

# MouseHaus Table

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## ABSTRACT

MouseHaus Table provides a computationally enhanced physical environment to support discussion and decision-making about urban design. It provides a physical interface that enables participants who have no previous computer experience to interact with a pedestrian simulation program. The relation between physical environment and individual pedestrian walking behavior is of interest to urban design and planning researchers. In “The Life and Death of Great American Cities”, Jane Jacobs stressed the importance of paying attention to design details that matter to people [1]. Sociologist William H. Whyte employed quantitative time-lapse filming to study the interaction of pedestrian behavior and the built environment [2]. Bin Jiang used multi-agent simulation techniques to understand pedestrian flow [3]. Keith Still developed VEgAS, Legion, and Myriad to investigate safety issues in crowd dynamics [4].

Interface researchers Hiroshi Ishii and John Underkoffler also explored using physical objects to augment computer simulation and visualization for urban design [5, 6]. MouseHaus Table has two parts: simulation model and physical interface. MouseHaus models individual behavior using autonomous agent technology to simulate pedestrian movement [7]. Each agent has an internal state initialized randomly and a perceived external stimuli affected by the physical environment. Together, the external and internal states generate pedestrian behavior. The associated variables of the external stimuli include the size, type, and location of urban elements such as buildings and parks. The MouseHaus Table physical interface enables the input of dimension and location information into the simulation program. The interface includes a web cam, colored paper, scissors, and a table with projected display. Users first register various colors of paper to represent different land uses or building types. One can cut the colored paper with scissors to decide the sizes of urban elements and place them on the table. The video camera mounted above the table captures the layout and converts it to input for the simulation. The program then projects simulated pedestrian animation on the table. The cumulative patterns of pedestrian flow can be displayed at any time. Users can configure different urban layouts for the simulation model to observe the impact of the built environment on pedestrian movement patterns.

This system also enhances communication among people in a participatory design setting. We conducted several user

studies. Two groups of five people performed the same tasks with both standard mouse input and paper and scissors input. We found that people had more conversation and negotiation during the paper and scissor sessions than the mouse sessions. They felt that they could more easily interact with the computer simulation using paper and scissors. Architecture and urban design and planning faculty members also gave positive feedback about the system. They recommended that the system be used in a site planning studio or a methodology class.

We plan to extend MouseHaus Table to support importing street maps from government databases as an underlay and to record preferred changes in a discussion for comparison. We are also adding physical inputs to control additional urban environment variables.

## REFERENCES

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