Principal Architect Engine Pipeline

Company Information

- **Company:** CÔNG TY TNHH MOTOROLA SOLUTIONS VIETNAM R&D CENTER
- **Website:** https://www.motorolasolutions.com/en_us.html
- **Address:** L07.01, Tầng 07, Tháp A, Số 15, Đường Trần Bạch Đằng, Phường An Khánh, Thành phố Hồ Chí Minh, Việt Nam

Company Overview Motorola Solutions is a global leader in public safety and enterprise security. Our R&D Center in Vietnam is a strategic AI Hub. We are building a unified, high-performance software foundation that powers Intelligent Edge Devices—from smart cameras to dedicated AI box processors—bringing server-class intelligence to the edge.

Job Description We are seeking a Principal Architect to define and own the architecture of our Unified Edge AI Engine. In this role, you will design the software backbone that orchestrates the entire lifecycle of video analytics on embedded hardware. You will act as the bridge between Systems Engineering and AI Research. Your mission is to build a modular, graph-based execution engine that balances massive data throughput with limited compute resources, enabling advanced AI models (optimized via quantization/pruning) to run in real-time across diverse hardware platforms.

Scope of Responsibilities/Expectations

- **Pipeline Engine Architecture:** Architect a modular, high-throughput Video & AI Pipeline Engine. Design the framework for dynamic graph construction (DAG) where AI models, logic nodes, and image processing blocks can be assembled and executed efficiently.
- **Heterogeneous Resource Orchestration:** Design the scheduling logic to balance workloads across CPU, GPU, DSP, and NPU. Manage critical system bottlenecks such as PCIe Bandwidth, Memory Controllers, etc.
- **AI Model Optimization:** Strong knowledge of techniques to reduce model complexity: Quantization (PTQ/QAT), Weight Pruning, and Knowledge Distillation. Experience integrating these optimized models into C++ runtimes (e.g., TensorRT, SNPE/QNN, OpenVINO).

- **Hardware Intimacy:** Deep understanding of SoC architectures (Qualcomm, Ambarella, NVIDIA). Ability to analyze how Cache Coherency, Bus Arbitration, and Memory Controllers impact AI performance.
- **Profiling & Analysis:** Expert ability to use system profilers (e.g., Perf, eBPF, Nsight Systems) to visualize the "Critical Path" of the pipeline and optimize instruction-level performance.
- **Pipeline Frameworks:** Experience designing or heavily customizing media pipelines (similar to GStreamer, MediaPipe, or DeepStream).

Basic Qualifications

- **Education:** Bachelor's Degree or higher in Embedded AI, Computer Science, Computer Engineering, or related technical fields.
- **Experience:**
    - 10+ years of industry experience in Embedded Software Architecture or High-Performance Computing.
    - Proven track record of designing complex software engines for Video Processing, Computer Vision, or Autonomous Systems.
    - Experience acting as a System Architect, making critical decisions on resource allocation, memory management, and hardware selection.
    - Mastery of Modern C++ (14/17/20) and architectural patterns for high-concurrency, real-time systems. Deep understanding of Producer-Consumer models, Lock-free queues, and multi-threaded synchronization.

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