AI in Video Games

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Overview

History of AI

Types and notable examples

Early AI

Pac-Man, Mario

Advancements and Combinations

Modern AI

Conclusion
Different Types of AI in Video Games

Deterministic

The AI reacts to the player’s inputs and position and responds accordingly

Patternistic

The AI adheres to specific patterns regardless of the player’s inputs and movements

Learning-based system

The AI uses information gained during the course of play time to determine how and when to change its actions
History

First video game: Tennis for Two (1958)

Early examples of Deterministic AI: Pac-Man (1980)


Early examples of Learning-based system AI: Not yet implementable

Recent examples of Deterministic AI: League of Legends (2009), Until Dawn (2015)

Recent examples of Patternistic AI: The Touhou Project (1996-Present), The Binding of Isaac Rebirth (2014)

Recent examples of Learning-based system AI: amiibo (2014), Shadow of Mordor (2014)
AI in Early Video Games

Pac Man

Each ghost tracks down Pac Man in its own way

Blinky (Red ghost): aggressive AI; always takes shortest path to Pac Man

Pinky (Pink ghost): ambush AI; goes ahead of Pac Man to try to ambush him

Inky (Blue ghost): unpredictable AI; randomly changes how he tracks Pac Man

Clyde (Orange ghost): ignorant AI; he just does his own things, seemingly random to the player

The ghosts have three behaviors

Chase: Ghosts track down Pac Man through the entire map

Scatter: Ghosts will move back to their own corner of the map for a few seconds

Frightened: Ghosts enter this mode when Pac Man eats a power pellet, ghosts are vulnerable in this state and can be eaten by Pac Man

Image from: http://www.arcademuseum.com/images/118/118124214343.png
AI in Early Video Games

*Super Mario Bros.* featured a variety of enemies with patternistic AI:

Goombas: Walk back and forth, turning around if they collide with one another or with a wall.

Koopas:

- Green Koopa: Walk forward towards Mario, only turning around if they hit a wall; they will walk off cliffs.
- Red Koopa: Walk forward towards Mario, turning around if they reach a cliff or hit a wall.

Hammer Bros: Throw hammers in an arc as they move back and forth, practically chasing Mario.

Bowser: Shoots fireballs and hammers at Mario and jumps occasionally.

Advancement in AI

Brought multi-obstacle games with smarter and flexible AI.

AI used for NPC, environment.

In big environmental game like GTA V. A bot controls a number of units that will have to navigate in a partially unknown environment, while at the same time avoid each other, search for enemies, and coordinate attacks to fight them down.
Blending the types of AI

As games continued to change, developers implemented multiple types of AI to create new kinds of experiences.

*Kingdom Hearts II* uses “Health Gates” to determine when the enemies change their patterns.

*Metal Gear Solid 2* enemies learn about the situations and either follow a pattern or work together accordingly to solve a problem.

Modern-Day AI

With the advances in technology, artificial intelligence in games has reached a high level of complexity.

The upcoming game *Final Fantasy XV* uses a massive rule-based system to determine the actions of the AI-controlled party members.

The AI can “think as an individual” or “think as a team”

AI analyses the environment to dynamically add or remove facts from its database of facts.

Learning in Video Games

Some games train the AI to perform actions based on the way the player has played, adapting to their playstyle.

Nintendo’s line of Amiibo figures have the ability to learn how to fight after being played against in the game *Super Smash Bros. for Wii U*. An Amiibo almost won a major tournament for *Super Smash Bros.*!

*Shadow of Mordor* boasts the “Nemesis System”, in which the enemies remember the actions of the player (i.e. whether the player killed them or vice versa) and the culture of the enemies as a whole change as a result.

Conclusion

GTA, 2K, and other such games combine rich and complex environments with AI to deliver such a stable and physics-based simulations and gaming experience.

It’s a real time and dynamic, quick and intelligent decision maker for all purposes.

Image from:
http://cdn2-b.examiner.com/sites/default/files/styles/image_content_width/hash/cf/de/cfdea9c12fabb7c8cff9e6a3ef8a07d1.png?itok=YeGvnSPJ