Playable Experiences at the 16th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment

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Abstract

This paper describes the accepted entries to the eighth Playable Experiences track to be held at the 16th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE'20). The Playable Experiences track showcases innovative complete works that are informed, inspired, or otherwise enabled by artificial intelligence.

Introduction

[1] [2] The AIIDE Playable Experiences track offers authors an opportunity to showcase work that is informed, inspired, or otherwise enabled by artificial intelligence. Tracks at the conference, including the main track, the demo track, and artifact-evaluation, provide opportunities for creators to supplement their research contributions with interactive demonstrations.

Accepted entries in the Playable Experiences track are complete experiences in and of themselves. The pieces presented here are vehicles for ground-breaking artificial intelligence research and artistic achievement.

Two entries were accepted to the 2020 AIIDE Playable Experiences track. These pieces demonstrate a range of technological innovations and artificial intelligence techniques, applied towards novel forms of playful interaction. The accepted entries are:

- *Why Are We Like This?*
- *0DayDreams: What Do Machines Draw When They Daydream?*

This paper includes the abstracts submitted by the creators of each experience, discussing their works, influences, and approaches to integrating artificial intelligence with novel forms of play.

Why Are We Like This?

Why Are We Like This? (*WAWLT*) is a co-creative, AI-augmented, improvisational storytelling game. In it, one or more players (ideally two) explore and direct an ongoing social simulation to gradually build a story of annotated, customized simulation events. The simulation is designed to foreground conflict driven by misunderstandings among well-intentioned characters forming differing subjective narrativizations of past and ongoing storyworld events.

This project is motivated by strong evidence that players enjoy narrativizing, or retelling, the events that unfold from simulation-based gameplay (as in *The Sims 2* (Maxis 2004), *Dwarf Fortress* (Bay 12 Games 2006), and *Crusader Kings II* (Paradox Interactive 2012)) (Eladhari 2018; Kreminski et al. 2019). And yet no game, to our knowledge, builds a core experience around that narrativization as a site of playful, computer-mediated creativity. To engage in retelling play with these existing games, players need to go out of their way to actively record or recall gameplay events and create a separate media work from them—so relatively few players ever do. We draw from *casual creator* design philosophy (Compton and Mateas 2015) and social simulation to make this unique kind of storytelling play approachable for a wider population, and to explore the novel design space that this new focus implies. *WAWLT* leverages storyworld simulation to provide a fleshed out, but open-to-interpretation substrate which players use as raw material, guide in different directions, and riff off of in a relatively safe creative possibility space.

Simulation-based storytelling relies on having a complex-enough simulation, and a large-enough space of actions, for stories to reliably emerge. One of the main challenges of the simulationist approach to storytelling is in finding interesting traces of actions through the vast possibility space. One of *WAWLT*'s innovations is a compositional *player intent language* (Martens and Hammer 2017) which players can use to guide the system, at a high level, toward the kind of story actions they want to see happen.

Using the intent language is framed as selecting author goals the players would like to pursue in the current moment of the story, such as involving a particular character in the plot, or escalating tension between two characters. Each author goal has an associated heuristic function that numerically scores a given possible action according to its relevance to this author goal. These scores are then used to

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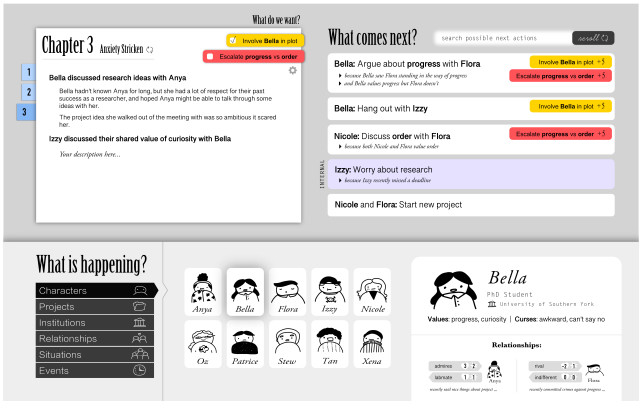

Figure 1: The main *WAWLT* interface, with the running transcript of the story so far in the upper left, action suggestions in the upper right, and the storyworld investigator (which allows players to explore fine-grained details of the storyworld state) on the bottom.

rank all currently possible actions given to players as action suggestions, and actions chosen for autonomous background simulation. This allows players to explicitly communicate (and continually revise) their current creative intent to the system, and whittle down the large possibility space according to that creative intent.

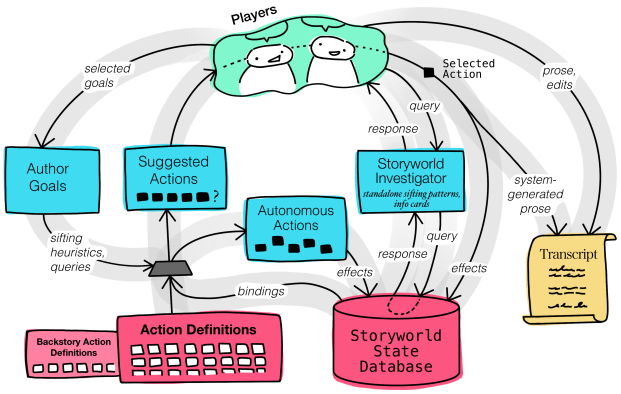

Figure 2: An overall system diagram of *WAWLT*, showing the important modules and data flows. Pink subsystems (action definitions and the storyworld state database) consist of inert data; blue subsystems (author goals, suggested actions, autonomous actions, and the storyworld investigator) act on this data; and the transcript emerges from player actions over the course of play.

After selecting author goals, players pick actions to happen next from a re-rollable set of suggestions, prioritized by author goal scores. Once selected, the action's effects are realized in the simulation (influencing future possible actions), and a generated action description – with space for freetext elaboration by players – is appended to an ongoing textual transcript recounting the story so far.

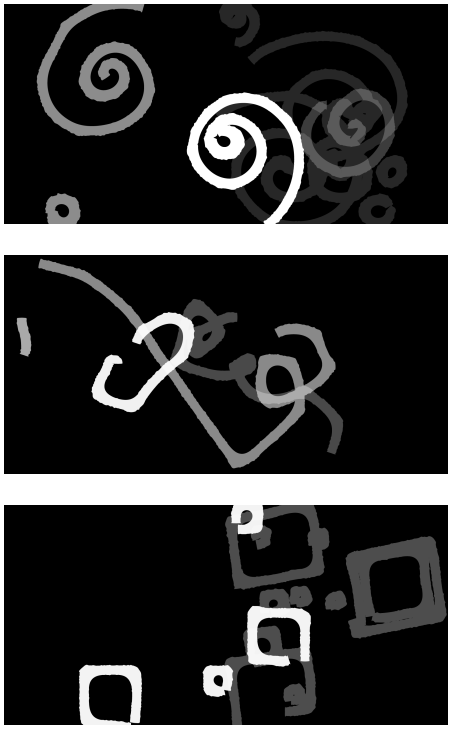

Figure 3: 0DayDream sketches. The shape appearances shifts during training.

A second innovation is the use of *story sifting*—the recognition of narratively potent patterns in a chronicle of simulation events, as discussed in (Ryan 2018)—to model character subjectivity. Characters run individualized sets of Felt sifting patterns (Kreminski, Dickinson, and Wardrip-Fruin 2019) over the history of all past events, evaluate these events based on the stories they identify, and act based on these evaluations. Because each character has access to different sifting patterns, characters often misinterpret the actions of other characters in systematically biased ways, and take actions based on their biased interpretations of the world. This is a novel use of story sifting to computationally model character subjectivity as a driver for cozy conflict in a simulated storyworld.

WAWLT is in active development. Some features, such as parts of the author goal intent language and storyworld investigator, are still under construction, and we are continually expanding the currently limited space of actions. See (Kreminski et al. 2020a) for more information about the design of *WAWLT*, and (Kreminski et al. 2020b) for more information about its AI architecture. The latest version can be played at https://itsprobablyfine.github.io/WAWLT.

0DayDream

When in thought, we often doodle or sketch little shapes or pattern. 0DayDream explores the space of machine daydream doodles. A neural net generates little sketches over and over. They are drawn in white on a black background utilizing a minimalistic brush simulation. Older sketches

fade away to make room for new daydream doodles.
The neural net is not trained on a large dataset. Instead it is inspired by a single human sketch. Visitors are able to draw and show new inspirations to the AI. The model is steadily trained on the last human inspiration sketch. So the knowledge of older human drawings fades over time and the installation is in a steady flow of new doodles and inspirations.

The project is built with Pytorch and Paper.js. The installation consists of one monitor to display the AI drawing process and one device with pen input, that gives visitors the ability to draw new inspiration sketches for 0DayDream. The neural net architecture is a transformer encoder with top-k sampling. The human-drawn inspiration sketch is augmented to create a dataset suitable for training the transformer. After each drawing of 0DayDream, a new epoch is trained with the current template sketch dataset. The generated dataset for each epoch is explicitly kept small, so the training advances slower and more interesting mixed model states can be explored by the observer. See figure 3 for a transition from a spiral-filled sketch to a sketch containing lot's of nested boxes.

The artwork is inspired by my research on path-based image generation using one-shot learning and directly builds on-top of it. The application of AI to creative design processes is a fascinating subject to me, especially if no large training datasets are required. Collecting large datasets is a costly task and can not be performed by everyone. Time, money or other limited resources might prevent people from creating their own models with own datasets. In my opinion, AI should be accessible to everyone: not only the use but also the creation. Therefore one- and few-shot learning is especially interesting to me. 0Daydream uses only one inspirational image to advance the model and watching the drawing process is exciting and very calming at the same time. How is my sketch used to create new daydream drawings?

The installation is currently not accessible online, because the inspiration sketches would need a moderator to prevent the submission of harmful or harassing sketches.
Two recordings of two different models states were created and can be found here:

- 0DayDreams - Model State 1
- 0DayDreams - Model State 2

Conclusion

The Playable Experiences track at AIIDE presents two unique works that intertwine artificial intelligence and artistic expression to create novel experiences. These pieces are technical contributions and are valuable resources for the future of the field. With an emphasis on human-centric playability and audiences, these works have the potential to inspire future game designers and researchers to further explore the design space of artificial intelligence-informed interactive experiences.

Acknowledgements

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