Markus Heimerl

Automotive Developer

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Profile

Innovative Automotive Developer with expertise in programming, hardware design, and computer architecture. Passionate about developing cutting-edge solutions for the automotive industry, with a focus on visualization and analysis tools. Skilled in C++, AUTOSAR, and agile methodologies. Committed to continuous learning and applying emerging technologies to solve real-world challenges.

Experience

2024–Present **Automotive Developer**, *intive*, Regensburg, Germany.
- Develop and optimize "Carmen," a visualization and analysis tool for BMW
- Implement advanced C++ programming techniques for robust software solutions
- Conduct code optimization and refactoring to enhance tool performance
- Implement rigorous testing methodologies following SOLID principles
- Collaborate with cross-functional teams to drive innovation in automotive technology

2023–2024 **Software Development Engineer**, *VECTOR Informatik*, Regensburg, Germany.
- Developed sophisticated flash bootloader for automotive ECUs
- Enhanced testing frameworks using C++ and Google Test
- Worked with AUTOSAR Classic framework
- Collaborated on complex software challenges in automotive sector

2022 **Academic Tutor**, *OTH Regensburg*, Regensburg, Germany.
- Conducted tutorials on digital technology principles
- Guided students in circuit development using VHDL
- Provided support in combinatorial logic and switching networks

Education

2018–2022 **Bachelor of Science in Computer Engineering**, *OTH Regensburg*, Regensburg, Germany.
Thesis: Development of a RISC-V RV32I Processor with VGA Interface using VHDL

Skills

Programming	C++, C, VHDL, Python
Frameworks	AUTOSAR, Google Test
Tools	Git, Jira
Methodologies	Agile, SOLID principles
Other	Digital Design, Embedded Systems, Robotics

Projects

Drone Simulator	`https://github.com/ratisbonrobotics/simulator` - Developed a sophisticated 3D quadrotor simulation environment, incorporating Newtonian physics for realistic flight dynamics and control
Transformer	`https://github.com/ratisbonrobotics/transformer` - Implemented an advanced autoregressive decoder transformer, pushing the boundaries of natural language processing and generation
Riemann Hypothesis Visualization	`https://markusheimerl.com/riemann/` - Created an interactive visualization exploring the profound connection between the Riemann hypothesis and prime number distribution
Cellular Automata Explorer	`https://markusheimerl.com/cellularautomata/` - Designed a dynamic system to demonstrate the emergence of complex structures from simple rules in cellular automata
Multilayer Perceptron Visualizer	`https://markusheimerl.com/multilayerperceptron/` - Engineered a detailed, interactive visualization of feed-forward processes in multilayer perceptrons, enhancing understanding of neural network architectures
Manim-based Math Education	`https://markusheimerl.com/manim/` - Leveraged the Manim animation engine to create visually stunning mathematical explanations, revolutionizing math education through video
Fragment Shader Art	`https://markusheimerl.com/shaderart/` - Developed a JavaScript environment for creating and rendering complex Shadertoy shaders, pushing the boundaries of real-time graphics
Parallel 2D Heat Expansion Solver	`https://markusheimerl.com/heatexpansion/` - Implemented a high-performance computing solution for 2D heat expansion using MPI, demonstrating expertise in parallel programming
CNN for Sketch Classification	`https://markusheimerl.com/cnn/` - Designed and trained custom neural architectures using the hyperband algorithm to efficiently classify hand-drawn sketches, showcasing innovation in machine learning optimization

Certifications

2021 Aerial Robotics - Coursera

2021 TOEFL iBT - Score: 105/120 (C1 Level)

Volunteering

2019 **Organizer**, *TEDxOTHRegensburg*, Regensburg, Germany.

- Recruited and coached speakers
- Managed IT infrastructure and online ticketing system
- Contributed to sponsor acquisition and relationship management