, type-safe cart operations, and efficient re-render optimization
- Built comprehensive form handling system with React Hook Form 7.52 and Zod 3.23 validation for contact forms, product management, user registration, server-side validation, and user-friendly error messages
- Developed responsive design with Tailwind CSS 3.4, mobile-first approach, modern UI components with Lucide React icons, accessible design patterns, and custom reusable component library
- Implemented enterprise-grade security features: password hashing with bcryptjs (10 rounds), SQL injection prevention via Prisma ORM, XSS protection, CSRF protection, input validation with Zod, and security headers
- Created RESTful API routes with proper error handling patterns, request validation, appropriate HTTP status codes (200, 400, 500), JSON response formatting, and comprehensive error messages
- Set up professional development environment with TypeScript strict mode, ESLint configuration, path aliases (@/*), production-ready build configuration, and code quality tools
- Implemented additional features: react-hot-toast for user-friendly notifications, clsx and tailwind-merge for conditional styling, and comprehensive error boundaries

Next.js TypeScript Prisma NextAuth.js Zustand Tailwind CSS E-commerce React Hook Form Zod bcryptjs JWT

Web & Mobile Platform - Corporate Website

2025

Own Initiative

Enterprise-grade corporate website with full legal compliance (DSG - Swiss Data Protection Act), responsive design, and advanced UX features. Built with Next.js 14, TypeScript, and modern web standards.

- Developed enterprise-grade corporate website using Next.js 14.0.4 (App Router) with TypeScript 5.3.3, React 18.2.0, server-side rendering, React Server Components, and optimized performance
- Implemented comprehensive DSG-compliant cookie management system with granular consent management (Necessary, Analytics, Marketing categories), 365-day cookie preference persistence, dynamic script loading based on user consent, custom event system for consent updates, and full compliance with Swiss Data Protection Act (DSG)
- Created complete legal documentation: comprehensive Impressum (legal notice) per DSG Art. 6 Abs. 1, detailed privacy policy (Datenschutzerklärung), GDPR/DSG-compliant data handling, and structured legal content presentation
- Built performance-optimized application with React Server Components for reduced JavaScript bundle, SWC minification enabled, optimized build configuration, dynamic meta tags for SEO, semantic HTML structure, and fast initial page loads
- Developed fully responsive design with mobile-first approach, smooth scroll animations using Intersection Observer API, accessible navigation with ARIA labels, keyboard navigation support, and optimized for Desktop, Tablet, and Mobile
- Implemented modern UI/UX with professional design system, CSS Variables for centralized theme system (colors, spacing, typography), consistent spacing and typography, interactive forms with validation, and user feedback mechanisms
- Created reusable component architecture: Header, Footer, CookieBanner, AnimateOnScroll components with modularity, clean code structure, component composition, and separation of concerns
- Built multi-page website: Homepage with hero section and features, Products page, About Us, Contact with form validation, Impressum, Privacy Policy with semantic HTML5 structure and proper heading hierarchy
- Designed advanced CSS architecture with centralized design tokens (colors, spacing, typography, shadows, border radius), CSS Grid and Flexbox layouts, modern CSS animations and transitions, gradient backgrounds, and visual effects
- Implemented robust error handling with cookie parsing, consent management, user-friendly error messages, try-catch patterns, and graceful degradation
- Set up professional development environment with TypeScript strict mode, ESLint 8.56.0 with Next.js ESLint config, Git version control, production build optimization, and comprehensive documentation
- Integrated browser APIs: Intersection Observer API for scroll-triggered animations, Document Cookie API for cookie management and parsing, Custom Events API for event-driven architecture, and Local Storage concepts

Next.js TypeScript React CSS3 DSG Compliance SEO Intersection Observer Server Components ESLint

Women's Health NGO Website - Full-Stack Application

2025

Own Initiative

Production-ready, full-stack web application for a Women's Health NGO focused on breast cancer awareness in Adare, Ireland. Features complete content management system, interactive forms, dynamic routing, and enterprise-grade architecture.

- Developed production-ready full-stack web application using Next.js 14.2.33 (App Router) with TypeScript 5.3.3, React 18.2.0, server-side rendering, static site generation, automatic code splitting, and image optimization
- Built comprehensive multi-page website architecture with 8+ pages: Home with hero section, Mission, Initiatives, Events with event listings, Blog System with dynamic posts, Donate with payment integration, Volunteer with application form, Contact with form validation, all with dynamic routing and SEO optimization
- Created enterprise-grade blog system with dynamic blog post pages using [slug] routing, category-based organization, date formatting with date-fns 2.30.0, SEO-friendly URL structure, individual post pages, and blog listing with filtering
- Implemented advanced form systems: Donation form with preset amounts, custom amount input, anonymous donation option, payment method selection; Volunteer application with multi-field collection, interest selection, availability dropdown, comprehensive validation, and database persistence
- Developed 3 fully implemented API endpoints: /api/contact, /api/donate, /api/volunteer with comprehensive request validation, error handling, proper HTTP status codes (200, 400, 500), JSON response formatting, async/await patterns, and ready for third-party payment integrations
- Built responsive navigation with desktop horizontal menu, mobile hamburger menu with animations, sticky navigation bar, smooth transitions, accessibility attributes (ARIA labels), keyboard navigation support, and focus indicators
- Implemented comprehensive form management with React Hook Form 7.49.2, advanced validation, error handling with user-friendly messages, loading states during submission, success feedback with visual indicators, auto-reset functionality, and form state management
- Created custom Tailwind CSS 3.4.0 configuration with primary/accent color palettes, custom font families, reusable component classes, typography scales, consistent spacing system, CSS layer architecture (@layer base, components, utilities), and PostCSS 8.4.32 processing
- Designed comprehensive user experience features: loading states for form submissions, success messages with visual feedback, comprehensive error handling, smooth scroll behavior, hover effects, micro-interactions, and responsive design patterns
- Implemented robust error handling: custom 404 page, API error responses with proper status codes, form validation errors with field-specific messages, user-friendly error messages, try-catch patterns, and graceful error recovery
- Set up professional development environment with TypeScript strict mode, ESLint 8.56.0 with Next.js ESLint config, Autoprefixer 10.4.16, production-ready build configuration, and code quality tools
- Ensured full accessibility (WCAG AA compliance): ARIA labels and roles, semantic HTML5 structure, keyboard navigation support, focus indicators, screen reader compatibility, proper heading hierarchy, and accessible form labels

[Next.js](#) [TypeScript](#) [React Hook Form](#) [Tailwind CSS](#) [API Routes](#) [date-fns](#) [SEO](#) [Accessibility](#) [WCAG](#)

Composer Portfolio Website - Multilingual Platform

2025

Own Initiative

Modern, multilingual portfolio website for a classical composer with internationalization (i18n), interactive music player, works catalog with filtering, and responsive design. Built with Next.js 14 and TypeScript.

- Developed modern multilingual portfolio website using Next.js 14.2.0 (App Router) with TypeScript 5.3.3, React 18.3.0, full internationalization support, and production-ready architecture
- Implemented complete internationalization (i18n) with next-intl 3.26.5, bilingual support (German/English), middleware-based locale routing and detection, dynamic content localization, language switcher with smooth transitions, and 11+ pages fully internationalized
- Built advanced interactive music player component with custom audio player using React hooks (useState, useEffect, useRef), comprehensive playlist management, progress tracking and seeking functionality, volume control and mute, auto-play capabilities, track navigation, and responsive design
- Created comprehensive works catalog system with dynamic filtering by category (8+ categories: Orchestral, Chamber, Solo, Vocal, etc.), real-time search across titles/descriptions/instrumentation, memoized filtering with useMemo for performance, category-based navigation, and individual work detail pages with dynamic routing
- Developed 11+ fully functional pages: Biography, Works with catalog, News, Discography, Press, Media, Contact, Listen with music player, Scores, Versus Vox, with dynamic routing, static generation using generateStaticParams, and optimized routing
- Implemented advanced Next.js App Router architecture with dynamic routes ([locale], [id]), server and client components optimization, static site generation (SSG), metadata API for SEO, and optimized routing patterns
- Built responsive and accessible design with mobile-first layout, ARIA labels and roles, semantic HTML structure, keyboard navigation support, custom scrollbar styling, focus indicators, and screen reader compatibility
- Created modern UI/UX features: smooth page transitions with Framer Motion 11.0.0, animated navigation indicators, backdrop blur effects, gradient backgrounds, hover states and micro-interactions, mobile hamburger menu with animations, and modern design patterns
- Implemented comprehensive performance optimizations: Next.js image optimization, code splitting and lazy loading, optimized bundle size, efficient re-renders with React hooks (useMemo, useCallback), and production build optimization
- Designed type-safe development with TypeScript interfaces for all data structures, strict type checking enabled, type-safe component props, centralized type definitions, generic types, and type inference
- Set up professional development environment with TypeScript strict mode, ESLint 8.56.0 with Next.js ESLint config, modern build optimization, PostCSS 8.4.33, Autoprefixer 10.4.17, and code quality tools
- Created comprehensive custom design system with Tailwind CSS 3.4.1, custom theme configuration, primary/accent color palette, typography scales, animations, CSS Grid and Flexbox layouts, and consistent design tokens
- Integrated additional libraries: Lucide React 0.344.0 for icons, clsx 2.1.0 for conditional classes, tailwind-merge 2.2.0 for class merging, and date-fns for date manipulation

[Next.js](#) [TypeScript](#) [next-intl](#) [Framer Motion](#) [Tailwind CSS](#) [i18n](#) [React Hooks](#) [Audio API](#) [SEO](#)

Driver Order Optimizer - Vehicle Driver Planning System

2025

Own Initiative

Full-stack application for optimizing order management and daily planning for vehicle drivers (Fahrzeugüberführer). The system integrates with Google Maps API for routing calculations and provides an interactive dashboard for plan visualization, route planning, and order management.

- Designed and developed a full-stack application using Next.js (App Router) and Express.js with TypeScript for type-safe development across frontend and backend
- Implemented RESTful API endpoints for order management and interactive plan building with route calculations and travel segment estimates
- Built Material UI dashboard with Next.js for interactive visualization of plans, order management, route calculations, and plan storage with level-based organization
- Integrated Google Maps API (Routes API, Distance Matrix, Geocoding) for driving and transit route calculations with intelligent caching and address normalization
- Created interactive plan builder with level-based plan generation, allowing drivers to manually select orders, calculate routes, manage transitions between orders, and save multiple plan configurations
- Designed plan store service for saving and loading multiple plan configurations with JSON persistence
- Set up comprehensive development environment using VS Code Dev Containers (.devcontainer) for consistent development experience across team members
- Implemented Zod schema validation for all API endpoints ensuring type safety and request validation
- Built geocoding service with persistent caching and Haversine distance calculations for spatial optimizations
- Developed transition routing system supporting both driving and train/transit modes with real-time schedule integration

Next.js Express.js TypeScript JavaScript Material UI Docker Dev Containers Node.js React REST API Google Maps API Zod Luxon
Haversine

OKAS FLD - Drive & Delivery Services

2025

Business Website Project

Modern business website for OKAS FLD (drive & delivery services). Built with Next.js (App Router), TypeScript, and Tailwind; responsive, SEO-optimized, and i18n (DE/EN/FR). Deployed from GitHub to Render.com with a custom domain via AWS Route 53.

- Developed responsive web app using Next.js with TypeScript
- Implemented multi-language support with i18n
- Created mobile-first design with Tailwind CSS and custom components
- Implemented modern development practices and architecture
- Handled full-stack deployment and DevOps workflows
- Deployed via GitHub → Docker Hub → Render.com with AWS Route 53 DNS management

Next.js React TypeScript Tailwind CSS GitHub Render.com AWS Route 53

ASOK-SE - Enterprise Web Application

2024

ASOK-SE SARL

Comprehensive web application aimed at enhancing enterprise advertisement. Integrated multiple technologies to provide a seamless user experience for businesses to promote their products and services.

- Developed and optimized front-end components using HTML and CSS, ensuring cross-browser compatibility and responsiveness
- Built robust backend services with Python/Django, handling business logic, data storage, retrieval, and processing efficiently
- Utilized Docker for containerization, facilitating easy deployment and scalability of the application
- Incorporated JavaScript for dynamic content updates and enhanced user interaction

HTML CSS JavaScript Docker GitHub Python Django

Local Jenkins Container in VS Code Dev Container

2024

Private Project

Professional CI/CD development environment with Jenkins configured for Django projects using VS Code Dev Containers. This setup provides a fully configured Jenkins environment with Docker support.

- Containerized Jenkins environment with Docker-in-Docker support
- Complete Python/Django development tooling
- Built-in security scanning (Trivy, Bandit)
- Integrated testing suite (pytest, pytest-django, pytest-cov)
- Code quality tools (flake8, black, isort)
- Professional template for Automated CI/CD pipeline
- VS Code integration with essential extensions

Jenkins Docker VS Code Python Django CI/CD DevOps

Vivantes Humanitas Web Application

2023 - 2024

Friend's Project

Django-based web application for Vivantes Humanitas e.V., enabling efficient management of volunteer registrations and activity tracking.

- Developed a Django-based web application for Vivantes Humanitas e.V., enabling efficient management of volunteer registrations and activity tracking
- Built a responsive frontend using HTML, CSS, and JavaScript, ensuring an intuitive and user-friendly interface
- Designed a secure backend with Django and Python, ensuring data integrity and compliance with privacy regulations

Python Django HTML CSS JavaScript

Pentak SARL International - Enterprise Web Application

2021 - 2022

Pentak SARL International

Web application using Laravel/Lumen to manage business operations for a friend's company.

- Created a web application using Laravel/Lumen to manage business operations for a friend's company
- Implemented a user interface with PHP, PHP-Blade, HTML, CSS, and JavaScript

PHP Laravel Lumen PHP-Blade HTML CSS JavaScript

Offer Comparison Web Application

2020 - 2021

Own Initiative

Laravel/Lumen-based application to compare online offers, allowing users to make informed purchasing decisions.

- Designed and developed a Laravel/Lumen-based application to compare online offers, allowing users to make informed purchasing decisions
- Integrated secure user authentication with Laravel/Passport, ensuring data privacy and secure access
- Utilized SQLite and Eloquent ORM for efficient database management and dynamic data presentation

PHP Laravel Lumen HTML CSS JavaScript Git GitHub SQLite

Restaurant Management Application

2019 - 2020

Initiative with Friends

Laravel/Lumen-based system to streamline restaurant operations, including inventory tracking and order management.

- Built a Laravel/Lumen-based system to streamline restaurant operations, including inventory tracking and order management
- Collaborated remotely using Zoom and managed code versions with Git/GitHub

PHP PHP-Blade Framework Git GitHub Zoom

Hairstyle Business Web Application

2018 - 2019

Initiative with Friends

Express.js web application to support a friend's hairstyle business by enabling appointment booking and customer management.

- Developed an Express.js web application to support a friend's hairstyle business by enabling appointment booking and customer management
- Created a responsive frontend with HTML, CSS, and JavaScript, ensuring compatibility across devices

Express.js HTML-TWIG Framework MySQL npm ngrok Git nodemon babel-node.js

CSK Student Association Web Application

2016 - 2017

Own Initiative

Web application for the CSK student group at TU Clausthal, facilitating event management and communication among members.

- Led the development of a web application for the CSK student group at TU Clausthal, facilitating event management and communication among members
- Designed a cross-platform solution using Node.js, TypeScript, and Ionic Cordova for enhanced accessibility

Node.js TypeScript HTML CSS Ionic Cordova Git

Private Tutoring in Computer Science

2014 - Present

Own Initiative

Conducted private tutoring sessions to help students master programming languages and databases, focusing on practical problem-solving and real-world application.

- Conducted private tutoring sessions to help students master programming languages like Java, C++, PHP, and Python, as well as databases such as SQL and NoSQL (Neo4j, ArangoDB)
- Focused on practical problem-solving and real-world application of frameworks and tools to strengthen students' skills and confidence

Java C++ PHP Python SQL NoSQL Neo4j ArangoDB

PROFESSIONAL WORK

IT Consultant - Vehicle Technology & Planning

August 2023 - Present

DB Regio AG

- Developed automation solutions using Python and UiPath, achieving 80% reduction in manual effort with a goal to reach 99% automation
- Built and deployed RPA robots using UiPath Orchestrator, enabling seamless task automation and improving team productivity
- Collaborated with cross-functional teams to design and implement robust software solutions, improving system efficiency and client satisfaction
- Utilized Agile (SCRUM) to manage and deliver projects on time, ensuring continuous improvement and client alignment
- Employed version control with Git and GitLab, ensuring smooth collaboration and code integrity
- Leveraged VBA (Visual Basic for Applications) to automate complex and time-consuming Excel processes, significantly improving efficiency and accuracy

Python UiPath RPA VBA Excel Git GitLab Agile SCRUM

Software Developer

August 2021 - August 2023

Achelos GmbH

- Developed tools in Java and C++ to manage virtual machine connections, automating configuration, file upload, and data processing tasks
- Integrated JUnit for unit and integration testing, improving code quality and reducing bugs in production
- Collaborated in an Agile environment, using JIRA for issue tracking and sprint planning to meet project deadlines efficiently
- Streamlined development workflows with Jenkins and Maven for automated build, testing, deployment, and CI/CD pipelines
- Managed package dependencies using Maven-Nexus for efficient artifact storage and distribution
- Utilized Git and GitLab for version control and source code management, with occasional use of Sourcetree for enhanced git workflow visualization
- Proficient in VS Code and Eclipse for efficient coding, debugging, and project management across various programming languages
- Fostered team communication and collaboration through MS Teams, ensuring smooth project communication and coordination

Java C++ Spring Boot JUnit Jenkins Maven Git JIRA

RPA Developer

August 2021 - June 2022

DB Regio AG

- Automated data processing tasks using Python and VBA Excel, cutting processing time by at least 30%
- Developed and deployed RPA robots with UiPath, streamlining business workflows and improving task accuracy and efficiency
- Worked with Agile methodologies (SCRUM) to manage automation tasks, ensuring timely delivery and client satisfaction
- Collaborated remotely with teams via MS Teams and GitLab to ensure smooth communication and version control

Python VBA Excel UiPath RPA Agile SCRUM

Working Student - Software Developer

June 2018 - February 2021

Eves-IT

- Developed tools in Java, Spring MVC, Spring Boot and JavaFX, optimizing internal processes for automotive clients such as Volkswagen AG
- Created database solutions with Oracle SQL and Flyway for seamless data management across multiple systems
- Implemented automated testing frameworks using JUnit and TDD principles, significantly reducing bugs before and after deployment
- Collaborated in an Agile environment, managing development cycles using JIRA for task tracking, Bitbucket for source control management, Bamboo for CI/CD, SonarQube for QA, Miro for digital team kanban board, Zoom and MS Teams for remote collaboration
- Used Confluence for documentation, ensuring that all project details were clearly documented and easily accessible to the entire team
- Managed project dependencies and packages using Maven Artifactory, ensuring smooth version control and efficient package distribution
- Leveraged IntelliJ IDEA and Eclipse as integrated development environments (IDE) to improve code quality and development speed
- Optimized client workflows by delivering customized software solutions on time, significantly improving operational efficiency

Java Spring Boot Spring MVC JavaFX Oracle SQL JUnit JIRA Bamboo

● ACADEMIC WORK

Master's Thesis: End-to-End Learning System for Autonomous Drone Navigation

2018 - 2024

Technical University of Clausthal

This project aimed to revolutionize autonomous drone flight by implementing a cutting-edge end-to-end (E2E) learning approach. Conducted within the AirSim simulation environment, the work achieved Level 4 autonomous navigation capabilities, integrating advanced spatial awareness, core navigation, and expanded features such as non-planar flight paths.

- Designed and implemented an autonomous drone navigation system using Python, TensorFlow, and AirSim simulation
- Achieved level-4 navigation capabilities, including spatial awareness and non-planar movement
- Delivered a scalable and efficient solution for drone navigation
- Unlike traditional modular methods, the E2E system directly learns the mapping between inputs and outputs, enabling seamless and efficient navigation in complex environments
- This innovative approach highlights a significant leap in autonomous aerial systems, setting the foundation for smarter and more adaptive drone technologies

Python TensorFlow Keras AirSim Pandas Scikit-learn Git GitLab Machine Learning Autonomous Systems

Master's Project: Safeguarding Safety-Critical Systems

2018 - 2024

Technical University of Clausthal

This project focused on analyzing safety-critical systems, with a particular emphasis on drones. As inherently safety-critical systems, drone development demands adherence to specialized methodologies, rigorous safety standards, and tailored development processes.

- Conducted an extensive literature review on safety-critical systems, focusing on unmanned aircraft systems
- Analyzed and documented industry standards and laws for system development
- The work primarily involved an in-depth literature review of relevant standards, laws, and safeguarding practices associated with the design and development of unmanned aircraft systems
- By exploring the regulatory and technical frameworks, this study provides valuable insights into the processes necessary to ensure the reliability and safety of these advanced systems

Literature Review Safety Standards Markdown LaTeX Excel Research Documentation

Bachelor's Thesis: Software Architecture Management in the Automotive Sector

2013 - 2018

Technical University of Clausthal

This project centers on Model-Driven Software Development (MDSD), a cutting-edge approach to achieving highly automated software creation. The primary objective was to design and develop a customized tool that supports Model-Driven Architecture (MDA), a pivotal aspect of MDSD, by generating tailored software architecture models derived from a metamodel.

- Built an eclipse standalone tool to support Model-Driven Architecture (MDA) for customized software solutions
- Utilized Java, Eclipse, and UML to address architectural challenges in the automotive industry
- Addressed the limitations of standardized frameworks like the Unified Modeling Language (UML)—which often lack flexibility or prove overly complex for specific architectural challenges—the tool is designed to meet the unique demands of the automotive industry
- By automating critical development steps and delivering architecture solutions optimized for real-world needs, this work demonstrates innovation in streamlining software development processes while driving efficiency and adaptability in safety-critical industries

Eclipse GMF/EMF Java UML Model-Driven Development Automotive Architecture

Bachelor's Project: Smart Beer Bar System

2013 - 2018

Technical University of Clausthal

This project involved the development of a smart beer bar management system designed to enhance user experience and operational efficiency. The system allows users to log in, view personalized details such as beer consumption in liters, manage other users and their consumption data, and securely log out.

- Developed a cross-platform, real-time management system using C++, Qt, and SQLite, enabling seamless tracking of beer consumption, user data, and inventory
- Implemented user authentication and role-based access controls, ensuring data security and allowing different levels of user interaction (admin, user, guest)
- Optimized inventory management by automating consumption tracking, reducing manual efforts and providing real-time insights into stock levels and user behavior
- Built using C++, Qt, SQLite, and developed in Eclipse and Qt Creator on Ubuntu, the project demonstrates a seamless integration of modern technologies to create a user-friendly and efficient solution

C++ Qt SQLite Eclipse Qt Creator Ubuntu UML Cross-Platform

Notable Project: Electric Vehicle Simulator

2013 - 2018

Technical University of Clausthal

This project focuses on developing an electric vehicle simulator to address key challenges such as range limitations and high costs associated with electric cars. The simulator enables users to simulate a trip and receive an evaluation of their driving performance upon completion.

- Designed and integrated an interactive driver-simulator module using Java and OpenDS, allowing users to simulate electric vehicle trips and receive detailed performance evaluations
- Implemented a feedback loop to analyze energy consumption and optimize trip performance, helping to improve electric vehicle efficiency and user experience
- Collaborated with a cross-functional team to ensure the simulator aligned with the real-world specifications of electric vehicles, enhancing the accuracy of results and simulations
- Divided into several sub-projects, this programming internship specifically involved the implementation of a driver-simulator interaction, built using Java

Eclipse Java UML OpenDS Java SWT Java Swing Simulation

Notable Project: Parking Management System

2013 - 2018

Technical University of Clausthal

This project addresses the growing challenge of finding parking in crowded urban areas while contributing to the advancement of autonomous driving by automating parking management. The goal was to create a real-time parking management system that allows users to easily monitor the availability of parking spaces.

- Developed a real-time parking management application for Android, using Python, TypeScript, and Java, enabling users to find available parking spots based on sensor data and user input
- Integrated data visualization tools for users to easily view parking availability and reservation status, improving the overall user experience
- Streamlined communication with backend servers to ensure up-to-date and accurate parking lot status, allowing efficient management of parking resources in high-demand areas
- The system was built using Python, TypeScript, and Java (Android), showcasing expertise in mobile development, backend services, and sensor data integration for autonomous systems

Java Android Python TypeScript UML Mobile Development Backend Services

Notable Project: Graph Database Comparison

2013 - 2018

Technical University of Clausthal

This project involved a comprehensive performance comparison between two leading NoSQL graph databases: Neo4j and ArangoDB. The objective was to assess the strengths and capabilities of each database to determine which offers superior performance for graph-based data management.

- Conducted performance benchmarking between Neo4j and ArangoDB, writing Python scripts to evaluate query efficiency and scalability under various real-world scenarios
- Analyzed and presented findings to stakeholders, providing actionable insights to optimize database selection for different types of graph-based applications
- Developed custom testing scripts to simulate data workloads, ensuring that performance metrics were relevant to industry standards and real-world usage
- To achieve this, I developed and executed a series of benchmark tests using a custom Python script, enabling a detailed analysis of each database's efficiency and scalability

Neo4j ArangoDB Python NoSQL Graph Databases Performance Testing

Research Assistant - Software Development and Automation

April 2021 - 2022

Technical University of Clausthal

- Built simulation tools using Python and ROS2 for monitoring security-critical drone systems, improving system reliability and performance
- Automated data collection and analysis for drone control systems using Python, ROS2 and Airsim, reducing the time required for experimental setups
- Collaborated with international teams to align research objectives with regulatory standards and safety protocols in the drone industry
- Collaborated remotely with local teams via BigBlueButton (BBB) and GitLab to ensure smooth communication and version control

Python ROS2 AirSim Drone Systems Research

Research Assistant

2014 - 2018

Technical University of Clausthal

- Developed and maintained software solutions in Java for various research projects, automating workflows and improving the efficiency of data collection and analysis processes
- Utilized version control systems using Subversion (SVN), ensuring seamless collaboration and traceability of code changes between multiple research teams
- Extended MS Excel functionalities with VBA Excel to support colleagues in time registration and data management
- Designed and implemented modular applications using the MVC architecture pattern, ensuring scalability and maintainability of research tools
- Implemented automated testing using JUnit to ensure software stability, reducing bugs and errors and improving the reliability of research outputs
- Followed the V-Model XT method for software development, adhering to structured and systematic processes to meet project requirements and quality standards
- Collaborated with teams using SharePoint for documentation and Subversion (SVN) for version control, streamlining code management across multiple research projects
- Utilized Eclipse IDE for efficient development and debugging of Java-based research applications, accelerating the development cycle
- Automated Excel workflows with custom VBA macros, saving significant manual effort and improving the accuracy of time registration processes for team members
- Worked independently to deliver high-quality software solutions that supported various research initiatives, demonstrating strong problem-solving skills and self-management

[Java](#) [VBA Excel](#) [MVC](#) [JUnit](#) [SVN](#) [SharePoint](#) [Research](#) [Eclipse](#)



TECHNICAL SKILLS

Comprehensive expertise across modern technologies and frameworks

PROGRAMMING LANGUAGES

- Python
- Java
- JavaScript
- TypeScript
- PHP
- C++
- VBA Excel

FRONTEND LIBRARIES & TOOLS

- Tailwind CSS
- React Hook Form
- Zod
- Zustand
- TanStack Query
- Framer Motion
- next-intl
- Prisma
- NextAuth.js
- TypeORM

MESSAGE QUEUES & EVENT STREAMING

- RabbitMQ
- Kafka
- Celery
- Bull Queue

DEVOPS & CLOUD

- Git
- GitLab CI/CD
- Docker
- Docker Compose
- Jenkins
- Maven
- Nginx
- Prometheus
- Grafana
- AWS
- AWS S3
- AWS EKS
- CI/CD

TESTING & QUALITY

- Pytest
- Jest
- Playwright

FRAMEWORKS & TOOLS

- UiPath
- Django
- FastAPI
- Spring Boot
- NestJS
- Next.js
- React
- React Native
- Expo
- Laravel
- Express.js
- TensorFlow

DATABASES

- PostgreSQL
- MySQL
- Oracle SQL
- SQLite
- Redis
- TimescaleDB
- Neo4j
- ArangoDB

REAL-TIME & WEB SOCKETS

- WebSockets
- Socket.io
- Django Channels

THIRD-PARTY INTEGRATIONS

- Stripe
- PayPal
- OpenAI API
- Firebase
- SendGrid

BACKEND TOOLS & LIBRARIES

- SQLAlchemy
- Alembic
- Pydantic
- Passport.js
- bcrypt
- Multer
- Nodemailer



EDUCATION

Academic qualifications and professional development

Master of Science in Computer Science

Technical University of Clausthal

2018 - 2024

Bachelor of Science in Computer Science

Technical University of Clausthal

2013 - 2018

High School Diploma

Gymnasium

2005 - 2011