

- Game & AI Case Study - Assassin's Creed Odyssey

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Abstract

This case study is about Assassin's Creed Odyssey, the second RPG entry to the franchise (and 10th mainline entry to the series overall). This game in particular was the start of the developer's (Ubisoft) transition from State Machines to Goal Oriented Action Planning. There is also improved NPC behaviour due to the Action Planning, Procedural Generation and decisions that affect the narrative (decision trees).

1. Introduction

We will be looking at how Ubisoft implemented Action Planning within their games from Assassin's Creed Odyssey and Immortals: Fenyx Rising. This AI method helped streamline development, since it was more modular and easier to add upon than previously used state machines. It also helped with more dynamic world building and mechanics. We will also take a brief look at the Procedural Quest Generation that gives an infinite stream of content within the game. We will end off by looking at the decision trees within the game that affects the family storyline.

2. Background

Assassin's Creed Odyssey is an action-RPG where you play as a Spartan warrior, named Kassandra or Alexios. This game, like all the Assassin's Creed games, takes a historical setting (in this case: Ancient Greece) and tells a fictional story. You meet various historical figures, such as Herodotos, Pythagoras and Sokrates as you explore the vast open-world of Sparta, Athens and the surrounding landscapes and islands.

3. AI Method - Action Planning

Ubisoft's previous method of using vast and cumbersome state machines was starting to become a hindrance - causing more bugs as features were added and preventing developers to focus on innovating with new features (since the constant need to fix bugs with every state that breaks upon adding new features). They needed another, more modular method - enter Goal-Oriented Action Planning [1,2].

Instead of "states" and "sub-states" they would have "planner actions" and converting systems from the State-Machine (SM) Method to the Action Planning (AP) Method was easy, allegedly [1]. This new method made the process of coding new features, testing and bug fixing much easier and often faster - a necessity of an ongoing franchise with the expectation of regular game releases. The increased modularity of the AP Method when compared to the SM Method is the main factor of why this method is now used in other Ubisoft titles as well. For example: Immortals Fenix Rising (and presumably Assassin's Creed: Codename Red).

In addition to reasons relating to production and development, there are also reasons relating to specific in-game features why Ubisoft implemented the AP Method. One of these features is NPC Environmental Interactions [1].

NPC Environmental Interactions



Figure 1: NPC's attacking the player character in Assassin's Creed Odyssey

NPC's and their interactions with the environment acts as an example of how the game's Goal-Oriented Action Planning is utilised. Unlike most Assassin's Creed games, where NPC's aimlessly wander streets and go about with their daily lives, Odyssey implements these ai planner actions to "build the behaviours, the planner data and the enemy archetypes to be as modular as possible." [1] The AI allows for NPC's to interact with the environment such as to pick up items, or even interact with the player and act based on the players actions, either forming rivalries or alliances. "They're passionate little defenders of justice, turning on you if they see you fighting a soldier, killing someone, thieving a horse, or otherwise playing fast and loose with the law." [3]

The environmental objects act as sources within the ai planner's actions. All interactable objects are dubbed as Smart Objects. These Smart Objects are then assembled by the AI, and thus it creates a pool of actions available to an NPC's based on calculations from the "navmesh reachability and distance" [1] of said NPC and object. Examples of these can be seen through Kelly's gameplay experiences in the article "Stupidly Brave NPCs Are One Of Many Reasons It's The Best In The Series". Kelly describes how if the player is fighting a group of bandits in a public setting, and said bandits unexpectedly hit a civilian, "The NPC they hit will sometimes grab a weapon and turn on their attacker, becoming a temporary ally in the battle" [3] or how upon looting a public temple's treasure chest, Kelly found himself "on the receiving end of a flurry of punches" [3] from the NPC priestess praying within.

It is thanks to these action planning methods that enable NPC's within Odyssey to create not only an immersive and interactive environment, but to also develop consequences based on player actions.

4. AI Method - Procedural Generation



Figure 2: Procedurally generated quests on the in-game Message Board

Another way AI is used within Odyssey is through the tracking of player's actions, choices, and playstyle over time to create a profile of the player's preferences, creating a unique and immersive experience tailored to how you play.

“AI-based player profiling collects and analyses data about a player’s behaviour within a game.” [4] In Odyssey, such examples could be, combat, exploration, or stealth etc, and tailor generated content accordingly. By monitoring player behaviour, AI can infer the player’s preferred activities.

The data collected is then processed using machine learning algorithms, which can identify patterns and predict future behaviour.”[4] By engaging with certain NPCs or entering certain areas, the AI tracks how the player plays and creates dialogues, quests and other encounters accordingly. These predictions then adapt the game and provide a personalised experience suited to each individual player depending on their playstyle.

5. AI- Method - Consequential Choices (decision trees)



Figure 3: Full family at the end of the family storyline (any or all of the family members may not be alive for this cutscene)

In Assassin's Creed Odyssey, players encounter pivotal choices that impact Kassandra/Alexios' family relationships, including decisions affecting siblings, parents, and other relatives. The game's AI monitors and remembers the choices made by the player throughout the story. These choices determine which family members survive or perish, leading to one of nine possible endings based on how many relatives remain alive.

Looking at the IGN Guide “Choices and Consequences”[5] the guide can be seen discussing the path players should follow if they wish to receive the best ending, which is to save and reunite with all family members. It further elaborates to us just how the AI tracks choices made in quests like "Where It All Began" and "Doing Time," where dialogue options and actions taken can spare or kill certain characters like Deimos and the player's mother.

Even seemingly innocent dialogue choices are remembered by the AI, generating outcomes based on the player's actions. Making the right choices, such as convincing Deimos the cult is manipulating them in "Doing Time," unlocks the potential to spare him later, thus also sparing the player's mother.

This creates a dynamic narrative experience where choices have real consequences enforced by the AI system, ultimately determining which family members reunite in the potential "best ending."

6. Conclusions

In conclusion, the implementation of Goal-Oriented Action Planning (AP) in Assassin's Creed Odyssey has revolutionised the game development process at Ubisoft. By moving away from the state machine method, the AP method has replaced complicated systems with a simpler way to create immersive experiences tailored by the player.

Beyond just development benefits, the AP method has also enhanced the in-game experience for players. Unlike certain other Assassin Creed games, NPCs are no longer stale and can now interact with the environment and the player in dynamic, goal-oriented ways, forming alliances or rivalries based on the player's actions.

Furthermore, AI-based player profiling tracks individual player behaviour and playstyles, allowing the game to adapt content, dialogues, and encounters to match each player's preferences. Machine learning algorithms predict player patterns, track and remember player decisions, thus generating outcomes according to how the player plays.

Ultimately, the integration of Goal-Oriented Action Planning and AI techniques within Assassin's Creed Odyssey has not only simplified development but has elevated the gameplay experience to new heights of interactivity, immersion, and personalization, highlighting the powerful potential of AI in modern game design.

References

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