# Simulating Human Behavior in (Un)Built Environments: Using an Actor Profiling Method

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**Abstract :** This paper addresses the shortcomings of architectural computation tools in representing human behavior in built environments, prior to construction and occupancy of those environments. Evaluating whether a design fits the needs of its future users is currently done solely post construction, or is based on the knowledge and intuition of the designer. This issue is of high importance when designing complex buildings such as hospitals, where the quality of treatment as well as patient and staff satisfaction are of major concern. Existing computational pre-occupancy human behavior evaluation methods are geared mainly to test ergonomic issues, such as wheelchair accessibility, emergency egress, etc. As such, they rely on Agent Based Modeling (ABM) techniques, which emphasize the individual user. Yet we know that most human activities are social, and involve a number of actors working together, which ABM methods cannot handle. Therefore, we present an event-based model that manages the interaction between multiple <em>Actors, Spaces, </em>and<em> Activities</em>, to describe dynamically how people use spaces. This approach requires expanding the computational representation of <em>Actors</em> beyond their physical description, to include psychological, social, cultural, and other parameters. The model presented in this paper includes cognitive abilities and rules that describe the response of actors to their physical and social surroundings, based on the actors&rsquo; internal status. The model has been applied in a simulation of hospital wards, and showed adaptability to a wide variety of situated behaviors and interactions.

**Keywords :** agent based modeling, architectural design evaluation, event modeling, human behavior simulation, spatial cognition
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