Morphogenesis in Cellular Automata Models of Non-Linear Media

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Abstract: We will demonstrate complex morphogenetic developments, including Turing patterns, exhibited in simple two-dimensional binary-state semi-totalistic cellular automata. We will present a research paradigm and simulation tools for design and studies of biological constructions like colonies of cell and interacting living systems. We will classify basic functions of cell-state transitions which are responsible for high complexity (both morphological and dynamical) and a potential for non-standard computation. We will discuss in details what types of computable systems can be derived from Turing patterns in unconventional computing devices. Finally, we will show to produce complex behavior from specific initial conditions and how to define simple atomic elements which will develop into highly complex populations.

Our project will be formalize biobricks as analogies of CA bricks to design and control specific process. Also an interpretation of formal languages shall be derived.

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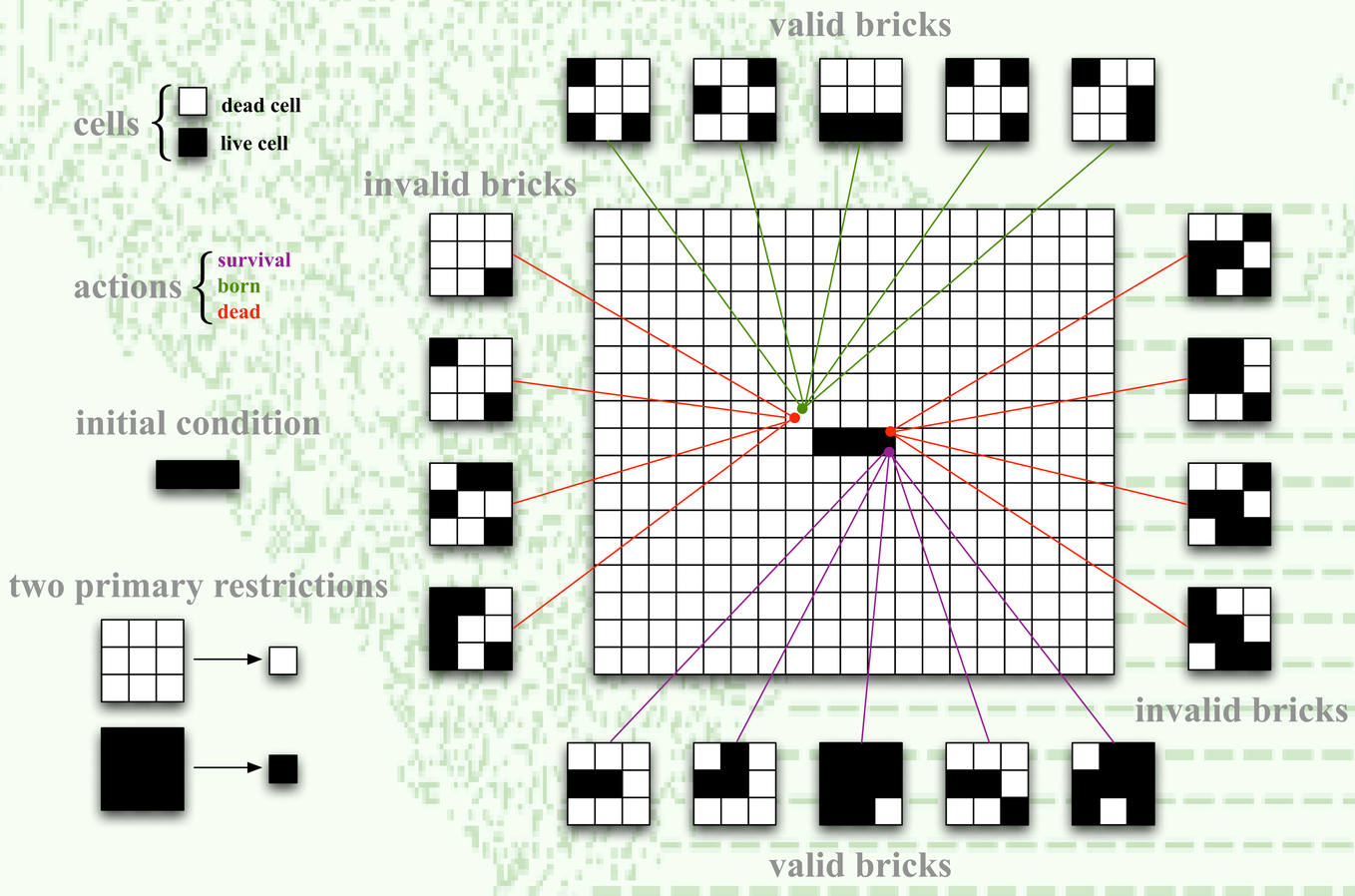
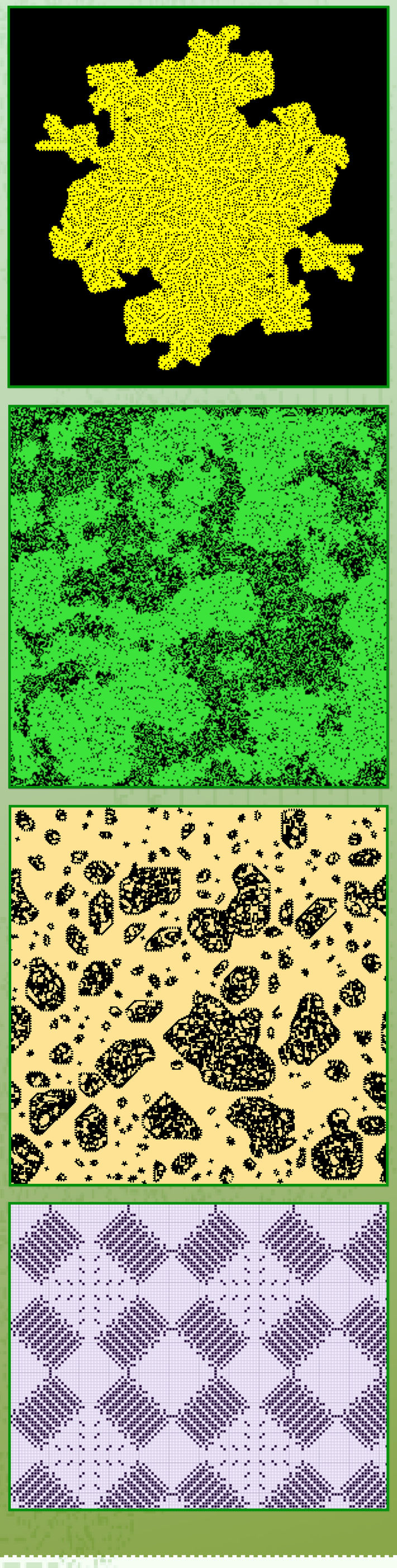
Synthetic construction with CA



Morphogenesis Patterns with Cellular Automata Model



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