Testing the Effects of Memory Structures and Recall on Non Playable Characters in Unity3D

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Abstract

In most games today there is some sort of artificial intelligence involved. Some of these artificial intelligent Non-Playable Characters (NPCs) require memory structures to store locations of objects in their virtual environment. The type of memory structure used will depend on the game. Along with memory structures, recall was used to see the effects on the NPC's performance. An experiment was created to test the effects of memory structures and recall percentages on NPCs. The focus on this experiment was to see how far an NPC travels and how much food it consumes while operating with a certain memory structure and recall percentage. The NPCs randomly travelled in a virtual environment searching for randomly placed food sources. When the NPC got hungry it used its memory structure, to search for a food source and used recall to see if it "remembered" where the food source was. Memory was structured on closest, random, FIFO, or LIFO. Percent recall was 100%, 66%, or 33%. The distance travelled and food eaten were recorded. This experiment was implemented using Unity3D. Both memory structure and recall significantly affected NPC lifetime. Closest, random, and FIFO were better than LIFO. 66% recall was the best. The experiment was designed with respect to AI for NPCs in games.