

Handling obstacles in pedestrian simulations: Models and optimization

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Abstract: In this talk we discuss advantages and drawbacks of existing techniques for handling obstacles in pedestrian models and we propose a new method to include obstacles in numerical simulations. The proposed technique guarantees both *impermeability* (pedestrians do not enter obstacles) and *real-like behaviour* (pedestrians are not repulsed by the walls or look through them).

Once the crowd prediction model is defined, we present a parametric obstacle design tool, which allows to evaluate a number of possible design alternatives.

Finally, we introduce a novel shape optimization framework to identify the most convenient distribution of free-shaped objects inside a room, in order to guide the crowd towards a desired target or behaviour. More precisely, the goal is to evacuate people using all the available exits, thus avoiding congestion, without communicating with people or using ad hoc signals.

The results of our simulations suggest improved design solutions particularly suitable for panic behaviour, i.e. for those situations in which people act instinctively and are not prone to follow authority’s directives.

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