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Virtual and physical cellular machines

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Abstract
Going down below 90 nm, whether CMOS or non-CMOS, the preference of locality in kilo or mega-processor chips is obvious, it means strictly more than just parallel. In these domains, the circuit models of the cell processors are constrained by the physical parameters. Hence, a Cellular Nonlinear dynamic Network (CNN) is a reasonably good model. The CNN Universal Machine, and its extension, the Cellular Wave Computer, provides for a stored programmable array computer with elementary spatial-temporal instructions (CNN dynamics). In the lecture, we show some properties of such an architecture, including detection mechanisms via an onset of a spatial-temporal chaotic pattern, some biological plausibility, and a way to combine physics and algorithmic elements. The introduction of the map from Virtual Cellular Machines into Physical Cellular Machines provides for a way to design kilo or mega-processor chips with array elementary instructions.