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A cellular automata for e-planning sustainable urban forms

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A cellular automata-like model, twinned with interactive intelligent geographical systems, is presented to drive planning process toward sustainable urban forms. The use of algorithms and mathematical approaches for the study of urban forms [1] becomes increasingly useful and sometimes indispensable for the understanding of social, economics, behavioural and spatial urban phenomena, and, when possible, for their guidance toward objectively desired patterns. A vast literature using cellular automata for urban growth processes [2] succeeded earlier cellular automata models of three decades ago [3]. Urban morphogenesis is a critical theme due to the exceptional magnitude and speed of world urbanisation which urge novel models of cities if we want a pleasant life and sustainable growth [4]. Isobenefit Urbanism [4] is a libertarian paternalistic approach whose morphogenetic code induces a particular green/built spatiality and a 15-minute walking city where one can reach within 1km natural land, shops, amenities, services and places of work. It does so by leaving free the actual urban development and growth to follow spontaneous random – or locally desired – patterns of functional locations and density across the urban planimetry liberally driven by market forces and genius loci. The outputs are in fact infinites, though all satisfying the code design objective function which can generate interesting urban environmental, planning and economic impacts [5].

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