Intelligent agent strategies for modeling urban economies

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Abstract. Attempts to model cities using variations on the theme of classical cellular automata (CA) belong to the tradition in which form is given priority over function. It is argued in this paper that whilst CA modeling has some attractions, it is likely to be more fruitful to adopt an intelligent agent modeling strategy. The paper opens by providing a brief review of urban modeling from the twin perspectives of theory construction and computation. The relative paucity of dynamic models is noted and the difficulties associated with various dynamic modeling strategies are highlighted. The properties of classical CA and the shortcomings of urban CA models are discussed. It is argued that what modelers should be engaged in is computer-assisted speculation. Their primary focus should be on theorizing behaviour rather than replicating form. The behaviour in question should be that of agents rather than places. And the behavioural assumptions should be plausible. This last point brings into question the value of the neighbourhood as the primary unit of analysis and, by implication, the utility of a CA approach. An intelligent agent approach has many of the attractions of CA modeling without its most obvious defects. To establish the general attributes of this approach, the paper reviews various attempts to model landscapes populated by intelligent agents. It goes on to map out a general specification for an intelligent agent urban model.