COMPUTER AND CONTROL ENGINEERING

New computational paradigms for neuromorphic HW

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Context of the research activity	Design of a framework for supporting the development of new computational paradigms capable of exploiting neuromorphic hardware architectures
Objectives	Although initially intended for brain simulations, the adoption of the emerging neuromorphic hardware architectures is also appealing in fields such as IoT edge devices, high-performance computing, and robotics. It has been proved that neuromorphic platforms provide better scalability than traditional multi-core architectures and are well suitable for the class of problems that require massive parallelism as well as the exchange of small messages for which the neuromorphic hardware has a native optimised support. Moreover, since brain-inspired, the neuromorphic technologies are identified from the scientific community as particularly adapt for low power and adaptive applications required to analyse data in real-time. However, the tools currently available in this field are still weak and miss many useful features required to support the spreading of a new neuromorphic-based computational paradigm. The basic idea of this proposal is the definition, and the design of a high-level framework that collects simple neuromorphic models (SNM) designed to performs small general-purpose tasks compatible with the neuromorphic hardware. The SNM framework, once included in a user-friendly EDA tool, can be directly used by most users for describing their complex application that can be then easily executed on a neuromorphic platform.
Skills and competencies for the development of the activity	Master of science degree in electronics engineering, computer engineering, computer science or disciplines related to information technologies.