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Software Lab
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PhD Position Application

Dear Software Lab Team,

I am thrilled to apply for the PhD position at the Software Lab of the University of Stuttgart, inspired by your groundbreaking work on ExecutionAgent, recently published at ISSTA 2025. Your innovative approach to automating test suite execution across diverse software projects using LLM-based agents demonstrates a transformative impact on software engineering, achieving a remarkable 6.6x improvement over existing techniques. This pioneering research, coupled with the lab's commitment to advancing AI-driven solutions for real-world software challenges, deeply motivates me to contribute my expertise and passion to your dynamic research environment.

During my Master's program, focusing on AI, I primarily used Python and Ubuntu as my development environment to develop applications for AI-driven tasks. One notable project involved autonomous navigation of the Turtlebot3 in a selected area, incorporating object detection and avoidance, while also mapping the area and ensuring the robot could return to its origin. This project utilized ROS (Noetic) and Gazebo for virtual testing, with key ROS nodes developed in both C++ and Python, leveraging deep reinforcement learning to optimize navigation strategies. Parallel to my academic pursuits, during nine months at AVL, I worked on the Adaptive AUTOSAR middleware (Service-Oriented Architecture) and developed its applications in C++. These Adaptive Applications were deployed on a custom Real-Time Linux Operating System using the Yocto project. For my Master's thesis at AVL, I upgraded their legacy FMU Generation Utility (written in C++) from the FMI 2.0 to the FMI 3.0 standard, enhancing the tool's functionality for co-simulation of automobile parts built in systems like MATLAB and C++. I also leveraged Google Protocol Buffers through ASAM OSI for efficient data serialization, streamlining the integration of sensor and environmental models in driving simulations, thereby improving virtual testing capabilities. Additionally, as a Junior C++ Developer at Persystems, I developed Virtual TestBench, a Qt Desktop application for simulating electrical components using Persystems' proprietary library. My responsibilities included designing the UI/UX in the Qt Creator IDE with C++ to ensure a seamless user experience and implementing the application's logic by connecting UI widgets to custom slots via Qt's signal-slot mechanism to manage data flow between the UI and backend operations interfacing with Persystems' testbench library. I also built a separate license check application for Virtual TestBench using Qt and C++.

With my Master's experience developing AI-driven applications in Python and managing complex C++ projects at AVL, alongside my past role at Persystems refining simulation software with Qt and C++, I am well-prepared to contribute as a PhD researcher at the Software Lab of the University of Stuttgart. My expertise in deep reinforcement learning from the Turtlebot3 project, combined with my proficiency in Python and C++ for developing ROS nodes, aligns closely with your research focus on AI-driven software solutions. My thesis work at AVL, upgrading tools to FMI 3.0 and optimizing data serialization with Google Protocol Buffers, showcases my ability to tackle large-scale software projects and contribute to innovative testing frameworks. My experience in Linux environments using Yocto and CI/CD pipelines, honed at AVL, equips me to meet the technical demands of your lab's research, including test suite automation and software verification. Furthermore, my collaborative efforts with peers during my Master's and presenting technical solutions at Persystems have prepared me to engage with undergraduate students and share research findings at international conferences, ensuring meaningful contributions to your lab's mission.

Among the many skills I have honed throughout my academic and professional journey, collaboration stands out as the most pivotal for advancing technology. My experiences have underscored that breakthroughs in technology are often the result of interdisciplinary teamwork and shared expertise. I am committed to contributing my utmost from the very start, beginning immediately.

I would be greatly honoured to receive an invitation for an interview.

Yours sincerely,

Regensburg, 20.06.2025