

Modelling and Simulation of Pedestrian Emergency Evacuation Dynamics

João Emílio Almeida ^{1,*}, Rosaldo J F Rossetti, ¹, António Leça Coelho ²

¹ LIACC - Laboratory of Artificial Intelligence and Computer Science

¹ FEUP - Faculty of Engineering, University of Porto

² LNEC - Laboratório Nacional de Engenharia Civil

*joao.emilio.almeida@fe.up.pt

Abstract

Pedestrian dynamics in emergency situations has become increasingly important and got the attention of both researchers and practitioners [1]. Various attempts have been made to model the behaviour of crowds in emergency situations for the validation of buildings and public environments in general. In the last decade a lot of effort was taken to enhance models and simulators. Different social simulation models exist and are used, such as the Social Forces and Magnetic Models, among others. Meanwhile, data for the validation of such models is scarce, due to the amount of time and means needed. Fire drills are a possible approach but hardly recreating the truly panic conditions, and people tend to take them not seriously.

To overcome the aforementioned issues, Serious Games (SG) have a set of features that might overcome this problem. SG offer engagement to their players and provide training to real life situations. The proposed approach consists in recreating a fire drill in a 3D environment using SG. Another goal is to collect data for later analysis. This data is of a great value, to help the validation and verification (V&V) process of existing or new emergency pedestrian simulators, as well as for the calibration of such models.

Preliminary work has led to the development of a prototype using Unity3D game engine [2], that can be used as a virtual fire drill training tool, but also as a collective behaviour analysis instrument that might give better insight into social aspects and interactions involved whenever crowds are forced to evacuate under elevated anguish and emotional distress.

Keywords: Modelling and Simulation, Emergency Planning, Fire Drills, Pedestrian Dynamics, Serious Games.

References

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