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Institut d'Electronique, de Microélectronique et de Nanotechnologie

UMR CNRS 8520

Master and Engineer Internship: 2018-2019

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Research group: Microelec Si

Title: *Smart sensing for healthcare*: Hardware demonstration of patient monitoring using "data fusion"

Abstract:

The concept of "data fusion" is to use information from different sensors (microphone, video sensor, temperature sensor, humidity sensor, etc.) to determine a context. For example, one can imagine using information from a couple of biomedical sensors such as ECG, body temperature or sweat sensors to monitor the condition of a patient. The technical objective of the project is to process data from different types of sensors and aggregate the results using machine learning.

However, using embedded sensors that communicate data to be processed in the cloud is power consuming, especially for the wireless communication part. The near-sensor computing paradigm pushes the intelligence towards the sensors, while considerably reducing the overhead in terms of communication. In fact, only meaningful information is transmitted instead of raw data. The embedded signal processing and decision-making process should then be very compact and energy-efficient. Eventually, in few years, the complete system will be integrated into advanced CMOS chips. The objective of the internship is to consolidate an architecture suitable for further integration, at the sensor level and the aggregator level, and to build a demonstration platform for a biomedical "data fusion" application. Depending on the results, the project could continue as a Ph.D., targeting CMOS integration.