FPGAs for Biomedical Applications

Promotor

Bruno da Silva ✉ Bruno.da.silva@vub.be

Research Lab

ETRO

Context

In the last year our research group has develop an open source educational kit based on photoplethysmography (PPG) called PPG EduKit [1]. The PPG technology is the same that you can find in pulse oximeters or smartwatches, and allow to retrieve your heart rate or your blood oxygen level among others. The algorithms to retrieve these physiological parameters are running on microcontrollers or multicore devices using the PPG Edukit, which is basically an Arduino shield.

Research activities and goals

The goal of this thesis is to perform these computations on an FPGA. The Pynq board is a perfect platform for that since it is compatible with Arduino shields, it has a framework which uses Python while includes a system-on-chip FPGA as a main core. The goal of this project is to adapt the existing code [3] to run on the FPGA, or at least, be integrated in the Python framework.

References and further reading

[1] Solé Morillo, Ángel, et al. "PPG EduKit: An Adjustable Photoplethysmography Evaluation System for Educational Activities." Sensors 22.4 (2022): 1389.
[2] http://www.pynq.io/
[3] https://gitlab.com/etrovub/wearables/publications/PPG-EduKit