Tuna Girişken

Senior Embedded Software Engineer | Embedded Linux

+90 533 646 0969
tunagrskn@gmail.com
tunagrskn
tunagrskn
tunagirisken.com

Summary

Senior Embedded Software Engineer with 5+ years of experience designing and developing safety-critical embedded systems for defense and automotive industries. Expertise in real-time operating systems and real-time Linux (PREEMPT_RT), embedded Linux (Yocto/Buildroot) for multi-core MPUs, and bare-metal firmware for MCU platforms. Developed avionics and embedded software for production aerospace systems at Baykar Technologies and TÜBİTAK SAGE. Deep expertise in Linux kernel development, device drivers, and bootloader customization for high-performance, deterministic, and reliable safety-critical systems. Currently developing end-to-end Telematics Control Unit (TCU) software stack for electric commercial vehicles, covering CAN/J1939 vehicle networks, GNSS positioning, MQTT-based cloud telemetry, and backend data integration.

Technical Skills

Embedded Systems: Bare-metal programming, Real-Time Linux (PREEMPT_RT), Embedded Linux (Yocto, Buildroot), U-Boot, Devicetree, Linux Kernel Module & Driver Development
Programming Languages: C, C++ (98/11/14/17/20), Assembly, Python, Bash/Batch Scripting, QML, SQL
Architectures: ARM Cortex (R5, M4, M33, A53, A55), PowerPC (P4080DS), x86 (Xeon D-1700)
Communication Protocols: CAN/J1939, TCP/UDP, MQTT, I2C, SPI, UART, USB, RS-232/485, MIL-STD-1553
Real-Time Networking: Time-Sensitive Networking (TSN), Precision Time Protocol (IEEE 1588v2)
Development & Debug Tools: GCC, GDB, LLVM, Clang, LLDB, CMake, Meson, Git/GitLab CI, QEMU, OpenSSL, Qt
Documentation & Quality: Doxygen, Sphinx, Uncrustify, Cppcheck, Valgrind, Jira, Confluence
Standards: JSF AV C++, MISRA-C/C++
Languages: Turkish (Native), English (Professional Working Proficiency)

Experience

•Senior Embedded Linux Development Engineer *Dec. 2024 – Current*

Karluna Engineering İzmir, Turkey

- Architected end-to-end Telematics Control Unit (TCU) software stack for light commercial electric vehicles, integrating CAN/SAE J1939 vehicle networks, GNSS positioning, LTE connectivity.
- Enabled fleet management and remote vehicle control through MQTT-based cloud telemetry with mobile and web interfaces.
- Develop a complete Yocto Linux distribution for NXP i.MX93 SoC, creating custom meta-layers for BSP integration, kernel modifications, and secure boot implementation with OTA update support.
- Designed high-performance C++23 telemetry framework using Linux SocketCAN, implementing thread-safe CAN communication with configurable filtering, SAE J1939 protocol stack.
- Integrated Quectel LTE modems (EC2x/EGxx series) using PPP and QMI protocols to provide cellular connectivity for embedded systems.
- Implemented modem control and networking features including AT command interfaces, TCP/IP stack configuration, APN management, network registration handling, and signal quality monitoring.
- Implemented multi-protocol OBD-II diagnostic interface, enabling real-time vehicle health monitoring and diagnostic trouble code (DTC) management.
- Integrated GNSS receiver with NMEA 0183 parser for real-time vehicle positioning, implementing position filtering and geofencing capabilities for fleet tracking.
- Developed MQTT telemetry client using Eclipse Paho MQTT library, implementing bidirectional messaging, configurable QoS levels, automatic reconnection, and offline message queuing optimized for cellular networks.
- Implemented secure command-and-control infrastructure for remote vehicle operations, utilizing certificate-based authentication, encrypted command channels, and comprehensive audit logging.

•Embedded Linux Development Engineer *Dec 2022 – Nov 2024*

Baykar Technologies Istanbul, Turkey

- Developed real-time operating systems for next-generation UAV mission computers, achieving guaranteed response times and deterministic execution for mission-critical flight control and avionics in production aircraft.
- Architected and implemented a security-critical software framework providing a standardized application development environment for RTOS platforms, ensuring full compliance with JSF and MISRA C/C++ coding standards for safety-critical aerospace systems.
- Designed and developed software solutions across diverse embedded architectures, from bare-metal MCU firmware to Linux-based MPU applications, implementing low-level drivers, bootloaders, and hardware abstraction layers for modern multi-core SoC platforms.
- Developed and validated Time-Sensitive Networking (TSN) infrastructure for distributed avionics systems, utilizing Precision Time Protocol (PTP) to achieve sub-microsecond time synchronization and deterministic communication across multiple mission computers.
- Designed and implemented update and test interfaces for avionics computers deployed across multiple operational UAV platforms, streamlining software deployment and validation processes in production environments.
- Implemented embedded security infrastructure utilizing symmetric (AES) and asymmetric (RSA/ECC) cryptographic algorithms to guarantee secure inter-system communication, authentication, and software integrity verification.

•Embedded Software Engineer Intern *Feb 2022 – May 2022*

TÜBİTAK SAGE Ankara, Turkey

– Contributed to build, configuration, and integration of embedded operating systems using ELDK and Yocto.
– Developed an NVMe driver at the bootloader level for VxWorks RTOS.
– Integrated and validated boot-time storage initialization for NVMe devices on missile systems.

•Software Instructor *Mar 2022 – May 2022*

Gazi Culture Art Trade and Tourism Inc. Gaziantep, Turkey

– Instructed C++ programming course at Deneyap Turkey, supported by Gaziantep Metropolitan Municipality and T3 Foundation.
– Covered advanced C++ topics including memory management, RAII, STL, and object-oriented design.

Projects

•NXP P4080DS Custom Linux Distribution and NVMe Driver Development

Yocto-based BSP with NVMe PCIe driver achieving 2.8 GB/s throughput

– Built production-ready Yocto BSP for PowerPC P4080DS platform with U-Boot and SPL optimizations.
– Developed and integrated bootloader-level NVMe PCIe driver with DMA support, reducing data transfer latency by 40% for high-speed logging applications.

•TI Sitara AM65x SBL Development

OSPI Flash-based bootloader with secure boot and image encryption

– Developed OSPI Flash-based Secondary Boot Loader (SBL) with memory-mapped XIP, achieving <2 second boot time for embedded Linux-based systems.
– Implemented secure boot chain with encrypted image verification and configured RTOS bootloader peripherals (UART, GPIO, Watchdog, etc.) for system initialization.

Education

•Master of Science in Computer Engineering *2025 – Present*

Ege University İzmir, Turkey

•Bachelor of Engineering in Electrical and Electronics Engineering *2017 – 2022*

Hasan Kalyoncu University (100% English Scholarship) Gaziantep, Turkey

– Degree project: RF-based stepper motor control system with PID control.