Curious Creatures: a living virtual research-creation lab

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ABSTRACT

The "Curious Creatures" project is an exploratory Research-Creation journey. Here, digital media practices in virtual reality (VR) are developed through an ongoing and evolving methodology. Sensorial engagement and embodiment practices are explored through practical exposure and theoretical study. Interactions between a user and their (VR) environment (as both agents of design and agents of use during the creation process) mirror intellectual and emotional decisions faced throughout the ongoing construction process. Through the study of and participation in the creative process, human agency is tested through these human-computer interactions where virtual environments are constructed with the anticipation of controlling the user's actions. Parallels are drawn to existing art, conceptual frameworks, engineering practices, and technology that inspire this curiosity driven exploration.

CCS CONCEPTS

• **Human-centered computing** → **Virtual reality**; *Collaborative interaction*; *Open source software*; • **Information systems** → Mashups.

KEYWORDS

virtual reality, research-creation, gesture tracking

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1 INTRODUCTION

Curious Creatures began as means to an end: As a way to both approach development through immersive virtual technologies and as a means to synthesize computational art techniques and concepts into tangible sensorial experiences. It has since grown into a living space of countless forked paths of questions and attempted answers induced by the exploration of the technical infrastructure available for VR creation. It is important to identify both the immersive expectations, and likewise challenges, of producing an experience that invokes a sense of presence. These two concepts I find quite vital to an engaged virtual experience; an experience that seamlessly fuses the visceral to the suspended.

The introduction of the element of surprise is a fairly simple way to achieve a moment of directed association within the virtual environment and this feature is honoured throughout the design and construction process. Whether the experiential moment is augmented, controlled, or induced by techniques such as visual cues, haptic responses, user-initiated environment transitions or, as this is an ongoing exploratory project, whatever else becomes desirable and useful to include- the core motivation is a curiosity driven symbiotic fusion of art, science and the technology that binds these together. Identifying moments that we share and experience daily through collective agency- but tie us so uniquely to a concept of existence, are those that I am seeking to imitate, create and re[search]-create. Particularly if they can be translated quite readily through the virtual medium. Users who engage with this living virtual experience will be immersed in a variety of embodiment opportunities- depending on the "Curious Creature" of focus at the time.

1.0.1 Outline. First, an introduction to the project and the inspiration for its existence is given to provide context and motivation. For the unacquainted reader a short primary on 'Research-Creation' as an academic process is outlined followed by a brief survey of interactive art framing participatory conditions. Last, a personal reflection on the current state of the project's design process and present features is concluded framing the research-creation process in an autoethnographic style.

1.1 Inspiration

Initial motivation for this work came from a number of discussions with Visual Arts Professor Emerita and New Media artist, Nell Tenhaaf [2, 3, 10]. A consistent thematic presence of opposition is developed throughout her art and one can look to exhibitions of hers where pieces such as Push/Pull are considered "a shaper of behaviours" as it attempts to entice an interactant's movements, and WinWin where she describes a "controller-controlled" behaviour scheme through human to non-human interactions that are transmitted back and forth via sound and light through a handheld controller and the structure known as WinWin. In particular, I was interested in Tenhaaf's multi-layered conceptual framework of control. In order for an interactant to control the pixelated-like imagery that appeared through the set of LEDs covering the surface of the WinWin structure, the user must be 'controlled' (i.e., in a zen-like control of themselves towards 'stillness'). The more an interactant shook or manipulated the controller itself - the less likely the desired state in the imagery could take hold. The imagery was encoded into a kinetic light display inspired from a naturally

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occurring phenomenon- the assemblage of crystalline nanostructures within a colloidal suspension. This is only achieved under certain environmental conditions (the aggregation is sensitive to turbulence) which Tenhaaf played into through the implementation of a conceptual framework idealized through the back-and-forth, give-and-take nature of controlling oneself to control alien others. Thus it is not always clear who or what is being controlled and what has initiated the controller, but it is often not nearly as literal as physically controlling the hand-held controller. Drawing from the Husserlian distinction [5] between spatial things that can be interacted with and temporal experiences that can be lived, I am curious to explore the blurring of lines in an aesthetic experience where the spatial things that are accessible for interaction generate temporal moments that, through their lived experience, simultaneously prevent, or alter, that which had just been possible to interact with.

2 BACKGROUND

2.1 Research-Creation

Chapman and Sawchuk[4] provide context of the importance of research-creation as academically valid pursuits that speak to 'contemporary media experiences and modes of knowing'. Research-creation is considered an emergent category in Canada and Chapman and Sawchuk see it as the 'methodological and epistemological challenge' to current academic frameworks in that the often tandem pursuits of technical, theoretical, and creative aspects quite readily forgo decorum and scholarly form in favour of experimentation. By identifying and discussing four sub-sets of research creation, they hope to open a discussion on its validity as process and not simply a result.

2.1.1 Research-for-Creation. Concerned with the need to initiate a search for quality and specific content in order to inform later creative pursuits. The result may be cyclically reviewed with further research and so on.

2.1.2 Research-from-Creation. Concerned with an initial artistic or creative body of work or project that can also be capable of generating research data for additional or secondary purposes and is often used to inform the creation as it happens. Additionally, generative data from a creative project may provide secondary research projects that may or may not be directly related to the initial creative concept.

2.1.3 Creative Presentations of Research. When traditional academic research is presented creatively- in any field of study. It may be that the creative process gives access to a specific body of knowledge or that a specific group is looking for creative interpretations and means of disseminating content and results to break down barriers found across broad interdisciplinary research.

2.1.4 Creation-as-Research. Inherently requires an act of creation or creative pursuit in order to obtain the desired knowledge. The resulting goal, the research itself, is achieved as a creation. Often the interest is in understanding the media in question by physically using it- the creative deployment may be the only valid methodology by which to achieve the theoretical analysis. It is likely more a questioning and redefining of the concepts of theory, creativity, and knowledge, than it is an iterative process between creation and reflection and knowledge and development.

2.2 Interactive Art

Huhtamo [6] provides a succinct, albeit 'tongue-in-cheek', breakdown of how to misunderstand interactive art. Common themes he addresses are how interactivity is not a new art form, but rather its inclusion with technology has made it more visible. Often there are negative associations with it as solely belonging to science and tech and not as accessible to art and culture due in part to mass media associations and the l-e-t-h-a-r-g-i-c process of legitimizing new mediums. Huhtamo laments on how video art only took 25 years and it's still barely tolerated. The misconception that often arises between doing 'artsy' things and academically or conceptually being an artist parallels the assumption that just because something is interactive doesn't mean there wasn't a creation process, purpose, or that the artist has not left themselves within the piece. Plausibly, most related to the 'Curious Creatures' concept of a virtual Research-Creation lab is the idea that the amount of interactivity is not necessarily the focus nor is it expected in, for example, art reflecting on historical preforms (I will leave it to the reader to curiously consider whether or not reading a satirical piece of writing as literal constitutes misunderstanding the interactive art on the misunderstandings of interactive art)...

A collection of essays and critical analyses on participatory conditions [1] provide a multi-faceted approach in framing participation and interaction. Particularly drawing from contributions on co-construction and the pacification and paradoxes of interactivity, a contextual road-map for stimulating production over consumption through internet mediated mutual cooperative practice is constructed. Here, participation under the ideology of collaborative creativity and worldmaking is a joint awareness that indulges one to combine the practice of manifestation with another- each equally responsible for the environment in which they are creating yet simultaneously building off one another's unique decisions in real time. The multi-user approach seeks to foster a symbiotic co-existence policy that parallels the participatory nature of our shared humane existence. Where there is 'success', there is 'failure'- neither is omitted from this morphing intersubjective experience pushing towards a collective emergence of distributed creativity.

Sha called for an approach to materiality in interactive and event-based art installations eschewing the discretization inherent in specifying a priori objects and subjects, offering instead an alternative framework that is inspired by continuous mathematics and process philosophy: "Let us use continuity and continua in their intuitive senses, seeing how we might make sense of matter as living continua versus matter chunked as living and inert objects"[9]. Curious Creatures has a foundational link to Sha's conceptual entanglement of media and materiality, with its focus on the ways in which media acts materially. Moreover, through the construction of a living virtual laboratory to play and construct computationally and curiously from within, it resonates deeply with Sha's computational motivation, in that "the computational affords boundless and intricate ways to construct media with experimentally different sorts of behavior than what one expects from non-computational media like water, wood, tissue, and sinew". Arguably the construction of

a living virtual laboratory to play and construct computationally within echoes this sentiment rather favourably.

3 PROCESS AND DESIGN

3.1 Technological Design Choices

The entire VR experience is built both conceptually and physically through bouts of live coding augmenting a stable structural base. During live coding experimentation I chose to work through CodePen- an interactive online hub of enthusiastic coders from all walks of life who upload, fork, share and express their code snippets, curious explorations and troublesome bugs- all to a public audience. Working in a environment such as this is an interesting experience, not unlike live updating a website, and often invited a state of flow- pulling one deeper into an expressive, artistic experience. You can erase, rebuild, pick and choose, rearranging the contextual emotions made tangible as you watch it built (rendered) right in front of you. It can become quite hypnotic- I found it to be both fascinating and at times frustrating, like a physically iterative design process that may or may not be inherent to building in VR. Often, to evaluate the creation process, one must physically enter the world they are creating, only to leave it shortly thereafter to 'adjust the code'. In this medium it is difficult not to be a literal part of the creation itself, fully immersed, and not just executing the process. To experience the building and creation process a room-scale HTC Vive VR system was used and connected to a WebVR enabled browser, such as FireFox Nightly (a development build), or Google Chrome.

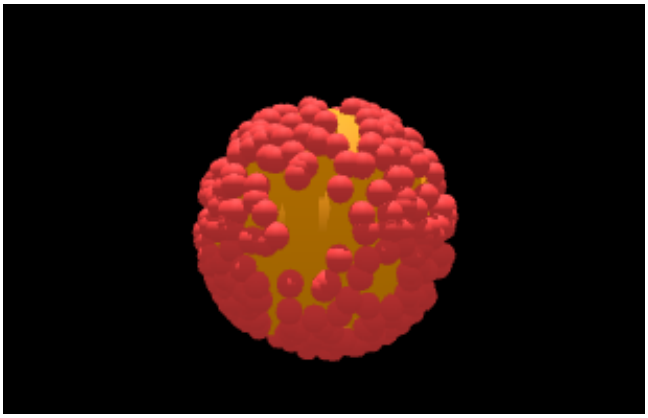

Figure 1: A sample structure used for testing control mechanisms in the VR environment.

3.2 Symbolic Features

Curious Creatures was initially run as a semi-logical state system such that different types and levels of interaction by an interactant in VR would trigger different and varying responses from the non-human agent(s). Often the interactions that facilitated the transition to a new state were not always obvious, but simple aesthetic clues could be observed, such as presenting the interactant with a large, eye-level, multi-layered, brightly lit, rotating sphere. This cue was reasonably expected to entice the interactant towards the sphere- possibly becoming curious enough to 'touch' it? Other examples include the 'mysterious' shadows that appear projected onto the spatially local surfaces directly surrounding, and beneath the interactant's position in Curious Creature- what might one do, or more aptly, where might one look when noticing shadows? Is the interactant drawn to curiously explore if there is a tangible or visible source to these shadows? Figure 1 illustrates an initial design used for testing the construction of this scenario.

This provides a similar dual level of abstraction as found in installations such as Tenhaaf's Push/Pull and WinWin [10] , where abstraction in software is considered from the perspective of being one of two types: "as endogenous (...behaviours are triggered autonomously within the agent itself...) or exogenous (behaviours run by an interactant)". Of interest here is the contextual framework emphasized by Naccarato and MacCallum [8] where, "[i]n the context of interaction design, 'taking the relation between subject and object by the middle' requires letting go of interpretations of mimicry and causality between pre-constituted 'things.' Only through their differentiation within processes of subjectification and intra-action do discrete 'things' become, and therefore become available as objects that can be made to interact."

Following work in Jang et al. [7], I also felt compelled to create using the perceivable limitless 'space' afforded by a virtual environment-in particular, choices in vertical alignment and spatial extension in the vertical axis were driven by their effective affect induced in an interactant's perceived immersive embodiment and sensitivity to change along this axis. Triggering events in the full 360 degrees available in a physically immersive virtual reality environment sought to encourage a more kinesthetic experience. Similarly, seeing the opportunity for exploring options of integrating a tactile experience I looked to a controller-controlled type scenario. Here I considered both VR controllers and later, the VR gloves, and what could be done. Could a haptic response be triggered? Could generative skins or objects be morphed visually onto the virtual hands? Might this encourage greater immersion or would this be the 'wrong' interaction design choice? Is too little or too much interaction more useful to an interactant when triggering unexpected state changes in spatial and temporal experiences?

At this point in my creative construction experience the consideration of a more complex personality-matrix and possibly the inclusion of a type of artificial-life are beginning to drive my curiosity. However, the value of implementing a conceptually simple, but artistically rich visual presentation is perhaps the best way forward from here at present.

3.3 Reflections on Development

The idealization of a completed 'work of art' that initially took hold, strongly, as the only benchmark for success soon became the barrier to that conceptual framework. Often I would realize much too late, that significant time was 'discovered' to have been spent 'adjusting a height', or 'tweaking a colour', or any number of carefully crafted execution possibilities. And although important, and certainly a direction I want to bring this piece towards as it evolves, there were many moments where what I wanted to create in any given moment was either not as clearly defined (as I have

now come to appreciate the value of doing), or if there was clarity of a specific implementation direction- the tools often did not exist.

There was a constant battle between a desire to implement some specific concept/task, with no consideration of the complexity of execution, and the desire to simply let go, breath, and shift perspectives to achieve a more engaging experience of enjoyment.

Curiously, as this project progressed, an alternative awareness of the depth and conceptual nature of art and a purposeful practice of creating for the sake of creating, began to emerge. I am fascinated to find out what this new motivational force could show me, particularly as it speaks to merging structure and integrity into a consistent framework; perhaps opening a pathway for clarity of concept to emerge via process and creative execution.

4 CONCLUSION

There is something oddly satisfying with naming a project after it's intended output and then being confronted with the notion that you were in fact, revealing yourself- to yourself. Curious Creatures was supposed to be the curious one; its artificial behaviour tweaked into an entity from which anthropomorphism would seep. Instead, for the time being, this first creation step of the entity now known as 'Curious Creatures' taunted me at every turn to explore deeper, to question wiser. The challenge is not to be stuck within the software but rather to ask a more clarifying question. To move beyond the methodologies of implementation and to move inward- to find a place from which I could draw creative reserves. I am sure some would find it amusing that the behaviour of this developer/interactant was so deeply shaped by an obscure fall down the proverbial rabbit hole during the creation of the virtual agent, and not during the actual interaction with the agent itself. According to Chapman and Sawchuk, "the point is to understand Research-Creation as a form of critical intervention that speaks to the media experiences and modes of knowing". Perhaps this experience was precisely that.

4.1 Future Work

Ultimately Curious Creatures will develop and grow as it morphs from its infancy as a virtual playground and into a conceptually driven manifestation of playing virtually. Through play and creation this evolving space will draw inspiration from mentors, artists, artistic expression and techniques, friends and scientific inquiries. Ideas will be implemented, techniques will be discarded, and hopefully much discourse and creative play will be induced through public exhibits.

Through the act of creating, each process will inform the research and direction of the next. Specific future adaptations will look at critiquing and evaluating artistic techniques and concepts both as a physical means in and of themselves 'to create for the sake of creating', and also as an effective method to gather exposure to both traditional art practices and new media collaborations, as well as active research into the practice of long time virtual and interactive artists such as Char Davies and Laurie Anderson. Certainly the inclusion of generative behaviour (artificial intelligence/life) would be a fascinating challenge as would the adaptation and inclusion of substantial anthropomorphic emotional scales. Integration and study of the perspective of poiesis as described by Sha's approach to materiality inspired by continuous mathematics and process philosophy is of particular interest as it encourages me to integrate aspects of my 'past-life' (a more formal technical and scientific designation) into digital and artistic endeavours.

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