

Dedicated Hardware devices for pattern matching

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Pattern matching activities are computationally demanding but are not suited to be executed on the architectures of general-purpose processors. Dedicated hardware devices are more and more often designed and realized to introduce new capabilities into complex computational activities. The to-date technology of the "reconfigurable" devices (FPGA) allows to rapidly (and cheaply) designing and prototyping dedicated hardware structures which allow to efficiently solve specific computational tasks. These are the main ideas which have driven the design and the realization of a dedicated FPGA-based board specifically devised to solve the problem of matching strings of characters. This device has been used to evaluate the frequency of occurrence of all the m-peptides (with $m < 7$) in the entire proteomes of yeast, Drosophila and Escherichia coli. The authors will also discuss the way of deploying this tool in other contexts of genomic and proteomic research.