Computer Models For Fire and Smoke

Model Name: EvacSim

Version: 3.11

Date: 4 Feb 2014

Model Actively Supported?: No

Classification:	Egress
Very Short Description:	Research-driven Model incorporating microscopic multi-agent free space pedestrian simulation and macroscopic network flow graph models. Multiple hierarchical levels of graph detail combined with scalable high-detail, validated pedestrian agents for scalable simulation of multiple potential future states of emergency evacuation.
Modeler(s), Organization(s):	Seán Óg Murphy, Mobile & Internet Systems Laboratory, University College Cork, Cork, Ireland
User's Guide:	-
Technical References:	Sean Og Murphy, Kenneth N. Brown, Cormac J. Sreenan "Problem decomposition for evacuation simulation using network flow" *DS_RT 2012*, Proceedings of the 16th IEEE/ACM International Symposium on Distributed Simulation and Real Time Applications, Dublin, October, 2012, pp101--108. Sean Og Murphy, Kenneth N. Brown, Cormac J. Sreenan "Predictive Simulation & Evacuation Monitoring in Wireless Sensor Networks" *AICS 2011*: Proceedings 22nd Irish Conference on Artificial Intelligence and Cognitive Science, August 2011.

Availability: By request

Price: -

Necessary Hardware: PC

Computer Language: Java

Size: 1.57MB

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Detailed Description: EvacSim is a microscopic pedestrian evacuation simulation tool developed in Java, designed for experimental simulation techniques, development of pedestrian simulation models, and ultimately for real-time decision support for evacuation planning and prediction. The goals of EvacSim are to allow for faster-than-realtime simulation of evacuations while using a detailed, high-fidelity simulation model; these two opposing goals result in a simulation design inspired by flocking techniques that keeps moment-to-moment computation low and maintains simulation accuracy in aggregate.

EvacSim algorithmically generates building graph topologies from 2D geometry and creates network flow graphs from these with micro-macro coupling used to establish accurate flow characteristics that reflect the motion characteristics of microscopic agents through spaces. The flow graph is used for dynamic, congestion-aware evacuation planning which accounts for hazard location and spread, and is also exploited for scalable decomposition of simulation space, allowing for multiple candidate future states of the evacuation to be simulated in short time-frames.