

# Reversing the process of living: Generating ecomorphic environments

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## Abstract

Space syntax has shown itself to be a useful analytic tool, but until now there has been little advance in the application of space syntax to generate environments. While there have been theoretical advances in knowledge about how urban environments come to be constructed, there has been little concentration on how we might build a constructive tool. This paper addresses this shortfall by appealing to the biological theory of autopoiesis. Autopoiesis is the process by which an organism maintains itself within the environment; we might propose autopoietic software agents that similarly maintain themselves within the artificial environment through natural movement. In response, the artificial environment may adapt to the software agent, moving services that the agents may use to more integrated or segregated locations, or by changing the relationship of the local to the global structure of the system in order to achieve intelligibility. Here, several experiments applying these ideas about the structural coupling between agent and environment are demonstrated, showing how environments may be evolved to fulfil the natural movement process of agents. That is, moving towards artificial buildings and cities that are generated as an ecomorphic response to inhabitation, in the hope to both understand better the process of occupation and urbanisation, and to look to the future of building and urban design.

## Keywords

agent-based  
modelling,  
generative design,  
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movement

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