



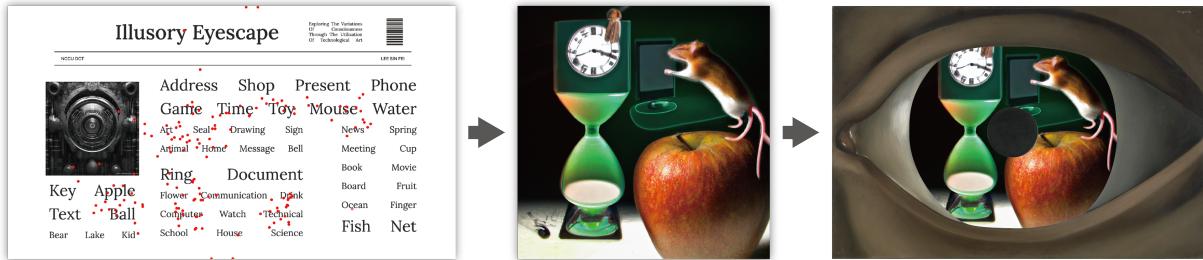
# Illusory Eyescape - Exploring the Variations of Consciousness through Generative Art and Eye-Tracking Techniques

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**Figure 1:** The proposed interactive art installation transforms eye-tracking data to the final images. The middle image was generated from the words "Mouse," "Apple," "Computer," "Drink," "Technical," "Art," "Animal," and "Time," with a total reading time of 30 seconds. Each red dot represents the gaze point during a 200-millisecond interval.

## ABSTRACT

Historically, art has been considered a form of expression uniquely reserved for humans. However, technological advances, particularly in computer graphics, have expanded the boundaries of artistic creation beyond human exclusivity. The emergence of Generative Art in recent years has not only transformed the artistic process but has also initiated extensive dialogues on the interactions between humans and machines. To delve deeper into this theme, we developed an interactive art installation titled "Illusory Eyescape." This installation integrates Generative Art and Eye-tracking Technologies to probe the fundamental nature of consciousness in humans and machines, questioning the role of art in this new epoch of human-machine synergy. This exploration broadens our comprehension of the potential amalgamations of art and technology and challenges our conventional perceptions of art.

## KEYWORDS

Generative Art, Eye-tracking, Interactive Art

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## 1 INTRODUCTION

In the fast-paced evolution of technology, artistic forms merge and evolve with digital techniques. Now, creating generative works is as easy as uttering a spell. But what really lies at the heart of artistic creation? Swiss artist Alberto Giacometti once remarked, "The object of art is not to reproduce reality, but to create a reality of the same intensity." In this perspective, art acts as a medium to express genuine emotions, transcending the physical to reveal the underlying spirit and emotions. Our work, "Illusory Eyescape," investigates the consciousness divide between humans and machines through technological art, focusing on language's role and limits within generative art. Using eye-tracking technology, this interactive installation captures viewer engagement data, which then drives a generative AI system to create dynamic visual artworks. These pieces reflect and respond to viewer interactions in real-time, deepening the understanding of human consciousness and further contributing new insights to the integration of art and technology.

## 2 DESIGN AND IMPLEMENTATION

Historically, machine-generated art has been evaluated from a human-centric viewpoint, treating art as fundamentally a human creation. Utilizing Graham Harman's Object-Oriented Ontology, our research propose the "Object Co-Construct" concept. This approach emphasizes that art interpretation involves the co-construction among these entities, dependent on active participant engagement. Our work further investigates differences in human and machine consciousness using foundational theories such as Edelman and Tononi's concept of human-machine consciousness divergence and Nagel's "bat problem". These theories underscore the unique value of personal consciousness in human experience.

Because consciousness is deeply influenced by vision, our work emphasizes various aspects of the eye. This includes exploring

subjective consciousness through the process of reading with the participant's eyes, allowing personal consciousness to be released. We also pay homage to René Magritte's "The False Mirror," [Magritte 1929] which symbolizes the eye's role in expressing. We draw from Wittgenstein's "Tractatus Logico-Philosophicus" [Wittgenstein and Monk 2013] and "Philosophical Investigations" [O'Sullivan 2017] to investigate the limitations and utility of language, exploring how language serves as a carrier for consciousness. In designing the reading material, we reference Wittgenstein's "Language Games" and "Family Resemblances," which underscore the inherent polysemy of language and its contextual dependencies.



**Figure 2:** The design of reading materials, particularly through dynamically changes in text style such as font size and background color, serves as a strategy for visual cues that directs the participant's gaze.

To gather reading data, we employ WebGazer.js [Papoutsaki et al. 2016], an eye-tracking technology, allowing us to capture where and how long a participant focuses on specific text. Our work uses dynamic text styling to guide the participant's attention. (See Figure 2). For instance, when a word is focused on, it is magnified; if the focus persists for one second, a black background appears to indicate emphasis; and if the other words related to the same "Language game" are highlighted with a gray background. The word is stored if the focus continues for 1.5 seconds or more (See Figure 2). This system not only enhances the reading experience by providing intuitive visual cues but also facilitates the effective extraction of data for consciousness research.

After capturing data, it is transmitted to a machine that simulates the participant's subjective consciousness and transforms it into visual artwork (See Figure 1). We employ the text-to-image model DALL-E [Ramesh et al. 2021] to convert consciousness into visual forms, enabling participants to observe the flow and transformation of consciousness visually. This process mirrors the way language interprets the world; humans use language and formulas to understand the world, but third-person descriptions can't fully grasp first-person experiences. Thus, we believe that changes relate only to its form, not its essence, which remains subjective and individual.

### 3 EXHIBITION

The "Illusory Eyescape" exhibition takes participants through a four-stage experiential process: entry, reading materials, viewing artworks, and either repeating or concluding the experience. As they read the on-screen materials, the system tracks their eye movements and extracts data, which serves as input for a text-to-image

model. Subsequently, the results from this model are displayed on the main screen and within the artworks, allowing participants to appreciate and reflect on the generated visual pieces. These artworks can, in turn, influence the participants' consciousness. At the end, participants can choose to continue reading to influence the next turn, enjoy the artworks, or end their experience.

This interaction creates a dynamic setting to explore consciousness. Participants generally experience real-time transformations of thoughts into images, although reactions vary on whether the machine-generated images meet their expectations. This variation underscores the subjective nature of human consciousness and the interpretive challenges faced by machines. Through the "Illusory Eyescape" exhibition, participants directly experience and reflect on the differences between human and machine consciousness, leading to a deeper understanding of how both perceive and interact with art.



**Figure 3:** Photographs of the "Illusory Eyescape" Exhibition.

## 4 CONCLUSION AND FUTURE WORK

The proposed installation aligns with the current trends in technology and art, highlighting the unique power of art to provoke thought and challenge existing paradigms. By interacting with the installation, the participant becomes part of the creative journey, experiencing the complexity and richness of human "consciousness," leading them to ponder its essence. Future developments could focus on optimizing technology, enhancing the interactive experience, and gathering more participant feedback. These efforts will further increase the interactivity and engagement of the artworks, ultimately enriching the participant's overall experience.

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