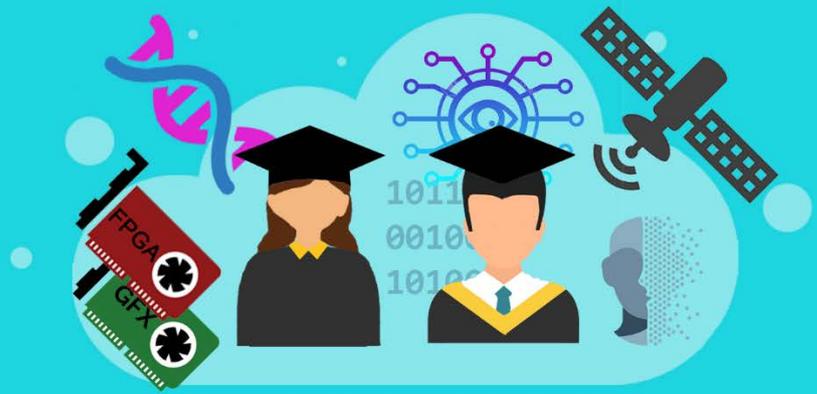


# Diploma Thesis

Microprocessors and  
Digital Systems  
Laboratory



## Framework Design & Applications for Heterogeneous VPUs

**The** end of Dennard Scaling and miniaturization improvements has led the industry and research to explore new avenues to cope with [the increasingly complex](#) new algorithms and applications, like AI. One of the most prominent ways to achieve this is through the introduction of [Heterogeneous Computing](#).

[Vision Processing Units](#) or **VPUs** is a new category of specialised and highly heterogeneous many-core processors, both in computational units and in memory, that offer very high performance in a small power envelope. Intel/Movidius [Myriad 2](#) & [Myriad X](#) VPUs are some of the best representatives of this category offering 50x increased performance/Watt improvement over traditional CPUs. Leveraging the capabilities of such devices is not an easy task though and requires significant effort from the developer's side as well as in depth knowledge of the underlying hardware.

In an effort to, smoothen the learning curve and increase programmability, microlab is developing a framework named **ParalIOS**. The goal of this framework is to achieve the aforementioned features, while also maintaining high performance and allowing low level optimisations.

The **goal of this diploma thesis** is to improve the design of the Framework and expand it by adding support for more Computational Units like Hardware Accelerators. In addition, the framework will be evaluated using state of the art algorithms and real-life applications.

### Keywords

VPU, Heterogeneous Computing, Framework Design, Parallel Programming, Embedded Systems, Applications.

### Prerequisites

- Good knowledge of C/C++
- Good knowledge of Computer Architecture
- Experience with parallel programming and Operating Systems is a plus.

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