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Introduction to Game AI

Unlocking the Secrets of Intelligent Game Behaviors

DEFINITION

Game AI refers to the techniques used to create responsive, adaptive, and intelligent behaviors in non-player characters (NPCs) within video games.

KEY CONCEPTS

Pathfinding

Pathfinding algorithms help NPCs navigate the game world efficiently, avoiding obstacles.

Finite State Machines

Finite State Machines (FSMs) allow NPCs to switch between different behaviors or states based on conditions.

Decision Trees

Decision trees help NPCs make choices based on a series of conditions, leading to varied outcomes.

Behavior Trees

Behavior trees are hierarchical structures that organize complex behaviors for NPCs in a modular way.

Learning Algorithms

Learning algorithms enable NPCs to adapt their behavior based on player actions or environmental changes.

EXAMPLES

- An NPC uses pathfinding to chase the player while avoiding walls.
- A guard NPC switches from patrolling to alert mode when it sees the player.
- A dragon NPC learns to avoid fire attacks after being hit multiple times.

MEMORY TIPS

- ★ Remember 'P-F-D-B-L' for Pathfinding, Finite State Machines, Decision Trees, Behavior Trees, Learning.
- ★ Visualize a tree for Decision Trees and Behavior Trees to recall their structure.
- ★ Think of NPCs as actors in a play, switching roles based on the script (FSMs).

COMMON MISTAKES

- ✗ Confusing finite state machines with behavior trees.
- ✗ Overcomplicating AI behavior instead of keeping it simple and effective.
- ✗ Neglecting performance optimization in AI algorithms.

QUICK RECAP

Game AI is essential for creating engaging and realistic NPC behaviors. Key concepts include pathfinding, FSMs, and decision-making structures. Understanding these elements helps in designing smarter game characters.