**RISC-V and Machine Learning Accelerators Hackathon – Enhancing Undergraduate Students’ Perceptions of Essential Chip Design Skills**

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The demand for chip design skills has never been as high as it is today. While semiconductor companies struggle to hire skilled students and engineers, the design complexity of VLSI (very large-scale integration) systems is continuously growing. Such technological challenges might introduce an entry barrier that prevents many students from expanding their VLSI knowledge and design skills. Furthermore, it has become even more challenging to attract students to this field because of competition from new emerging domains such as data sciences, cyber and mobile applications.

In this paper we present a novel hackathon that aims to intensify undergraduate students’ insight of digital hardware design skills along with discussing its broader contexts in machine learning computational acceleration. The hackathon theme introduced a design challenge of a machine learning accelerator in conjunction with a RISC-V microprocessor on an FPGA (field-programmable gate array) platform. The hackathon offered the participants a learning environment where they could practice, collaborate with teammates, share innovative ideas, and enhance their soft skills without any formal educational supervision.

As part of the hackathon, an FPGA board was provided to each participant with a reference design as a baseline for the challenge. In addition, a training workshop was conducted which included basic training in operating the FPGA board, designing in Verilog, running the software toolchain, and machine learning basics. All the necessary tools, training workshop recordings, and reference materials were provided online to all hackathon participants.

Through the analysis of the hackathon data, which was performed as a part of this study, we examined students’ perceptions of the required skills prior to the hackathon challenge as well as following 24 hours afterwards. A total of 30 students, ranging from junior to senior years of study in the electrical and computer engineering department at the faculty of engineering, answered open questionnaires before and after the event. In addition, students were asked to point out any significant change in their perceptions following participation in the hackathon. Quantitative and qualitative data extracted from the questionnaires was validated, processed, analyzed, and categorized by educational experts in the field of engineering. According to our findings, while technical know-how and persistence skills were considered as essential before and after the event, students testified that the event intensified the importance of additional skills such as team collaboration, system-level thinking, and hardware-software integration perspective.

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