A RISC-V Based Virtual Prototype with an Integrated Hardware-in-the-Loop Radar

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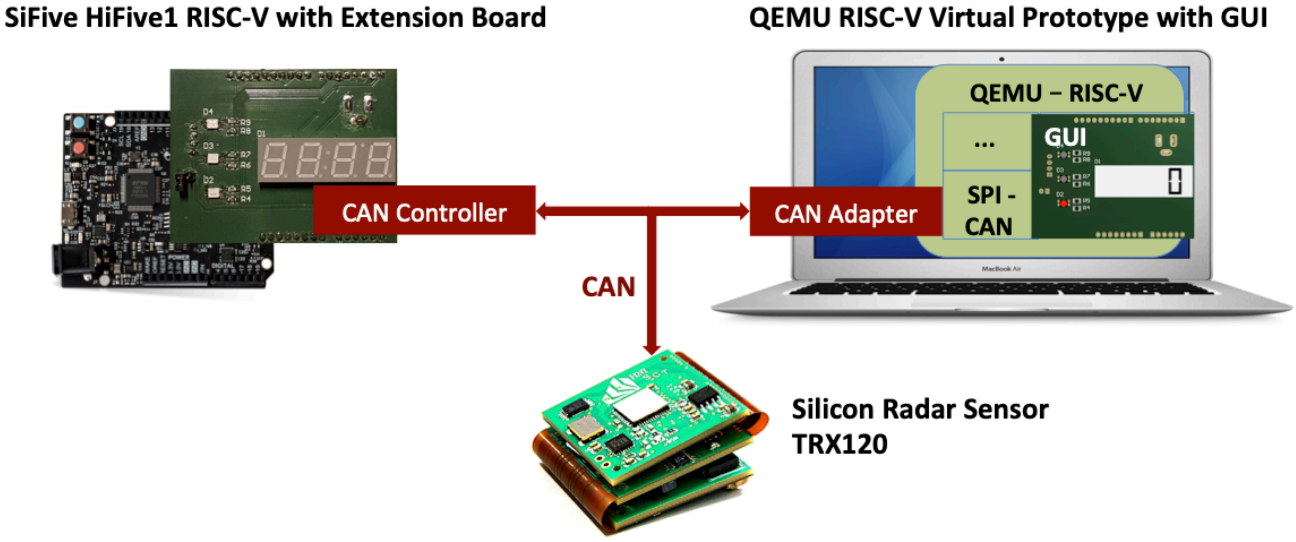
Our demonstration shows a small radar sensor in interactive communication with a RISC-V processor board and a RISC-V Virtual Prototype (VP) where the VP and the processor concurrently execute exactly the same target compiled software without a visible difference in reaction time. This demonstrates that widely available open source based virtual prototyping environments provide an adequate, stable, and efficient framework for the analysis of such embedded applications.



Joint Hardware and Virtual Prototype Setup

The demonstration integrates our in-house developed 120GHz radar sensor via CAN bus with the SiFive RISC-V HiFive1 development board and our QEMU based VP. For the HiFive1 integration, we developed an Ardunio compliant extension board with an SPI-CAN adapter and a display. For the VP integration, we implemented the same components as QEMU QOM hardware models. Though the VP is executed in a linux based VirtualBox virtual machine on top of an additional host operating system, the impact of both is not visible in this setup.

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