

GRADUATE THESIS PROPOSAL



IMPLEMENTATION OF REAL-TIME ANDROID SYSTEMS FOR INDUSTRIAL APPLICATIONS

Android operating system is getting a certain amount of popularity in the industrial world, even if originally it is has not been designed for this market segment.

The goal of the thesis is to address this issue by:

- evaluating the applicability of the Android operating system 4.x to embedded systems designed for industrial applications, where both HMI (human machine interface) and supervising/controlling functionalities are required
- implementing such a system on a real platform
- measuring system performances in terms of stability and real-time responsiveness.

The hardware platform that will be used is based on Xilinx Zynq 7000 system-on-chip (SoC). This component integrates dual-core ARM Cortex A9 CPU and Artix-7 FPGA, providing a great flexibility and a high integration at the same time.

Main issues the graduating student will face are:

- implementing – at application level – real-time control algorithms by exploiting linux kernel extensions (for instance PREEMPT_RT patch, Xenomai etc.)
- implementing in FPGA peripherals and communication interfaces that are commonly used in the industrial world (for example Profibus data link layer, EtherCAT slave controller, stepper motor controller etc.)
- developing managing software of such modules (both at application and device driver level).

Keywords: real-time, RTOS, Android, field-bus, FPGA.

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