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[My Portfolio](#)

Address

19 Area, Wah Cantt, Rawalpindi, Pakistan

TECHNICAL SKILLS:

Embedded Platforms:

Xilinx Zynq-7000, Zynq UltraScale+

Operating Systems:

Embedded Linux (PetaLinux, Yocto,

Buildroot, OpenWrt)

Programming:

C (advanced), Python (scripting,

automation)

Linux Kernel & Driver Development:

- Character device drivers
- AXI DMA (Scatter-Gather mode, MM2S/S2MM)
- SysFS interfaces
- Interrupt handling, memory-mapped I/O

Hardware Interfaces & Protocols:

UART, SPI, I2C, PCIe, Ethernet (1G / 10G,

SFP+)

Build Systems & Tools:

Yocto, Buildroot, PetaLinux, Vivado,

Vitis, Git

Core Expertise:

- Device Tree customization & debugging
- BSP development for custom hardware
- Kernel debugging (dmesg, ftrace, debugfs)
- Hardware-software co-design & integration

Muhammad Ayaz Akhtar

Embedded Linux Developer

Experience

Oct 2022 – Present

EmbedINN Pvt. Ltd

Embedded Linux Developer

- Developed Linux character driver for Xilinx AXI DMA (Scatter-Gather mode) enabling high-throughput PS-PL data streaming
- Designed and customized PetaLinux BSP for Zynq-based platforms, supporting multiple custom peripherals
- Enabled and optimized PCIe communication on Zynq UltraScale+ for reliable high-speed host interfacing
- Built and stabilized 10G SFP+ Ethernet interface, achieving consistent high-bandwidth data transfer
- Created and maintained device tree configurations for custom hardware integration
- Performed kernel debugging, driver validation, and system bring-up on embedded Linux platforms
- Customized and deployed OpenWrt for embedded networking solutions
- Collaborated with FPGA and hardware teams for end-to-end system integration and validation

Sep 2021 – Oct 2022

EmbedINN Pvt. Ltd

Embedded Hardware Developer

- Designed embedded systems using STM32 and Zynq (Eclipse Z7) platforms
- Implemented UART and SPI communication for sensor integration using state machine-based architectures
- Developed inter-MCU communication (UART-UART, SPI-SPI) for reliable data exchange
- Streamed 256K ADC samples from Zynq to ESP32 over UART, with SD card logging
- Integrated Nextion display via UART for real-time user interface
- Developed bare-metal firmware and FPGA designs in Vivado for sensors (BME280, 9DOF IMU) over SPI

Key Projects

High-Speed Data Transfer (AXI DMA)

- Implemented Scatter-Gather DMA driver for efficient PS-PL streaming
- Optimized throughput for real-time data applications

10G Ethernet Communication System

- Developed BSP and configured SFP+ interface on Zynq
- Achieved stable high-speed communication with host systems

OpenWrt on Custom Zynq Platform

- Built and customized OpenWrt image for embedded networking
- Integrated custom drivers and network configurations

Education

2016-2020

International Islamic
University Islamabad

BS in Electrical / Electronics Engineering

CGPA 2.92/4

Final Year Project:

Raspberry Pi-Based Assistive Reader for the Visually Impaired

- Developed a portable assistive system using Raspberry Pi to enable real-time reading of printed text
- Implemented image capture and text-to-speech pipeline to convert printed content into audible output
- Designed to improve accessibility and independent learning for visually impaired users
- Focused on real-time performance and usability in a portable environment