A Cellular Automata based Electronic System to Study and Optimize Crowd Behavior in Airport Areas

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At the airports, everything must work with remarkable precision and coordination, especially since their operational processes involve managing a large number of moving human groups in order to minimize waiting and service times of individuals, as well as to eliminate phenomena resulting from the interaction of a large crowds, such as crowding and congestion around points of interest. The aim of the study is the development of an integrated automated simulation model for human behavior and traffic in the spaces of an airport. Thus, the model simulates the behavior of the human crowd in different operational areas of an airport. The area of the airport is divided into levels that are characterized by differences in the way that people move within. A fully analytical model based on the computational tool of the Cellular Automata (CA) was realised as well as an obstacle avoidance algorithm that is based on the A star (A*) algorithm. According to its structure, the model is microscopic and discrete in space and time. Its prominent feature is that the crowd consists of separate, autonomous or non-autonomous entities rather than a mass. During the simulation, the developer is given the opportunity to assign to each entity unique features that affect the person's behavior in the different areas of the airport terminal.

Keywords: Crowd modelling, Cellular Automata, Airport, A* algorithm, Simulation.