Ahmad SHBAT

EMBEDDED SW ENGINEER

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WORK EXPERIENCE

Software Engineer I

Since December 2022

Continental AG Romania, Timisoara

- **Software Architecture:**
  - Led the redesign of the amplifier diagnostic system, enhancing modularity and efficiency.
  - Served as the system architect for the Child Presence Detection (CPD) system, utilizing UWB (Ultra-Wideband) technology for series production in a modular platform environment.
  - Designed scalable and interoperable system architecture, ensuring compatibility with varying hardware setups.
- **Machine Learning Integration:**
  - Integrated machine learning algorithms within the CPD project to detect the presence of a child inside a vehicle.
  - Developed and trained custom models to recognize small breathing movements, optimizing detection accuracy while minimizing false positives.
  - Fine-tuned the model using real-world data, applying cross-validation techniques for enhanced performance.
- **Embedded Systems Development:**
  - Refactored the amplifier diagnostic system within the Audio Telematics domain, improving code efficiency, maintainability, and adherence to automotive software standards.
  - Enhanced low-level hardware code to meet client hardware timing (e.g., TAS5421 chip integration).
  - Implemented standalone diagnostic tasks and integrated with AUTOSAR RTE for seamless operation.
  - Extended IPC bridge connections to accommodate new feature requests, including speaker gain adjustments.
  - Managed NVM memory configurations for persistent audio settings and implemented read/write operations.
- **Model-Driven Development:**
  - Designed the CPD system architecture using IBM Rhapsody, following model-driven development principles.
  - Generated production-ready C++ code, maintaining consistency between the system model and implementation.
  - Employed UML diagrams (class and sequence) for structured software design following SOLID principles.
- **Code Quality and Optimization:**
  - Optimized C code for embedded audio modules, resolving memory leaks and enhancing performance.
  - Established unit testing protocols, achieving +90% coverage for the Audio-VuC module.
  - Implemented integration and performance testing, validating system robustness and logical correctness.
  - Developed CI pipeline configurations for automated builds and tests using Jenkins.
- **Embedded Security Development:**
  - Engineered SELinux modules to secure embedded systems within the Audio Telematics domain.
  - Managed SELinux security configurations for audio projects over a year, maintaining client compliance.
  - Enhanced system security by optimizing permission management and analyzing coredump defects.
- **Development Process Expertise:**
  - Demonstrated comprehensive knowledge of the full software development lifecycle, including code reviews, traceability, and systematic root cause analysis.
  - Collaborated with high-level engineers to align project implementation with client requirements.
  - Managed configuration and version control, including branching and build system file creation.

Associate Software Engineer

From April 2022 to December 2022

Continental AG Romania, Timisoara

Software Developer Internship

From October 2021 to April 2022

Continental AG Romania, Timisoara

English Interpreter

From 2016 to 2017

Filoxenia Organization Thessaloniki, Greece

EDUCATION

Bachelor: Informatics in English (Graduated)

From 2020 to September 2023

West University of Timisoara Romania, Timisoara

- Evaluated by the German ZAB (Central Office for Foreign Education).
- Officially recognized as equivalent to a **German Bachelor's degree**.
- Enables access to jobs and Master's studies in Germany.

Full certificate with official digital seal available upon request.

PROFESSIONAL PROJECTS AND ACHIEVEMENTS

- Fixed memory leaks and optimized C code for audio modules.
- Integrated audio module functions with AUTOSAR RTE.
- Added advanced hardware features, including dual speaker configuration.
- Ported and refactored audio modules to meet client requirements (Audio SxS project).
- Improved low-level hardware code to match client hardware timing (TAS5421 chip).
- Implemented unit tests for Audio-VuC module, achieving +90% coverage.
- Diagnosed and fixed defects related to mute issues in Head Unit (Radio) and BuB (Low Power mode).
- Developed standalone diagnostic tasks for audio hardware (TAS5421).
- Configured software timers following AUTOSAR standards using DaVinci tools.
- Extended IPC bridge for inter-hardware communication (e.g., speaker gain).
- Configured NVM for persistent audio settings and implemented read/write operations.
- Initialized and configured audio repositories and build systems.
- Enhanced audio routing and fixed bugs.
- Managed SELinux for audio projects for over a year.
- Implemented interfaces and labeling for secure audio module interactions.
- Optimized permissions to enhance project security per client requirements.
- Analyzed and debugged coredumps, providing tested fixes.
- Authored Software Design Documents (SDD) for localization modules.
- Developed initial software architecture (SWA) using Rhapsody and EWM.
- Created UML class and sequence diagrams following SOLID principles.
- Developed a desktop application to simulate CPD use cases.
- Implemented unit testing and integrated CI pipelines via Jenkins.
- Built a machine learning module to detect a child inside a car by recognizing small breathing movements.
- Trained the model to accurately identify child presence using signal data from the CPD module.

TECHNICAL EXPERTISE

- **Primary Skills:** C/C++, STL, SELinux
- **ML Module:** Child Presence Detection (CPD) with real-time performance
- **Operating Systems:** FreeRTOS, Zephyr RTOS
- **AUTOSAR Platforms:** Vector Informatik AUTOSAR, Elektrobit AUTOSAR
- **Debugging Tools:** SWD (St-Link), GDB, Logs (UART/CAN), QXDM (Qualcomm eXtensible Diagnostic Monitor)
- **Microcontrollers (MCUs):** Cortex-M0/M3/M4 (STM32), RISC-V (ESP32)
- **Optimized Low-Level Driver Development:** TAS5421-Q1 22-W Mono Automotive Digital-Audio Amplifier
- **Interfaces:** I2S, I2C, UART, CAN
- **Wireless Communication:** BLE, Wi-Fi, UWB
- **Standards and Protocols:** HTTPS, TCP, UDP
- **Version Control:** Git
- **CI/CD Tools:** Jenkins
- **Development Methods:** Agile, V-Model
- **Project Management:** Jira, Confluence

SOCIAL NETWORKS

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PROGRAMMING LANGUAGES

C/C++

SELinux Policy

Python

Make & CMake

Assembly

Shell

SPEAKING LANGUAGES

English
Professional

German
(Basic)

Dutch
(Basic)

Romanian