More than Interactivity: Designing a Critical AI Game beyond Ludo-Centrism

Abstract: This article presents our work-in-progress game *Sea of Paint*, aimed at exploring concerns around contemporary machine-learning-based AI technologies. It is a narrative-driven game with dialogues and a custom-made text-to-image system as its core mechanics. We identify our design approach as non-ludo-centric, as in, de-emphasizing the importance of game rules. We argue that contemporary game design language has largely been ludo-centric, where audiovisual and narrative aspects are framed as having somewhat static and complementary roles to game rules and mechanical interactions: as context, content, or smoothening and juicing up interactions. Although we do not believe that game design writ large has been ludo-centric, given the diversities of games in both commercial and experimental spaces, we still argue that the entanglement of design decisions across a game's different aspects have been under-discussed. By presenting our project, we demonstrate how the interrelations across mechanical, narrative and visual aspects help us communicate our critical AI themes more effectively, and explore their potentials more thoroughly.

Keywords: game design, critical design, ludo-centrism, text-to-image, critical AI

1. Introduction

Data-driven, machine-learning-based AI technologies have gained increasing attentions recently across academic, industrial, commercial and public spaces. However, with accelerating development of AI also comes with concerns around its social, cultural and ethical implications. We want to use the medium of videogames to explore this tension, and develop a critical game where the player is encouraged to reflect on contemporary issues of AI. To this end, we deploy critical game design, as Malazita and O'Donnell describes, "the deep synthesis of game design, cultural critique, and reflective design research practices" [29]. This article aims to show not only how contemporary issues around AI are reflected in our game design, but also how our design goals made us reflect on the very established principles of game design itself.

We present our project *Sea of Paint* — a narrative-driven game with a custom-made text-to-image system. The game is set in a sci-fi world where big data has become a naturalized part of the world and where "spirits" can be conjured based on machines - as analogs of AI. We identify our design approach in this article as non-ludo-centric. We define ludo-centrism as having mechanics as the center of game design, with narratives and audiovisuals at the periphery. Decentering mechanical design means that each aspect of our game (mechanics, narratives, visuals) includes significant decisions that can afford or constraint decisions in other aspects — the meaningfulness of one aspect cannot be considered without the other. Theory-wise, this article aims to challenge the ludo-centric game design languages and models standardized in education and academia. It does not seek to claim that our design process is novel, rather, non-ludo-centric design decisions already occur in practice without being framed as such. Our design process starts out with themes around issues of AI, and then explore ways the game can realize those themes.

We'll briefly discuss the intellectual background of our work in Section 2, including an overview of ludo-centrism. Our design process starts out with themes around issues of AI, and then explore ways the game can realize those themes. We introduce our game and its themes in Section 3, and then discuss the specifics of design in Section 4.

2. Background

2.1. Ludo-centrism in Game Studies and Game Design

Ludo-centricism has a rather long and complicated story in the studies of games. It has its roots in defining the distinct properties of games compared to other media. Early game scholarship defined a game's ludic qualities: interaction, participation and the rules/systems, as the formal properties of the medium. Even the infamous debate between narratology and ludology, which marked the founding of game studies as a field [2], did not disagree on this formal definition, rather on the degree to which studying rules/systems needs its own methodology, separate from those of other fields such as literary studies [17,30]. Interaction here takes on a particular meaning as the "nontrivial efforts" required to navigate the artifact [1, p.94], or as Lantz puts it, "what looking is to painting, listening is to music, [...] *thinking and doing* are for games." [26, p.26, original emphasis]. Game also distinguishes itself because of its configurability — the fact that it "restructures itself" [19, p.3] and grants the user that configurative power [1, p.164]. Thus, ludic qualities can be appreciated in their own terms because interaction becomes a distinct way of media engagement and configurability becomes a distinct property of games, as Lantz proposes, "games are the aesthetic form of thinking and doing." [26, p.27].

As a result, game design becomes a discipline that mainly tackles the craftsmanship of rules and systems for play, as distinct from storytelling[1] and visual and audio design. This is quite evident in game design textbooks [4,7,34,42], which focus mainly on designing game rules such as goals, mechanics, systems, rewards and difficulties. But games, especially computer games, are nevertheless multi-media and multi-sensory experiences. How much other qualities of games would relate to their ludic qualities remains somewhat ambiguous. Game designers and scholars largely see them as equally important to a game, thus theoretically do not endorse ludo-centrism. For example, Hunicke et al.'s MDA model (Mechanics, Dynamics, Aesthetics) [22] is often recognized as one of the most influential game design model. But the word choice of "mechanics" (game components that designers have direct control over) and "aesthetics" (subjective experience of play) were criticized for reinforcing "pre-existing concepts like 'gameplay vs. graphics' or 'underlying system vs. surface qualities' or 'abstract rules vs. images and story' [...] It suggests a point of view that considers a game's assets to be of secondary importance." [25]. The model was either reworked [37] or was acknowledged for its limits[42, p.9]. But because of the focus that game design puts on rules and interactions, narrative and audiovisual aspects have to be considered out of scope and have somewhat limited functions in game design education. Anthropy & Clark would discuss visual, animations and sound in terms of "context" to "help a player to internalize those otherwise-abstract rules" [7, p.77]. Zubek would discuss narrative structures as "content arcs" and frame narrative design mostly through choice structures [42, p.152].

It is within this context that we define our approach as beyond ludo-centric game design: what does game design look like when rules/systems, visuals and narratives are placed on equal footings, where decisions made in one would implicate decisions in others, and the meaningfulness of one aspect cannot be considered without others? We have no doubt that these crisscrossing decision-making is not new to game design practices, but making them explicit pushes them to a position where these decisions deserve to be discussed and studied. This is additionally significant when one considers how game studies has moved to acknowledge the audiovisual [23, p.135] and affective [5, xv] qualities of play, and how game design educations are still largely technical [21] and under the context of STEM education [29], thus marginalizing many disciplines involved in game development.

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[1] It should be noted that interactive narrative is still an actively researched field and has many overlaps with game design. But it is nevertheless not synonymous with game design.

2.2. A Critical Game with AI, about AI

Yannakakis and Togelius summarize the field of game AI as mainly three branches: playing games, generating content and modeling players [39]. Many AI algorithms, machine-learning-based or not, are developed for these three purposes. Nowadays, with the rise of generative AI, it is increasingly being seen as the foundation of a potential new media paradigm. Sun et al. would present their game *1001 Nights* [3] as what is called a "AI-native" game, where generative AI is "fundamental to the game's existence and mechanism" [35]. Although generative AI offers many new possibilities for game design and research, most current applications remain in an early and underdeveloped stage where design considerations are still being explored [33,38,41]. Our game utilizes a small sentence transformer model for our more rule-based text-to-image system, whose purpose mainly aims to simulate the dynamics of machine-learning-based text-to-image interaction rather than adopting widely-used text-to-image models such as Stable Diffusion.

Overall, it is evident that current research on game AI primarily focuses on their engineering and design aspects, with not much discussions on the value of games as a medium for exploring AI's impact on humanistic and societal dimensions. We seek to promote criticality towards AI as inspired by the field of critical AI, including discursive critique of generative AI [9,10], big data [31], hidden labor [20] and extractivism in production [14]. This is also why we adopt a non-ludic centric approach — we believe different topics and questions are explored more efficiently through different forms. For example, we created one of the main characters as a data worker so our narrative can include many research and reports around the current condition of data labor.

We define our critical game in a looser way, in contrast to other more specific genres of games or design methodologies that promote reflection and criticality such as serious games [24] and persuasive games [12]. It is a critical game because criticality towards current state of affairs is the core design goal that guides our design decisions. As Flanagan defines, a critical game/play would "occupy play environments and activities that represent one or more questions about aspects of human life [...] be fostered in order to questions an aspect of a game's 'content'" [16, p.6]. However, we also took the liberty to develop fictional settings and characters for dramatization and appeal.

3. Sea of Paint

This section will provide a brief overview of the in-progress game *Sea of Paint*. To reiterate, the game is the main case study of this article in order to illustrate a non-ludo-centric game design approach that emphasizes game rules and systems' symbiotic relationships with other media forms. Subsection 3.1 will go over the game's general setting, story and gameplay. And Subsection 3.2 will lay out the current themes the game is trying to explore, as the core orientations for design specifications in Section 4.

3.1. Game Overview

Sea of Paint is a narrative-driven game that combines dialogue-driven interaction with text-to-image generation as its core gameplay loop. The game is set in a sci-fi setting based on the current boom of data-driven and AI technologies. The current version of the introductory text gives an overall summary for the world and the narrative context around gameplay:

> The Sea is everywhere, all around us. Every minute, traces of ourselves dissolve into the man-made Sea. A whole continuously breaks into parts to become the Whole again.
>
> Machines were developed to harness the Sea. Machines that bring back the spirits. Machines that can produce words like a person. And machines that can turn words of the spirits into images.

I'm an operator of one of these machines. As per the grieving's request, I am contracted to temporally bring back the deceased, in order to produce pictures as memorabilia.

This latest contract is a rather special one: someone who spent much of their life building the very machine that I will be using.

I wonder what awaits me there. To peek behind the curtain of the machines, that are often seen as if enchanted. How do I capture the essence of someone to whom the mystical has become ordinary?

The sea and the machine are direct analogies to data and current data-driven artificial intelligence technologies such as large language models and text-to-image models, with some magical realist and supernatural motifs to help integrate the themes and add flourishes to the premise. The game aims to be a one-hour session where the player will switch between conversing with the "spirit" and generating images that supposedly capture the spirit's experiences. The conversations and images will revolve around life of the spirit's experience as a data worker, a once-aspiring writer, a working mother, someone exposed to the uncertainty around technologies, and someone whose current existence is mediated by that very technology.

The main way to progress through the game is finding the keywords or the code words for the text-to-image interface through dialogue. If the player attempts to generate images without the keywords, the game's image generation system will output an image with two image assets blended together. The contextualization is that the player character believes this result is undesirable because the description is not sufficiently "authentic" to the spirit's experience. The play loop consists of the player conversing with the spirit to infer emotional words to unlock the unblended image asset.

The ending sequence will become available once the player unlocks a certain number of images, where the player character's conception of authenticity will be challenged, as the technological mediation and the social context bring into question whether memories can be accurately captured in the pictures. Afterwards, the player is granted the agency to choose how to remember the spirit, where the player can generate either blended or unblended images as memorabilia. While the blended images are framed as undesirable during the main game loop, the ending will acknowledge them as legitimate ways to narrate the spirit's past.

3.2. Themes

Sea of Paint is a theme-driven game, as in, its design is oriented towards exploring questions and exposing problems around the current development of AI technologies. This gives a certain flexibility to some design elements while fixing others in place. For example, the character backgrounds, the world, as well as the dialogues are developed based on their contribution to the themes. This subsection will list three main themes that we have identified as core to the game. Section 4 will further detail design elements based on these themes.

3.2.1. Visual Meaning-making and Text-to-Image

As part of the core mechanics, text-to-image generation is a thematic focus explored mainly through interactive design. This theme can be broken down to two topics: firstly, meaning-making through visual creativity and secondly, visual creativity through text-to-image generation.

The first topic mainly focuses on designs that encourage the player to express themselves through creating aesthetically pleasing images. This follows the design principles of existing games about visual creativity such as *Chicory* [28] and *Passpartout 2* [15], where the player is given narrative context and simplified drawing tools to be visually creative in the game. We also want to explore how visuality is a distinct manner of sense-making, where visual images can foster different understandings on a subject from textual descriptions. This is mainly realized through our mechanics and visual design aiming to make

creating images not only compelling, but also impactful to game progression and narrative understanding, as discussed more in Subsection 4.1 and 4.2.

The second topic centers around how the interactive modality of text-to-image is distinct from more well-practiced methods of visual creation, such as drawing and painting. This is inspired by Zhou et al.'s theorization [40], where they argue that text-to-image habituates a different form of creative intention through recognizable ideas and objects, where low-level visual decisions are made by algorithmic generation. We explore this interactive dynamic through the design of our image generation system, where we inject random decisions to further the creator's role as a curator, as discussed in Subsection 4.1.

3.2.2. Consequences of Data-driven AI Technologies

This theme focuses on the various ethical concerns around the recent boom of data-driven AI technologies. We aim to realize this theme mainly through the narrative, where a substantial part of the story and setting are grounded within contemporary issues of AI, as further discussed in Subsection 4.3. Thus, instead of exploring sci-fi topics that can be more abstract, the narrative intends to be more representational and research-based. These concerns are introduced through fictional setups such as the spirit's past life as a data worker, and the history of the sea as an analogue for big data. The narrative decisions will be informed by research such as realities of data workers in the production of current data-driven AI, as well as the discourses and histories around data and big data.

3.2.3. Memory and Remembering

We see this theme as central for the development of different story beats. We are particularly inspired by the philosophical discussion around enactive memory [13]. Instead of thinking about memory as storage and representation, and remembering as retrieval, the enactive memory thesis argues that memory is the "dynamical coupling between the agents' brains and bodies, and the sociomaterial environment they inhabit" (p.2), and remembering is more "action-like." This is the most explicit in gameplay progression, where the player character rejects blended images as "inauthentic" and attempts to unlock unblended images by injecting emotional keywords.

The story beats will be developed around challenging the player character's notion of "authentic" memory by highlighting the sociomaterial nature of memory and remembering. There are many story beats that can relate to this point, such as the sea (analogue to big data) as a technical and institutional construction, tech-enabled personhood as inevitably linked to corporate practices (inspired by [11]), and real humans behind the scene such as data workers becoming forgotten and marginalized. The gameplay aims to reveal these tensions leading up to the ending.

4. Designing beyond Ludo-centric Models

Having reviewed the central themes of the game, this section will detail current design specifications to realize these themes. In addition, the section also aims to illustrate how the designs of these different aspects (mechanics, visuals, narratives) are inter-dependent. Instead of understanding these three different aspects of the game as having fixed relations to each other (such as the visuals as flourish and narrative as content for the gameplay), we want to demonstrate how these different aspects are entangled in uneven ways, where one has to examine specific decisions to reveal the contingencies across different elements of design.

4.1. Text-to-Image System

The decision was made early on that the system will not rely on existing diffusion-based models such as Stable Diffusion, DALL-E and Midjourney. Besides the computational overhead and ethical concerns over models trained on non-consenting data, diffusion-based models are simply too general to control their interactive limits within the game. Additionally, the consistency for the characters, setting and tones also requires control. We

anticipate heavy mechanisms and vigilant testing if we were to adopt diffusion-based text-to-image models. As a result, we resorted to a custom-made and narrower text-to-image system, where the generation mechanism is constrained but predictable.

Although diffusion-based models are not used, we nevertheless want to imitate the feeling of interacting with a text-to-image system. Zhou et al. discusses how text-to-image changes the way the image creator relates to their own creation, where the user asserts control only on a high level, and the more fine-grained decisions are based on the data, the model and the random seed at each run [40]. This positions the player as both a creator as well as a curator.

The system mainly operates on images hand-drawn by the authors that are intended to be aesthetically pleasing and narratively meaningful. The main gameplay tasks the player to find keywords in the dialogue to unlock each hand-drawn image. Most of the time, the system will blend two images together and render a new image. Some examples are provided in Figure 2.

A sentence transformer is used to pick out the image — the only machine learning model used in this system. Each image has its own description that is measured against the user prompt and returns a similarity score. If the prompt is not sufficiently close to any description, the system will return a white noise, signaling that the user can't simply enter whatever they want. The system will randomly pick two images with sufficiently matched descriptions to blend. If one or more descriptions reach a certain threshold of similarity, meaning that the player specifically entered the descriptions of those images, the system will pick the highest matched one to blend with another. The design aims for a balance of player control when they have a specific image in mind, and randomness when the player simply starts out exploring the potential of the system.

We designed the system so randomness can have tangible consequence on the final image, such as randomized opacity of the blending, or additional layers on top to shift the color scheme. This aims to push the player to continuously click on the generation button to explore novel generation results. This is the intended dynamic, as [40] points out, the users tend to continuously click on the generation button for games that utilize text-to-image models. At the same time, overusing the system is discouraged, framed as the generation hurting the spirit. This interactive setup asks the player to find a balance between exploring new results and committing to one. The punishment for overusing the system is discussed in Subsection 4.3.

4.2. Visual Design

For *Sea of Paint*, the visuals have a significant place in the game. This is in contrast to more ludic-focused game design, in which gameplay would either take priority or be treated as separate from visuality (in this sense, the common practice of grayboxing/blockout implies an interpretative practice that determines the extent visuality matters to gameplay). For *Sea of Paint*, visual design *is* interactive design, with feasibility and quality of the visuals necessarily implicating the interactive system itself.

We made the decision of using dithering as the stylistic motif across all of our artwork. In computer graphics, dithering is a technique that applies noise to imply a more granular gradient of colors. It typically looks like two colors are interlaced in variable patterns to imply a gradient between the two. Applied intentionally, dithering can artistically evoke an ambiguity of form, where concrete shapes and figures come in and out of discernibility among the visual noise. We find this feature attractive, as the main fictional invention of the narrative is the sea, as an analogue to big data. As the theme of memory in Subsection 3.2.3 states, the game explores this tension of individuality and authenticity as constructed from data. The sea is supposedly "everywhere, all around us." We seek to utilize this visual motif as part of the theme, as shown in our sample artwork in Figure 1.

Figure 1. An example artwork utilizing dithering — the visual noise the motifs of the artworks.

Since the main interactive feature is the text-to-image system in which two artworks are blended together, much time and thought have been devoted to how such mechanized process can produce something aesthetically pleasing. This is a core part of making the text-to-image system engaging, and also complements the final narrative beat of the game, in which blended images are appreciated as meaningful rather than the corrupted versions of the original images. We interpret blending as a visual way to communicate connection. Regardless of what is being blended, the player registers a connection between the two layers and interprets based on contextual clues in the image or game dialogue.

For example, there are already many possibilities when two figures are blended together. If the figures seem to be the same person, a blended version connects them through distinct moments, giving a fuller view of the character's life. This would come through especially when the two images have contrasting features, such as differences in time, mood, or activity. If the figures are distinctly different persons, the blended image would communicate the connection between the two, such as how one is important to the other in their life, or that one figure is thinking about the other figure. We organize the span of our artwork with these possible blended meanings in mind. Figure 2 showcases some examples of our artwork, where one image is blended with three different images.

Figure 2. Examples of blended artworks. Each one has the same base image, blended with a different images to evoke different meanings.

We want to reinforce how the generated images are distinct ways the game narrative unravels itself besides the game dialogue and enable different interpretations of the story, as part of the visual sensemaking theme discussed in Subsection 3.2.1. When the player hovers over each image, a text box would appear with descriptions over it. Before an

artwork is "solved" through key words, its blended version would display questions that alludes to conversation topics and unlocks a new dialogue option that corresponds to the topic. After the player successfully unlocks an artwork, the description would turn to how the player character interprets the image. And after the ending, the blended images also come with interpretive texts themselves. This way, each image becomes "content" for the gameplay. We position these descriptions as ways to to encourage the player to interpret the image in the context of the story.

4.3. Narrative Design

To develop a critical AI game, we want our story to be faithful to the current ethical concerns around AI, as Subsection 3.2.2 describes. This means that we mainly develop the world, the characters and their stories from current research and reports around the development and production of AI. We design the spirit's past life as a data worker, who gave up on her writing aspiration to choose a more stable family life.

Since the story is largely fictional and set in a sci-fi universe, we have a greater authorial freedom on how to represent certain facts and issues through the narrative. It is a case by case basis whether we decide to completely replicate the facts from the research, or to ambiguate certain details, or to extrapolate certain patterns we observe in the research. For example, we find that Chinese data workers tend to work in an office-like setting [27,36], while data workers in other regions tend to work remotely [8,18]. We decide to design the spirit's work as in-person to better introduce interpersonal drama without regional information. Other details such as the exploitation and discrimination in the workplace [27], as well as the emotional stress for content moderators [6], are replicated as faithfully as possible in the dialogue. Other facts such as the California bill CJPA, originally proposed to support newsroom and journalists, being hijacked to accelerate the adoption of AI [32], are reduced to very brief and vague mentions in the context of why the spirit did not choose the path to be a writer. We seek to strike a balance between being informative and representative of real-life concerns of AI and being conscious of the each detail's relevance to narrative development.

To progress the game, the player has to identify three keywords that describe the spirit's feelings about a subject (e.g., family, work, characters). We want to develop the spirit's story enough for each particular topic to have three non-obvious keywords per subject, as well as in congruence with the artwork we're creating for each subject. It remains an open question how clearly we want to communicate these keywords in the dialogue. The most direct approach is to insert clear signaling sentences such as "I feel...", "it feels..." and "I love...". A potential step up in the challenge can have the spirit describing the feelings without giving away the keyword, or the keywords would require informational dependencies (e.g. "it's completely opposite of how I feel about my work" — signaling that the player has to find keywords for work first). The gameplay mechanics here would treat the dialogue as both a space with hidden information and a deduction puzzle. We believe playtesting is required to see how intuitive these challenges are so as to inform our difficulty design and the writing.

Additionally, as Subsection 4.1 discusses, the game would have a mechanism to punish overusing the text-to-image system. This is framed as the system needing to draw from both the spirit itself and the sea, and the overuse of it would cause the spirit to lose their individuality to the sea. When the player overuses the system, a simple generation system would scramble the written words to make the content a little harder to parse. For example, "That sounds ridiculous" would become "That cannot be seen and will recognize them and the places visited remained uncertain sounds ridiculous". The generation system is a Markov model trained on a small selection of classic literature.

Throughout the conversation, the player is offered dialogue choices to respond to the spirit. Here, we follow mainly three general approaches to offering choices. They are based on the multiple motivations already in place for the narrative and gameplay:

First, dialogue choices are offered for the purpose of evoking some criticality around ethical issues in AI. The player can choose their attitudes towards various concerns around the practices of AI, such as exploitation at the workplace (Are some of the practices to raise productivity excusable?) and AI's relation with writing and journalism (What does journalism and publishing look like after AI?). We strive to offer nuanced options and generally avoid clear-cut questions such as "Is exploitation good or bad?".

Second, dialogue choices are offered to help the player connect to the spirit's story and emotions. For example, the player could comment on whether or not the spirit made the right decision to give up writing and choose a more stable job as a data worker. Since the main dialogues would be the spirit talking about its past life, it would be natural to bond over feelings and choices in the past.

Third, the player can ask probing questions regarding how the spirit feels about certain events. This is complementing the gameplay goal of finding the keywords for unlocking different images. The choices can be offered in the context of the player trying to guess what the spirit feels like. The wrong choice can result in the spirit conveying their feelings less directly. Overall, the writing has to subtly suggest gameplay opportunities while remaining narratively coherent.

5. Concluding Thoughts

Admittedly, the thematic questions of our project are quite ambitious, with much research and critical reflection needed to fully realize these complex and abstract themes. We believe that they cannot be effectively communicated without utilizing all aspects a game can offer, thus motivating our non-ludo-centric approach. But it also means that much playtesting is needed to ensure that they are integrated well.

We'd also like to note that because of the inter-connectivities across the different aspects of the game, the small scale of our three-person team made the quick iterations more tractable. It is an entirely different question to investigate what non-ludo-centric design decisions would look like in a larger scale, where divisions of disciplinary responsibilities become clearer. Regardless, we hope to have demonstrated a space for more nuanced discussions of design, and potentials for more experimental game experiences.

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