How is artificial intelligence used in video games?

Q:

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A:

Artificial intelligence in video games is largely used to determine the behavior of non-player characters (NPCs) in games.

The application of the term “artificial intelligence” might be a misnomer, as many games don’t use true AI techniques. Game developers are usually not AI researchers, and many games use simple predetermined patterns.

A lot of AI in game development goes toward defining the way a computer opponent behaves. Behavior can range from relatively simple patterns in action games all the way to chess programs that can beat champion human players.

Many early video games like Pong (1972) only allowed human opponents to face each other. Though computer-controlled opponents existed from the very beginning in Computer Space (1971).

While human opponents can obviously still be a lot of fun to play against, the video game industry really took off when microprocessors allowed players to square off against more sophisticated and challenging computer opponents.

Space Invaders (1978) provided an early example of the challenge that computer-controlled opponents could bring to a game. As the player shot down the aliens, the game sped up considerably with fewer opponents. This was a side effect of the limitations of the hardware at the time, but Tomohiro Nishikado, the inventor of the game for Taito, left it in because it made the gameplay so exciting.

Even while AI researchers debate whether AI in games is the real thing, game developers have used techniques from AI research to create more challenging opponents. They can examine player behavior and change their responses to make the games more challenging using emergent behavior.

Techniques used in AI game programming include decision trees and pathfinding.

Some AI opponents in first-person shooter games can listen for player movements, look for footprints or even take cover when a human opponent fires on them.

Artificial intelligence has long been used to simulate human players in board games. Computer chess players are the best-known example. Modern chess programs are able to easily beat the best human players. IBM’s Deep Blue computer famously beat Garry Kasparov in 1997.