

Proposed subjects/areas:

1. LLVM Compiler Backend for GPUs

LLVM is the main compiler tool used in the company. The purpose of this task is to further optimize the backend of LLVM and perform various link-time optimizations (LTO). The underlying architecture will be based on Nema GPU, the new programmable, multicore GPU of the company.

Skills required: compiler background, computer architecture, basic knowledge of compiler optimizations.

2. Adaptive Management of Nema Display Controller based on Frame Rate

Nema display controller is a multi-layer display controller developed by Think Silicon. As part of this project, it is requested dynamically modify the generation of frames (output of Nema|DC) and software calls when the application dictates a constant frame rate.

Skills required: OS background, basic knowledge of OS drivers and firmware.

3. Framework for On-Chip Debug Hardware

The purpose of this project is to build a framework for on-chip debug hardware (JTAG/UART etc). The framework will be applied to Nema GPUs and it should be able to insert HW breakpoints to monitor and visualize the current GPU execution state.

Skills required: good knowledge HDL/Verilog.

4. Building and Evaluating Image/Vision Processing Algorithms in Nema GPUs

Nema GPUs are ultra low power, multicore and multithreaded GPUs for IoT (Internet of Things) and wearable devices. In this project, you are requested to evaluate the performance of a multicore version of Nema GPUs in image processing algorithms. Prime candidates are JPEG codecs and lens correction algorithms.

Skills required: C/C++ programming, understanding of image processing algorithms.

5. Build the OpenVG API for Nema GPUs

OpenVG is a vector graphics processing API officially maintained by the Khronos group (<https://www.khronos.org/>). The purpose of this task is to port the OpenVG API to Nema GPUs of Think Silicon. This requires to fully understand the C code of OpenVG and write vertex and fragment shaders that will be accelerated in Nema GPUs.

Skills required: Very good background in C/C++ and graphics programming

6. Build Sample Games for NemaGFX Library

NemaGFX is a low level software graphics library developed by Think Silicon (<http://think->

silicon.com/products/software/nemagfx-api/). The purpose of this project is to develop simple and interactive games based on NemaGFX API.

Skills required: Very good background in C/C++ and graphics programming

7. Port of Android Wear to Zynq SoC-based FPGAs

Android-Wear is a special version of Android OS customized for wearable devices. As part of this project, you are requested to port the Android-Wear in the Zynq (programmable logic + dual ARM processor as hard core) FPGA platforms.

Skills required: OS background, basic knowledge of OS drivers and firmware.

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