

# Design Validation for Data-Intensive Embedded Systems

**Scope and goal** Data intensive applications are widely present in fields like multimedia, where image and video processing often plays an important role. Implementing such applications on a chip, e.g. in a mobile device, involves specific constraints for high-quality products. Examples of constraints are minimizing memory and energy consumption, and optimizing temporal performances. Beyond these aspects, the functionality correctness of applications must be also guaranteed.

A solution to deal with the design of embedded data intensive applications consists in using model-based approaches. Typically, automata can be used to characterize the periodic temporal behavior of these applications. Then, automata based reasoning may be applicable to the resulting models in order to (formally) deal with the mentioned constraints.

The goal of this internship is to consider existing results about automata and synchronous approach in order to address validation issues during the design of data intensive embedded systems, as found in multimedia domain.

**Prerequisite** multimedia applications, automata, formal methods, embedded systems, synchronous approach, hardware-software co-design

## Location

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## Related literature

- Adolf Abdallah, Abdoulaye Gamatié And Jean-Luc Dekeyser ” *Model-Driven Design of Embedded Multimedia Applications on SoCs*”, 12th Euromicro Conference on Digital System Design (DSD'2009), Patras, Greece, August 2009
- Albert Cohen, Marc Duranton, Christine Eisenbeis, Claire Pagetti, Florence Plateau et Marc Pouzet ” *N-Synchronous Kahn Networks: a Relaxed Model of Synchrony for Real-Time Systems*” ACM International Conference on Principles of Programming Languages (POPL'06), Charleston, South Carolina, USA, January 2006
- Roberto Lublinerman and Stavros Tripakis ” *Modular Code Generation from Triggered and Timed Block Diagrams*” Real-Time and Embedded Technology and Applications Symposium (RTAS'08)