Agence, A Dynamic Film about (and with) Artificial Intelligence

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Figure 1: Hero art of Agence

ABSTRACT

Agence is a short "dynamic film" that uses AI to power a real-time story. It was co-produced by Transitional Forms and the National Film Board of Canada (NFB). It is available on VR, PC and mobile, but for the purposes of this paper, we will be talking about the VR version, since it most closely matches the director's vision. The film is directed by Pietro Gagliano whose work on interactive stories has spanned many years and technologies. A few years ago he started Transitional Forms to combine real-time storytelling with artificial intelligence. The intention behind that process is twofold: First, we believe that entertainment will soon be driven by AI. And secondly, artificial intelligence is poised to be humanity's greatest tool, and stories might be the best way to make sense of it. To this end, we believe that Agence is an innovative production with bold strides in immersion, interactivity and technology. The approaches taken in this film are novel and unique in their propositions, and may open the door to many new projects that may build upon them.

KEYWORDS

VR, neural networks, reinforcement learning, dynamic film, immersive

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1 STORY

Agence is developed around the notion of 3-way authorship. In which the directorial vision, the audience's decisions through interactivity, and the virtual characters' reaction through artificial intelligence, all influence one another to generate a different story with every viewing, a "dynamic film." In an experience where the characters and the user each have their own agency, the elements that move the story forward are mainly packed into the environment. The experience opens with an origin story of small, intelligent creatures called The Agents who live on a barren floating planet in a peculiar universe. Gravity goes straight down throughout this universe so the agents need to balance and counterbalance with each other on the planet as it gently spins due to shifting weights. This stable but monotonous process sets the starting tone of the film.

However, the story takes a shift when the user approaches. The user has the power to change the agents' existence forever. Depending on the user's interactions, agents' patterns are disrupted to varying degrees. Their training and programming quickly break out of the parameters that they've been programmed with, leading to rapid instability in the world. To move the world back into balance, users may interact in various ways: pushing agents apart, driving

them away from the edge, or even dropping the more disruptive ones into the abyss.

The most important interaction the user can take is planting magical flowers. These flowers become a focal point of the Agents, changing the dynamics of the world and forcing the agents to quickly adapt their behaviour in order to survive and consume the flow. Agents can cooperate or they can compete; they can be greedy or cautious. Love, Loss, Discovery, Betrayal, Death and Rebirth are all possible stories that can manifest on each planet in our simulated universe.

While most endings of these simulations are dire, there is a small chance that agents can achieve slow and controlled progress, maintaining a balance between consumption and care. Such a feat would require careful communication between the agents, the user and the environment. It is our thesis that to achieve this ending, the user must successfully empathize with the agents.

2 FORM

Just as the story of Agence is built around the consequences of the viewer's actions, the design of the experience tries to reinforce this notion by carefully guiding the user's attention to the subtle impacts of their presence.

User interactivity has been carefully designed to allow users to feel immersed in the experience. Initially, the user is embodied only by their ability to observe the world, strongly cementing them in the role of a viewer. As the user gains the ability to interact, we render a single humanoid hand to represent them in the world. Through a single button, the user can cause massive changes in the world, at times fundamentally altering the course of the narrative. User actions unfold slowly, requiring the user to hold the button and forcing them to carefully consider whether they should commit to their influence. As these interactions alter the balance of the planet (and the world) and events slowly spiral the world out of control, the user's hand fades away, forcing them to observe the results of their interventions. Our careful approach to interactivity yields an experience that discourages mindless interaction, avoiding a game-like feel in exchange for a more observant one.

The design of the Agents helps drive this tension home. Somewhere between cute and alien-like, their presence can be inviting or imposing. While the contortions of their limbs and writhing movement can create a sense of discomfort, their faces express relatable and distinct emotions. In this form, the user can quickly step in and out of seeing the creatures as algorithmic entities, alternating between relatability and detachment. The emotions of the agents themselves are driven by the actions taken by the user, as well as the events unfolding around them.

A major component in shifting the user's perception is driven by the camera-work in the experience. While it may sound unintuitive to reference camera-work in VR, the use of reorientation, re-framing, and scale changes can give a casual viewer the sense that they are watching a movie. Our dynamic camera system translates typical movie-like cuts into the VR experience. Often this may involve geometrically attaching the user's navigation space to anchors in the world. We find that these cuts have only caused discomfort in a minority of users. We mainly attribute this to our careful transitions and the design of the virtual space. Furthermore, changes in scale can dramatically re-frame the context of an action, shifting the user from a position of control to a position of fear and awe.

The void itself in which the story is contained remains infinitely scaled throughout the many iterations of the story.It is a recurring, recursive, expanse that presents a new planet every few meters. While the initial emptiness of the space may diminish the presence of a small planet, over time, the user discovers the endless abundance of such simulations, and is forced to consider whether there are actual consequences to any of their actions. As the user replays the experience, more and more planets come into view, increasing the visual noise and unsettling the player. The nature of the simulations is shown to the user, and they can become aware of the repetitive nature of this universe.

3 FUNCTION

Agence serves as a turning point in AI technology and story. By default, the agents standing on the world are programmed using hierarchical state machines. Upon receiving certain stimuli, they switch across different "states", developing new goals and changing their behaviour respectively. This is a traditional approach to programming virtual creatures in interactive media. To really tell a story about (and with) AI, we wanted to employ reinforcement learning.

The user can enable "RL mode" on a given agent. This causes the agents to don a headdress that resembles their new mode of control, a Neural Network. Agents using neural networks to interact have not been programmed, and their behaviour remains a mystery to the director of Agence and our developers. The agents developed their intelligence through Reinforcement Learning as we simulated millions of instances of the world. As they went through this experience, each agent had a set of values that guided their eventual behaviour. These values are not tied to the decisions that they take, but rather to the desired outcome. Some agents are greatly adverse to seeing the others fall, while other agents may slightly prefer it. These variations allowed us to see subtle changes in their behaviours, ultimately allowing them to interact in new and unexpected ways.

Both the comparison across different agents and between the two modes are ways in which users can pay closer attention to the behaviour of virtual beings. While these kinds of creatures may be a second thought in many experiences, Agence puts them at the forefront.

4 CONCLUSION

Agence is a first of its kind dynamic film. It encourages users to be mindful about their interactions, and observe the behaviour of intelligent agents. Minimalistic in its action and interactivity, most of its development was focused on the construction of an environment that would facilitate and augment agent-user interactions. It carefully leveraged VR in new ways to evoke a filmic style and a sense of presence and familiarity. Finally, the use of Reinforcement learning introduces a new type of AI to the filmic medium. The user is invited to contrast this behaviour and consider its future ramifications.