**CD++ Model Data Form**

Title: Reactive Agents

Type:

Acronym/Short name: RA

Purpose for which Developed: to model, simulate, and verify the behavior of a flexible agent that moves based on its level of comfort in each cell to exhibit the behavior of an agent that reacts to environmental situations or important game events.

Other Applications for which it is Suitable: Any behavior of entities that need to move to all eight cardinal and ordinal directions following some rules.

Date Developed/Implemented: 23-NOV-2020

Domain: Game Environments

Current Version: 1.0

URL:

Description (including characteristics): The core idea of this concept is derived from the “*Combining Influence Maps and Cellular Automata for Reactive Game Agents*” article by *Penelope Sweetser* and *Janet Wiles.*

Our model derives from the concept of this article and presents a simplified model of reactive agents using CD++. In our model, the game terrain is represented by a W x W cell grid, where W is the system size. Each cell in the system has a predefined value that represents what kind of terrain it is. We define 4 different cell types (Lava, Heated, Warm, and Normal) and a human agent that can occupy these cells.

Each cell value represents the *level of comfort* an agent feels when standing atop that cell. The level of comfort decreases as cell values increase. Agents start anywhere in the terrain and try to cross the terrain from left to right without colliding with any other agent in the system. While having this right-moving behavior, they always consider their current level of comfort and may move in opposite directions or take turnarounds if necessary to be as comfortable as possible.

Links to Related Documents (External Paper)

Short Title: Combining Influence Maps and Cellular Automata for Reactive Game Agents.

URL: https://link.springer.com/chapter/10.1007/11508069\_68

Description: This paper presents an agent design which combines cellular automata for environmental modeling with influence maps for agent decision-making. The agents were implemented into a 3D game environment, the EmerGEnT system, and tuned through three experiments. The result is simple, flexible game agents that are able to respond to natural phenomena (e.g. rain or fire), while pursuing a goal.

Keywords: Game Environments, Reactive Agents, Cellular Automata, Cell-DEVS, Environmental Modeling

Developer:

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Comments: This model works, it`s ok