AI and PCG in Video Games

What is AI?

Artificial Intelligence or AI is defined as a system that can learn. This system does not need to have previous knowledge but just the capacity for it to learn. Once it has the ability to change its reaction or thinking based on taking in information, it is then defined as an intelligent system [1] [2] [3].

What is PCG?

Procedural Content Generation is defined as content that is created automatically by a computer, usually using a set of pre-generated rules [4] [5]. Examples of this are things like level generation in Minecraft that is entirely new each time a level is generated or creatures in Starbound or No Man's Sky being made of random combinations and positions of limbs (Minecraft 2009) (Starbound 2016) (No Man's Sky 2016).

Level Generation PCG

Most work into level generation in games where the landscape can be altered has been procedurally generated as it would take too much time for example to put every block in a map in Minecraft that has chunks of 16x16 [6] and a height of 62 [7] on average which makes for 15872 blocks having to be hand placed (Minecraft 2016). This is not feasible and as such programmers have started using AI and PCG methods of creating worlds. Some do this by using fractal or noise generation of landscapes [8] while others use set of techniques seem to use random tree mapping for designing a playable dungeons [9].

Smart Enemies AI

Smart Enemies also known as Advanced Artificial Intelligence are the modern counterpart to classic AI in video games. Before where creatures would have preprogramed behaviour, now we have games such as Alien: Isolation 2014 where the main antagonist is a creature that learns how the player likes to act and then acts in order to circumvent this. Enemies that learn from their environment and as a result manage to react accordingly is what makes this AI advanced. Even more AI is used in video games but not necessarily as AI enemies, sometimes the advanced AI is in the director. In Left 4 Dead (2008), the director learns to keep track of stress and how the players like to react to certain problems and attempt to make the game harder without making it too stressful for them, making this a smart system [10].

Overall

We believe we don't want the environment fully created by our device but to be edited somewhat such as light flickers and moved furniture. Not only this but we decide to make an AI director for our game that learns what the player is scared of and attempts to cause that to occur more to create our final product.

References

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