A framework to simulate the evacuation of a crowd in emergency situations

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Abstract

This paper describes a model for simulating crowds in real time. We deal with the hierarchy of the crowd, groups and individuals. The groups are the most complex structure that can be controlled in different degrees of autonomy. The autonomy means that the virtual agents are independent of the user intervention. Depending on the complexity of the simulation, some simple behaviors can be sufficient to simulate crowds. Otherwise, more complicated behaviors rules can be necessary in order to improve the realism of the animation. We present two different ways for controlling crowd behaviors: - by defining behavior rules, to give intelligence to the agent. By providing an external control to guide crowd behaviors, this control is done by the user or by an autonomous agent called the guide. The main contribution of our approach is to combine these two ways of behaviors (autonomous, guide) in order to simulate the evacuation of a crowd in emergency situations. Many strategies of evacuation have been implemented and we will demonstrate that in most situations, the guided method decrease the average escape time and increase the chance of survival in emergency situation.

Keywords Crowd model- behavioural animation- autonomous agent- evacuation simulation.

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