OpenCL implementation of an adaptive disruption predictor based on a probabilistic Venn classifier

Disruption prediction in fusion devices (JET)

The challenge
- Response time < 1ms
- Implementation using OpenCL for the ARM processor and for the FPGA
- Implementation of OpenCL Board Support Package including an ADC

The solution
- Embedded FPGA-based architecture using a SoC (Cyclone V)
- Implementation of the prediction model in a GPU to shorten the execution time using OpenCL

Use of an standalone system with a System On Chip (ARM+FPGA) Implemented using OpenCL

FPGA OpenCL implementation

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ADC

SoC
ARM+FPGA

Alarm

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Initial MATLAB algorithm with the Venn Probabilistic Classifier

System architecture solution
- Using a SoC (Cyclone V)
- A Linux host

Implementation of the Board Support Package for OpenCL

Results: Execution Time

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