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Editorial for Volume 7 Number 2: Simulation human stampedes to improve decision making in Humanitarian Logistics

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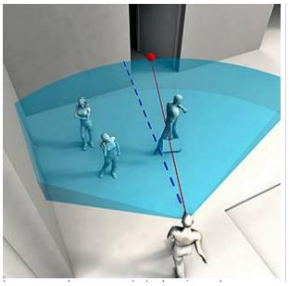
Human stampedes occur most frequently during religious or musical pilgrimages and professional sporting events, as these tend to agglomerate to a large number of people. Also occur in moments of panic (e.g. as a result of a fire or explosion) when people try to escape. However, the most common causes are because the crowd trying to reach something like in the above examples, because the crowd is so great that those behind to continue not to push forward knowing that the front are being crushed. Deaths from stampedes occur mainly due to asphyxia by compression and not by trampling. This is what is known as crushing crowd, or just crush (in some media, avalanche). The compressive force is produced in both the horizontal and vertical thrust stack. After studying video pedestrian patterns, behavioural scientists concentrated on the rules that people are accustomed to using in their daily lives and transform them into heuristic formulas. Simulating crowded places helps architects to design safe public spaces. However, until now, they ignored everyday human behaviour when walking, or stop talking like going to tie his shoelaces, which implies greater complexity. By ignoring this, it dehumanizes people and are considered as static particles that react to formulas such as how long it takes to get from one place to another.

That is why we must use multi-agent systems dynamics coupled with the crowds and how our brain works. So we start from the idea of how baseball players catch the ball in their first games and how to improve with time. The model specifies that the brain does not process complex equations to achieve, but develops small synapses based on experience. Some of found patterns were that simple interactions in a hallway, people in a hostile environment is aligned it so that the ability to regulate the speed and distance so that cumulatively the increase the number of real people when occurs bottlenecks are created is lost that in emergency exit prevent it. The relevance of this research is that it had never created a behavioural model of the dynamics of the crowds from empirical observation so this simulation will help prevent crisis scenarios.

Using Parallel Computing (CUDA) and Multiagent Systems a stampede and side effects of group of individuals trying to survive is modeled, the modeling will reveal risk situations in religious sites (stampedes in Arabi Saudi), shipwrecks that need support emergency by NGOs or Red Crus or even to simulate risk situations in sunk ships at risk of capsizing, an important situation is that sociocultural aspects, age, physical and anthropometric status were considered (including phenotype and body mass) .



People walking at denostrate their behavior based on visual information, the brain considers the distance and obstacles so that you can adapt your speed and way forward.

The Multi-Agent Systems (MAS) theory is one of the new approaches in artificial intelligence and their areas of research and development with an increased activity (Wooldridge, 2009). Despite the popularity of the term agent in technical and popular literature, there is no general agreement on the precise definition of agent. Some dictionaries refer generically to an agent as "one who acts or has the power or authority to act ... or represent other ". An alternative definition is broader: "What works or exercises action as opposed to a patient, who suffers it" (Merani, 1976). In this definition, the proactive and autonomous agents are emphasized (Soto, 2004). Agent technology allows more effectively address the construction of more complex intelligent systems applied to a wide variety of areas. An intelligent agent is an entity that perceives and acts on an environment. An agent is autonomous, proactive and social. Typically agents are developed independently but as entities that constitute a system, which is called Multi-Agent System. Communication protocols between agents are the rules an agent use to communicate with others in a coherent manner. Protocols allow to structure interactions in a standard way, and also have the advantage of carrying a modular agent design, as they allow separating the internal design from the communication interface design.

Intelligent Agents features:

- They have sensors to perceive their environment.
- They have actuators through which they perform actions.
- Must be able to negotiate with other agents in their environment.
- Its nature is dynamic.
- They are interactive (actions can be initiated by the agent, the system or the user).
- Are flexible, an agent is:
    - Reactive: Able to respond to changes in the environment in which it is located.
    - Proactive: Must be able to try to fulfill his own plans.
    - Social: Must be able to communicate with other agents through an agent communication language.
- They are persistent (they does not run one time or expect to be called).
- They are independent and autonomous.
- They are concurrent (working in parallel).
- They can have mobility, can interact and move to other platforms, environments physically and logically different?.
- Security.
- Reliability.

Multi-Agent Systems (MAS) apply an interesting variety of sciences and techniques from computer science:

- Object Orientation:
    - System structure.
    - Assignment of responsibilities.
- Expert systems:
    - Behavioral definition.
    - Knowledge representation.
- Distributed Artificial Intelligence:
    - Organization.
    - Communication of knowledge.
    - Coordination.