



The Art of Dying in a Digital World: How Death is Represented in Digital Art

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Abstract With the rise of computing, human rituals and cultural practices have increasingly interwoven with digital technologies. In this milieu, the cultural facets of death and art are particularly noteworthy. The realm of art has undergone a seismic shift due to computing, developing new artistic forms and enhancing the reach of older forms. Concurrently, aspects of death are now integrated into digital technologies, manifesting in unique ways such as the retention of data from the deceased, digital expressions of grief, online memorials, and the like. In light of this, our fundamental, qualitative, and exploratory study endeavors to map out and discuss digital art pieces that delve into themes of death, mourning, and digital afterlife. In doing so, we probe the intersection of art, death, and technology. Our findings delineate the primary methodologies and technologies employed in digital art centered around death, and the nuanced modalities through which this subject is portrayed in digital media.

Keywords: Digital Art, Death, Information Technology, Human-Computer Interaction

1 Introduction

According to Duchamp and Cabanne [1990], “Art is a game among men of all eras”, permeated by the cultures and techniques of any given time, maintaining an interchange between its participants through influence and memory, evolving in tandem with societal shifts and giving shape to human thought. Art is far from taking on a static nature or being isolated from its historical context and social backdrop. On the contrary, it is dynamic, alive, and adept at harnessing the technologies and techniques of a society while concurrently engaging in dialogues with its myriad cultural facets.

With that said, the more recent dynamics in the realm of art and its interconnections with data, processes, and devices prevalent in the digital world emerge as potent representations of social thought and cultural rites. For Weiss [2019], the virtual space and the physical realm are intertwined tightly enough to foster the transition and adaptation of human cultural facets into the virtual domain: “Our campfires and radios are now called social networks, and all indications suggest that disentangling from them would come at a cost.” [Weiss, 2019]. In this vein, it is essential to highlight art’s role as a paramount cultural endeavor within the digital landscape, often coined as “digital art” [Rodrigues, 2012], “web art” [Nunes, 2003], among other nomenclatures. As articulated by Nunes [2003] and Rodrigues [2012], this mode of artistic expression encapsulates works harnessing digital and computational means, explicitly excluding those which merely use computational affordances to allude to or document pieces rooted in the tangible realm, like photographs of artwork or scanned versions of books.

During the recent SARS-CoV-2 pandemic, the demand for digital services and societal immersion into the digital do-

main surged at an unparalleled rate, eclipsing all prior eras since the Internet’s inception [Nunes, 2022]. At that time, death took center stage in societal discourse, with emotive appeals, funerary rituals, and the mourning process deeply embedded into online platforms [Trevisan *et al.*, 2023]. Although death and mourning as digital phenomena came into sharper focus in this setting, these themes have been interwoven into the web since its dawn. This is because the internet, as a realm for human interaction, extends the physical world and, as such, is saturated with cultural expressions [Weiss, 2019].

Therefore, it is imperative to underscore the inherent connection between art and death, and how this bond crystallizes in the digital realm. Death, as an inescapable and universal facet of the human condition, has perennially served as an inexhaustible wellspring of inspiration for artists across epochs and mediums [Townsend, 2008]. Within the digital sphere, through digital paintings, 3D sculptures, digital games, interactive installations, and other creative outlets, artists endeavor to confront and transcend the transience of human existence, delving into themes like mortality, mourning, memory, and the intrinsic value of life. This intricate interplay between art and death not only offers a conduit for existential introspection and catharsis for both creators and admirers but also pushes the boundaries of artistic representation, urging deep contemplation of the human condition and its interrelation with death.

Bolstering this perspective, according to Maciel *et al.* [2020], the implications of death within the digital realm are a pressing concern for computing, software producers, and legal frameworks. This is due to it being a nascent and relatively uncharted frontier of technological advancement and cultural practices. Echoing similar viewpoints and under-

scoring the importance of this study, we revisit Elias's assertion that "death is a problem of the living," [Elias, 2001] as well as the intersections between death and art in what is conventionally termed "funerary art" (as sculptures in cemeteries and tombstone engravings) or in figurative and symbolic representations of death and dying in visual arts.

Thus, the present study was constructed upon three pillars — art, death, and the digital world — aiming to map out and describe digital art pieces that address the themes of death, mourning, and digital immortality. Specifically, the goal is to gather texts discussing these themes, map out works fitting this context, explore techniques for developing digital art, and in the future, design and create works centered on this theme. To achieve this, we carried out an exploratory, basic and qualitative research [Wazlawick, 2009], involving a literature review and documentary research procedures. The literature review encompassed the aforementioned themes, with searches conducted in the following repositories: Google Scholar, IEEE Explore, ACM Digital Library, and SBC-OpenLib (SOL). Documentary research, on the other hand, revolved around the collection and description of works from the virtual repository ELMCIP (Electronic Literature as a Model of Creativity and Innovation in Practice) Knowledge Base, supplemented by other works from diverse sources. Both processes are detailed in Section 3.

This research is integrated with the partner research groups SEMIC¹ (Contemporary Semiotics) and LAVI² (Laboratory of Interactive Virtual Environments), both affiliated with UFMT (Federal University of Mato Grosso), through the project "Data Beyond Life" (Dados Além da Vida — DAVI³). The activities were carried out between September 2022 and August 2023.

This work is an extension of the article "Arte, Morte e Interatividade: Obras de Arte Digital que Transportam a Temática da Morte para o Campo das Tecnologias da Informação", published in Portuguese in the proceedings of the Workshop Sobre as Implicações da Computação na Sociedade (WICS) under the DOI: <https://doi.org/10.5753/wics.2023.230479>.

This article consists of 5 sections: Introduction; Theoretical Background (a brief discussion of fundamental concepts of the field); Literature Review and Mapping of Artworks (with a description of the methodology); Results (detailing the artworks, especially their approaches and technologies); and Final Remarks.

2 Theoretical Background

This section introduces the primary concepts and contexts of digital art and death as intertwined phenomena impacting technology and digital cultures. To do so, we revisit concepts from each of these topics in ascending order, starting with digital art. To conclude the section, related works are discussed.

2.1 Digital Art

In the 1940s, while the surrealist art movement took shape and World War II swept across Europe, the first computers emerged. Computing rapidly advanced with inventions such as transistors, integrated circuits, and computer graphics. In 1969, the birth of the internet paved the way for the development and dissemination of even more artistic categories and tools. However, the art world truly began to embrace these technologies in the 1990s, when the World Wide Web gained global popularity.

While they did not inaugurate the category of digital art, the first graphic interfaces emerging in the 1970s initiated their exponential growth and provided groundbreaking resources. According to Rodrigues [2012], this period marks the end of a purely analog era for the arts and establishes the beginning of a digital age, solidified in the following decades. Although in this text we use the phrase "digital art" to refer to the modality of art that encompasses computer-generated images, animations, videos, games, performances, interactive installations, and hybrid forms between different languages [Simanowski, 2014], this art modality can also be labeled as informational art, internet art, net art, web art, new media art, digital age art, and so on, according to Simanowski [2014].

With the advent of computational technologies, art forms now leverage computers, software, and other digital tools to craft works that delve into the creative and aesthetic potential of digital media. Thanks to the affordances of these technologies, digital art is distinguished by its potential to explore novel modes of interaction between the artwork and its audience [Venturelli and Teles, 2008], thus enabling viewers to engage with art pieces in innovative ways.

According to Townsend [2008], art has always tackled the subject of death from multiple perspectives. Alongside with love, beauty, nature and war, death is one of the most common motifs in the history of art. Funerary art, i.e., art that forms, or is placed in, a repository for the remains of the dead, dates back to pre-historical times (the oldest archaeological constructions are actually tombs) and is present in most cultures, shifting throughout world history between religious cultural practices and secular cultural practices. Religious funerary art includes objects crafted to honor the dead in their afterlife, connecting them with mystical figures and deities, as in catacombs, sarcophagi and church monuments, whereas secular funerary art often involves aesthetic representations of respect to the memories of the deceased, but no reference to metaphysical powers, as in the examples of the AIDS Memorial Quilt and The National September 11 Memorial and Museum.

Within a more specific context, digital art goes beyond paintings, sculptures, architecture etc. and addresses death through its own unique affordances, with the added layer of employing its meta-analytical capacity [Rodrigues, 2012] to reflect on the end of life within the digital realm, social networks, and algorithmic cultures. In this vein, Weiss [2019] reinforces the understanding of the transition of human life into the virtual space, implying the incorporation of sociocultural elements from the physical environment blended with new, distinct cultural facets of online networks. For Weiss [2019], virtual life is an extension of physical life, with both

¹Available on: <https://semioticascontemporaneas.wordpress.com/>

²Available on: <https://lavi.ic.ufmt.br/>

³Available on: <https://lavi.ic.ufmt.br/davi/>

being inseparable and crucial for a comprehensive understanding of post-internet human existence (and its eventual end).

Digital artists have an expansive array of techniques and tools at their disposal to craft digital art pieces. They employ specialized software to generate digital images, 3D modeling, animations, and various other visual effects. Furthermore, artists can utilize coding to create interactive works that respond to audience actions or are continually updated based on data availability. Digital art also allows for the creation of pieces in video and sound formats, delving into novel narrative and aesthetic possibilities. As Bell *et al.* [2004] suggest, digital art harnesses computers to produce or display art forms that leverage diverse channels, whether they are written, visual, auditory, or in hybrid multimedia forms.

However, the boundaries of digital art are not fully understood. For Rodrigues [2012], for instance, “it can be stated that digitization of photos, paintings, and books aren’t considered digital art per se.” Such views differentiate “digital-born” art from digitized art [Hayles, 2009], confining the realm of digital art to creative and aesthetic productions that have inherently “sprung” from this medium. Additionally, Lieser [2009] describes digital art as multimedia works that possess flexibility and portability, in the sense they can adapt to various devices and are easily disseminated. This form of art confronts significant challenges concerning its preservation and authenticity. Given the fleeting nature of digital technologies, many such artworks exist solely in a digital format, making them susceptible to technological obsolescence. Additionally, the ease of digital manipulation can cast doubt on the work’s authenticity.

Digital art has increasingly been recognized as a medium to delve into issues related to technology and contemporary society. Many digital artists utilize this medium to comment on and critique societal shifts, touching on concerns such as privacy in the digital age, artificial intelligence, virtual reality, the rise of technocapitalism, and digital immortality, as will be discussed further. Hence, it serves as a tool to probe these matters and spark public discourse around them.

2.2 Death and Technology

The nexus between death and technology stands out as a pivotal theme in contemporary times, heavily molded by the proliferation of social networks and the escalating digitization of human existence [Maciel and Pereira, 2015]. Grieving and death within a digital milieu bring forth profound complexities, claiming for thoughtful and discerning approaches [Maciel *et al.*, 2020]. The COVID-19 pandemic, as remarked upon by Nunes [2022], hastened society’s immersion into the virtual realm. This shift brought to the fore critical issues such as the conservation and fate of deceased individuals’ data, the inheritance of digital assets, and the evolving technologically-mediated mourning practices [Brubaker *et al.*, 2014].

A key concept anchoring the understanding of death within any technological paradigm is the notion of “digital afterlife” [Graham *et al.*, 2012]. This concept alludes to the lingering online presence and data residues left behind by individuals post their demise. In an increasingly digitized

era, users’ digital footprints have expanded exponentially, spanning across social media profiles, email accounts, cloud storage, and numerous online subscriptions. Such proliferation prompts ethical and legal concerns tied to privacy, ownership, and potential posthumous interactions [Maciel and Pereira, 2012]. It underscores the imperative for individuals to thoughtfully think over and plan the fate of their digital legacy [Graham *et al.*, 2012].

Digital technologies harbor the potential to proffer avant-garde solutions addressing matters of death and mourning. Yet, these groundbreaking strides don’t come devoid of substantial challenges. These include looming concerns over the deceased’s data privacy [Beppu *et al.*, 2021] and the enduring presence of deep-rooted cultural taboos [Maciel *et al.*, 2020]. Consequently, it is paramount to foster critical thinking about digital tech’s ramifications in the death and grieving milieu. There’s an urgent need to champion exhaustive research to carve out ethical and accountable pathways in handling these delicate issues.

According to Maciel *et al.* [2020], such a transition is both natural and anticipated, given that the virtual realm acts as an extension of the social world Weiss [2019], thereby being imbued with cultural practices, social dynamics, and the human essence. Mourning and death within a computational media landscape set forth a novel social paradigm, rife with variables awaiting to be explored by Human-Computer Interaction scholars, ideally within transdisciplinary cohorts. The magnitude of this emerging paradigm is so pronounced that it has given birth to a fresh industry termed DAI (Digital Afterlife Industry), which is geared towards the management of posthumous data, digital memorials, and other analogous services [Ohman and Floridi, 2017].

Digital technologies can offer useful solutions to address issues related to death and mourning, such as platforms for preserving memories and posthumous tributes. However, we must also be aware of the challenges that arise, like the matter of the deceased’s data privacy, preserving the dignity of the departed in the digital realm [Viana *et al.*, 2020], and the taboos that both users and software developers confront when faced with matters of death and mortality [Maciel and Pereira, 2015].

Thus, critical reflection on how digital technologies are transforming the way we deal with death and mourning is of utmost importance to ensure these tools are used responsibly and sensitively. More in-depth studies on the topic are needed to understand the complexities and challenges involved, allowing us to find more appropriate solutions for handling death and grief in the digital context.

2.3 Death, Art, and Technology

Given the discussions in the previous sections about death, technology, and digital art, there is evident intersection between these topics regarding the representations of death in digital art. In this light, the potential for reflection and social representation inherent to art matches the technical and expressive resources of digital technologies and their easy content distribution. This combination allows for a creative, reflective, and aesthetic approach to issues related to death, the mourning process, the value of human life, memory cre-

ation, immortality, funeral rites, and other aspects of death in various cultural contexts.

In terms of the relation between death and technology, digital art plays a pivotal role in depicting dying, delving into concepts such as immortality, mourning, the value of life, and memory [Rothblatt, 2016]. Contemporary artists harness advanced technologies, such as virtual reality and artificial intelligence, to challenge the boundaries of mortality and human essence, crafting immersive experiences that defy both traditional conceptions of life and death [Starck, 2006] and traditional symbolic representations of death, as in skulls, crosses, veils, wreaths, flowers etc. Artistic expression provides a creative and alternative approach to verbal language, making the topic more accessible to the general public [Townsend, 2008]. Regarding digital immortality, numerous possibilities arise with the use of Artificial Intelligence, which in turn prompts reflection from the perspective of human values embedded in these applications [Galvão et al., 2019].

In the convergence of death, art and technology, astonishing and unique artworks and techniques emerge. For instance, Gach [2019] illustrates how data analysis and visualization can be translated into the design of memorials, supporting works that are dynamic and integrated with the network, physical space, and context, continuously updated with fresh data. The author advocates for utilizing this approach to create art dedicated to honoring the deceased, using their personal data, and to emotionally support individuals navigating the experience of loss.

Moreover, digital art has opened avenues to delve into the theme of immortality in groundbreaking ways [Rothblatt, 2016]. By crafting pieces that incorporate virtual reality technologies, artificial intelligence, and other digital tools, artists aim to surpass human life's limitations and challenge traditional notions of mortality. These artworks provoke the audience to ponder over what it means to be human in an era where technology enables the fabrication of immersive experiences nearly indistinguishable from reality. Given that death remains a taboo in our society, artistic expression on the subject permits exploration of this theme through creative approaches distinct from our everyday verbal language, which typically shies away from addressing issues of mortality and the dying process.

Considering that the most popular forms of digital art nowadays are digital games, Marcos and Zagalo [2011] reinforce that digital games are pivotal expressions of contemporary art that serve as suitable platforms to approach profound, moving, and sensitive social issues, which includes death. Supporting this view, Edmonds [2010] contends that digital games combine various art forms, morphing them into something unique with their own aesthetic, narrative style, and interactive mechanics that amplify the work's significance. When games address topics like death, mourning, and the value of human life, Laamarti et al. [2014] label them as "serious games." For these authors, serious games represent an intersection between entertainment, multimedia, human experience, simulations, and digital games. Other researchers refer to these as "empathetic games" [Pineiro et al., 2016], given their potential to evoke empathy in players throughout the game-play.

The convergence of these themes sparked the interest of the research group "Dados Além da Vida" (DAVI), which delves into issues related to digital legacy, digital immortality, empathetic games, and education about death, driving research into the realm of the arts.

2.4 Related Works

This research is quite innovative in the sense that it related three different elements (art, death and digital technologies) connected to cultural practices in modern societies. Most papers we found often cover two of these subjects, like the relation between art and death, the relation between art and digital technologies, or the relation between death and digital technologies, but not the three of them.

For instance, Maciel et al. [2020] briefly discuss the main topics pertinent to the studies of death and digital technologies, such as digital immortality, digital legacy, online memorials, etc. However, this study does not include a topic related to digital art. Other works by the DAVI group, mentioned in section 2.2 of this paper, also fall into the same scope.

Likewise, Rodrigues [2012] delves into the encounter of art and the digital universe, presenting key concepts of this field, but does not approach death as part of this discussion.

On the other hand, Townsend [2008] develops a strong work connecting art and death throughout the humanity culture, techniques, and history. However, this research does not focus on digital art, shedding light only on analog works of art that address human mortality, such as film, photography and installations.

We found two works that concomitantly address digitality, death and art, but with a very different approach in comparison to ours. Ntelia [2015] addresses how death is perceived in digital games, but from a thanatological and philosophical perspective, whereas Ennis [2011] discusses the representation of death in digital photography and how it reconceptualizes mortuary photos that were typical of nineteenth-century photography.

Finally, it is worth mentioning that we found no other work mapping literature with the same approach we did, and no other work systematically mapping out works of digital art focused on a specific content, like death.

An important related work still in press is being carried out by other members of the Davi research group: a list of analog works of art dealing with death as a theme (paintings, sculptures, literary texts, songs etc.) is being compiled and will be added to the results of our mapping out of digital works. The final spreadsheet with works of art from both studies will be an artifact to help in educational projects aimed at teaching about death at schools, as discussed by Trevisan and Maciel [2023].

3 Methodology

This section is dedicated to describing the methodology used in the construction of this study, aiming to promote replicability and transparency. For clarity, this section is divided into two parts, each of which covers distinct stages of the

research process. This is an exploratory study [Wazlawick, 2009], with a qualitative approach. Its primary goal is to map out and describe digital art pieces that touch upon the themes of death, mourning, and digital immortality.

Initially, a traditional literature review Gil *et al.* [2002] was carried out to explore how scientific literature addresses death and digital art. We used the strings “data as art” + “death”, “death” + “information technology”, “digital art” + “death”, “digital afterlife” + “art”, and “games” + “art” + “death” in the search tools of platforms like Google Scholar, IEEE Explore, ACM Digital Library, and SBC-OpenLib (SOL). The publication repository of the DAVI⁴ project was used as another important reference for this process.

The texts were selected for this literature review based on their adherence to our aim of understanding the intersection between digital art, death and informational technology. By scrutinizing titles, abstracts, and keywords, we ensured that each text aligned with the themes identified for this study. The decision to include or exclude a particular text was guided by its relevance to our work goals, depth of insight, methodological compatibility, and the richness it contributes to the overarching theme. This selection process ensured that every text played a crucial role in advancing our understanding of the research topic.

In order to map out digital art pieces addressing death, a document research was undertaken [Gil *et al.*, 2002] based on the concepts of digital art and their relation to death elicited in the traditional literature review. Our scope for searching pieces of digital art was based on the concepts by Venturelli and Teles [2008] and Nunes [2022], thus prioritizing interactive experiences using web resources, programming, generative software etc., and excluding non interactive digital images such as those shared in Pinterest or commercialized in NFT stores. To this criterion, related to the material formalization of the artworks, we added a second inclusion criterion focused on the content of the works, which should be related to the themes of death, mourning, immortality, and/or digital legacy.

The search for art pieces was conducted in the open repository ELMCIP Knowledge Base⁵ using its search tool. This is one of the world’s largest free and open-access repositories for digital art and digital literature. Although the repository’s acronym refers to “Electronic Literature as a Model of Creativity and Innovation in Practice”, its content is not solely about literary works in the sense recognized by print culture. It represents an expanded understanding of the term literature, encompassing various forms of digital art intertwined with the written word to varying extents.

For the search of the artworks, the strings “digital art”, “grief”, “mourning”, and “death” were used, without the use of advanced filters. We opted not to use strings related to specific forms of digital art (“games”, “hypertextual narratives”, “interactive poetry” etc.) as these would limit the results to popular categories, and, as in any other emerging field, digital artists often refuse to classify their works according to well-established formats, using neologisms instead. The research was conducted in February 2023. The returned art-

works were then listed and organized by genre and authorship, and were further analyzed in-depth if they aligned with the scope of the research.

Similarly, other digital art pieces not found in the ELMCIP repository were incorporated into the selection due to their notable approach to issues related to death. These pieces were added to our corpus either because they were mentioned in the papers gathered in the literature review stage or were previously known to the researchers due to their creators’ popularity. Examples include the digital game “That Dragon, Cancer” and the documentary about its production “Thank You for Playing”, both referred to in previous works from the DAVI group. Other works identified out of the ELMCIP repository include “Imensuráveis”, showcased by the Sacred Art Museum of Mato Grosso; “A arte e o luto”, distributed by Calixto Gallery; “Queer Digital Intimacies”, presented by the digital gallery The Haven LGBT; “Illuminated Voices”, from the University of Central Florida; “Tumba”, a recommendation by the artist and researcher Fábio Fon; and “Gris” and “Spiritfarer”, from the Steam gaming platform.

In the selection of artworks, deliberate decisions were made to exclude commonplace elements like social media photos and texts, as well as digital illustrations, in favor of a pursuit of more interactive, disruptive, and technologically intriguing pieces. This strategic omission aimed to elevate the coherence of the corpus by focusing on art that goes beyond conventional forms, seeking to engage viewers in novel and innovative ways. It is also important to underscore that our intention was not to delve into digital games, as the primary objective of this search was to introduce diversity in the types of artworks presented, and a great bias would be introduced if we focused on digital games as a field that is much more massive and grows much faster than that of digital art per se. Consequently, extensive searches were not conducted on gaming platforms such as Xbox, Steam etc. in order to maintain a deliberate approach to a broader spectrum of artistic expressions.

The selected works can be seen in Table 1. As inclusion criteria for each work in the corpus, it had to answer YES to all following questions: Does the work relate to the themes of death or mourning? Does the work have artistic appeal that goes beyond commercial interests? Does the work use digital resources that transcend physical or non-digital mediums? In structuring the table, columns were determined based on the most important metadata of the works to provide an overview of the sample. It should be noted, however, that other crucial information, such as the year of production and/or programming language used, are not displayed here as they were not available in the repository for all works.

4 Results

Having presented the introduction, theoretical background, and methodology, we describe below the works identified in the research and listed in Table 1. For the sake of open science, the table includes links to each work of the sample we analyzed, which can be accessed and checked by readers of the paper. The list of works analyzed is part of the “DAVI na Escola” website, which lists useful artifacts for schools to

⁴Available on: <https://lavi.ic.ufmt.br/davi/publicacoes/>

⁵Available on: <https://elmcip.net/>

Table 1. Selected Works

Title	Authorship	URLs
A Arte e o Luto	Luísa Clauson	https://www.galeriacalixto36.com.br/post/a-arte-e-o-luto
Amazon	Eugenio Tisselli	http://www.motorhueso.net/wuwei/amazon/
At Nightfall, the Goldfish	Mou Peijing	https://elmcip.net/node/17738
DaddyLabyrinth	Steven Wingate	https://elmcip.net/node/10054
Death Becomes the Artist	Young-Hae Chang Heavy Industries, Young-Hae Chang e Marc Voge	https://elmcip.net/node/2623
Death Fugue and Illuminated Voices	Xtine Burrough	https://projects.cah.ucf.edu/mediaartsexhibits/uncontinuity/Burrough/burrough.html
Girl Birth Water Death	Martha Conway	https://elmcip.net/node/752
Gris	Nomada Studio	https://nomada.studio/
Imensuráveis	Museu de Arte Sacra de Mato Grosso	https://www.museudeartesa.org.br/exhibition_category/memorial-imensuraveis/
In a World without Electricity	Alan Bigelow	https://elmcip.net/node/7144
Inumeráveis	Edson Pavoni	https://inumeraveis.com.br/
Interstitial	David Jhave Johnston	https://elmcip.net/node/1469
I Have Said Nothing	J. Yellowlees Douglas	https://elmcip.net/node/2063
Last Words (Ordinary People Speak at the Moment of Death / in or around the New York City Area)	Alan Bigelow	https://elmcip.net/node/5009
May Amnesia Never Kiss us on the Mouth	Basel Abbas e Ruanne Abou-Rahme	https://mayamnesia.diaart.org/
My Hands/Wishful Thinking	Keith Obadike e Mendi Obidake	https://elmcip.net/node/11635
Passage	Jason Rohrer	https://elmcip.net/node/3655
Queer Digital Intimacies	Lari Burry de Souza	https://thehaven.lgbt/queerdigitalintimacieslaunch.html
Say Their Names	John Barber, Holly Slocum e Greg Philbrook	https://elmcip.net/node/15463
Spiritfarer	Thunder Lotus Game	https://store.steampowered.com/app/972660/Spiritfarer_Edio_Farewell/
Thank You for Playing	David OsitMalika e Zouhali-Worrall	http://www.thatdragoncancer.com/
That dragon, cancer	Ryan Green	http://www.thatdragoncancer.com/
The End: Death in Seven Colours	David Clark	https://elmcip.net/node/10816
The Executor	Nick Montfort e William Gillespie	https://elmcip.net/node/5023
The Fetch	Jerome Fletcher e Caden Lovelace	https://elmcip.net/node/8514
This is How You Will Die	Jason Nelson	https://elmcip.net/node/1351
To the Moon	Freebird Games	https://freebirdgames.com/games/to-the-moon/
Tumba	Paula Trojany	https://tumba.hotglue.me/
Wallpaper	Andy Campbell e Judi Alston	https://elmcip.net/node/12157

discuss death and technologies.

4.1 An Overview of the Mapped Works

The work “Inumeráveis” (2020) is a virtual memorial dedicated to Brazilian victims of COVID-19. Constructed on a web page, it displays a single column with the name, age, and a tribute left by the victims’ families. This singular column, in contrast with the multitude of names, gives a sense of infinity. At the end, there’s an appeal: “No one likes to be a number; people deserve to exist in prose”. Similarly, in “Imensuráveis” (2020), there’s the construction of a virtual memorial to honor the victims of COVID-19, featuring images and data about them. This work is an initiative by the Museum of Sacred Art of Mato Grosso, allowing its visitors to pay tributes to family members or friends they lost during the pandemic.

Much like “Inumeráveis” and “Imensuráveis”, “Say Their Names” (2020) is an online memorial. However, its focus diverges from the former works as it addresses deaths resulting from police violence. The piece recalls the name, age, date, and location of the victims’ deaths. Names are iteratively added to a virtual wall, which becomes increasingly dense and populated over time.

“That Dragon, Cancer” (2016) is a serious game that delves into the true and autobiographical story of Ryan and Amy Green, chronicling their experience of caring for their son Joel, a 12-year-old boy diagnosed with terminal cancer. Developed using the Unity engine, the game integrates a 3D world with a touching narrative complemented by an evocative soundtrack. In tandem, the documentary “Thank You for Playing” provides a behind-the-scenes look at the game’s creation, highlighting the emotional, design, and technical aspects, including the tools employed. This game has been analyzed from the user perspective in other studies conducted by the DAVI group [Santos *et al.*, 2018].

“May Amnesia Never Kiss Us on the Mouth” (2022) is a work that fuses physical installations with a multimedia web page, aiming to incite social reflection on the value of life in Iraq, Palestine, Syria, and Yemen. Similarly, the Brazilian piece “Tumba” (2020) uses virtual reality to explore how various cultures approach death and construct their mourning rituals. With this premise, the artist transfers cultural elements into the virtual realm to visually and topographically echo what exists in the physical world, offering a comprehensive and rich experience to those who cannot access these physical spaces.

In the same vein as “Tumba”, both “Queer Digital Intimacies” (n. d.) and “Say their names” (2020) employ virtual reality to showcase nuances of queer experiences and identities. The former is actually a metaverse hosted on its own website, dedicated to presenting digital artworks that reflect the value of queer life. Similarly, “My Hands/Wishful Thinking” (2000) critiques social relations and highlights the poignant case of Amadou Diallo, a migrant from Guinea who was tragically killed in the United States by police violence, tainted by racism and xenophobia. The piece is a web-page featuring illustrations, crafted using JavaScript and HTML (Hypertext Markup Language).

Conversely, “The End: Death in Seven Colours” (2015)

delves into the life and death of prominent figures, such as Alan Turing, Sigmund Freud, Princess Diana, Jim Morrison, Judy Garland, Walter Benjamin, and Marcel Duchamp, through a multimedia website. In doing so, the work builds an intimate connection between memory, pain, death, and mourning, introducing the cultural context and perspective inherent to each event. It represents various artistic approaches to distinguish the cultural practices surrounding the death of marginalized individuals, often treated as anonymous in official narratives, and that of celebrities. The differential response to death of members of these two groups in digital media is also observed by [Galvão *et al.*, 2019] in non-artistic contexts. They analyze how digital means of immortalization and the handling of one’s digital legacy differ for ordinary users compared to celebrities.

In “Gris” (2018), technology is harnessed to craft immersive aesthetic experiences that leverage interactivity and visuals to weave a profound and poignant narrative about the main character’s grief. The piece is a game built using the Unity engine, showcasing that technology can be a formidable medium for the creation of meaningful artistic experiences aimed at exploring deep and intricate themes and fostering an emotional bond between the piece and its audience. The game eschews text, instead utilizing mechanics, soundscapes, and richly illustrated settings to convey its intended message to the player. This game, regarded as empathetic by DAVI researchers, was the subject of analysis in Pinheiro *et al.* [2016].

“Death Fugue and Illuminated Voices” (2020) employs interactive physical installations built with micro-controllers and light projectors. These installations are used to reflect on the deaths of Holocaust victims and labor relations, aiming to produce memory through a dynamic experience. “Death Becomes the Artist” (n. d.) also conjures a dynamic performance, utilizing Adobe Flash to create a web-page with texts that resonate with the theme of death. “Girl Birth Water Death” (1995) also has an interactive proposal by using web programming to weave a narrative where the viewer engages with the plot. The piece portrays, through concise texts, various aspects of the human life cycle, particularly emphasizing death. “Passage” (2007), like previous works, employs gamification as a tool to deliver a narrative about life and death. The game is short in duration and utilizes pixel art for its aesthetic construction. Its creator, Jordan Magnuson, describes it as life in a bottle, a poem, and art that isn’t art for the sake of love, but rather a movement in support of artists who lack significant funding.

Addressing human life and its destruction by global technocapitalism, “Amazon” (n.d.) asserts code-writing as an essential part of digital art. Its author, Eugenio Tisselli, considers the program’s design as art in itself, which is complemented by the resulting web-page. This page also delves into environmental destruction and is partly a play on words between the names of the Amazon rain-forest and the major multinational corporation. Close in spirit to the previous work, “This is How You Will Die” (2005) merges gamification, poetry, and algorithms in crafting a page that disperses content about death. This content encompasses texts, videos, and images, which are randomly combined each time the viewer uses the “spin” function in an interface mimicking

a slot machine's operation.

“Last Words (Ordinary People Speak at the Moment of Death / in or around the New York City Area)” (2012) is a web-page built on HTML, CSS (Cascading Style Sheets), and JavaScript. It prompts reflection on death by presenting texts and audiovisual elements that evoke the final moments of life, the last thoughts, and the words of the chosen characters for the work. “In a World Without Electricity” (2012) is a website built using web technologies. The work, based on true events, portrays the tragic death of Kate and the mysteries surrounding her. The narrative serves as a memorial to the deceased and articulates a call for more thorough investigations to uncover what happened to her.

The game “To the Moon” (2011), developed on RPG Maker XP (Windows) and Unity (Mobile, Switch) game engines, employs a pixel-art universe and a captivating soundtrack to weave a compelling narrative. In the world of “To the Moon”, Johnny Wyles, who is on the brink of death, enlists the services of Sigmund Corp., a corporation skilled in creating artificial memories. They offer to utilize this capability to fulfill the dying wishes of the terminally ill. Stemming from this premise, the game's storyline delves into moments leading up to death, exploring life and memory.

“I Have Said Nothing” (1994) employs pure HTML to deliver a dynamic and captivating narrative centered around themes of death and mourning. Through hyperlinks, multiple pages, and choices about which page to read next, the piece offers the reader an intriguing and unconventional way to follow the story. “The Fetch” (2013) utilizes more sophisticated web resources, yet still straightforward in terms of technological complexity, to provide a unique reading experience in which two texts overlap and the reader can interact with them. Similarly, “At Nightfall, the Goldfish” (2021) also leverages the web to craft an interactive story, composed of poems that touch upon the themes of life and death.

“Interstitial” (2006) is a multimedia art project comprising three videos and audio elements combined in real-time using custom software. The project captures moments of transition, such as a decomposing cat in the Saint Lawrence River, landscapes in Vancouver, and the metamorphosis of a dragonfly nymph atop a piece of bread. The project reflects on the overlapping cycles of birth, life, and death through technology and artistic expression.

“The Executor” (2005) is a unique story collaboratively written by two authors: Nick Montfort and William Gillespie. They penned the story by alternating sentences, beginning with the last sentence and working their way backward. The plot centers on Jeremy Salader, who, after leaving his past behind, is compelled to return home due to a phone call. He finds out that his sister, Selma, is tending to their mother, who is on the brink of death at the family home, leading to a reunion with his estranged mother. The story is presented using Processing, an open-source programming language, and Java, where the text gradually shifts and speeds up as the narrative unfolds.

“Daddylabyrinth” (2014) is a multimedia memorial project, incorporating writing, videos, and web pages crafted using SCALAR. The project focuses on the intricate relationship between the author and his deceased father, examining the objects and emotions left behind by the latter and

their impact on the former's identity, especially as he too becomes a father. SCALAR was employed to enable navigation that aligns with the experience the author intended to convey. The work is available online and continues to be an expanding endeavor.

Lastly, in “Wallpaper” (2017), the story of PJ Sanders, a computer engineer grappling with the grief of his mother's recent passing, unfolds. The piece is a three-dimensional game boasting high-quality graphics and a mysterious ambiance. Similar to “Wallpaper”, “Spiritfarer” (2020) is a digital game but is visually two-dimensional. In “Spiritfarer”, the player steps into the role of Charon, the ferryman from Greek mythology responsible for transporting the deceased across the River Styx to the underworld. Thus, the game provides an engaging narrative that takes players through the life and death stories of various characters.

In the following sections, we group the works based on recurring approaches and technologies used, highlighting patterns we observed emerging during the mapping and description stages of the works.

4.2 Approaches

Contemporary digital art, driven by technology and creative experimentation with new media, proves to be a fertile ground for the exploration of narratives that address death and mourning. In this context, a series of notable works emerge, each with its unique approach, but all sharing the use of digital media as a fundamental vehicle to convey their messages and provoke deep reflections on the human condition.

In terms of recurring approaches, there are some similarities observed in the body of works mapped out by this research. For instance, it is noticeable that “Inumeráveis” and “Imensuráveis” are two poignant specimens of how digital art can humanize statistics and transform death numbers in massive catastrophes into personal stories, where suffering, loss, and finitude have their intimate dimension underscored for the survivors. Both works are virtual memorials that pay tribute to the victims of the COVID-19 pandemic, presenting their names, age, and tributes left by family members, thereby turning statistical data through art into a touching narrative. In a similar vein, “Say Their Names” focuses on victims of police violence, giving each name or incident record a story, using digital media to create an ever-growing virtual mural, making the reality of police violence more visible and impactful.

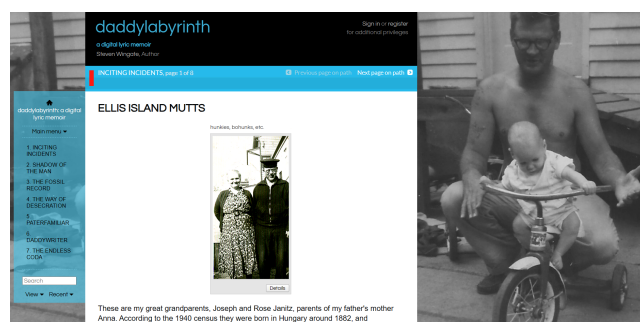


Figure 1. Screenshot from “Daddylabyrinth”.

“That Dragon, Cancer” and “DaddyLabyrinth” (See Figure 1) delve deeply into personal narratives of grief and loss to create digital empathy. As a digital game that narrates the experience of parents caring for a child with terminal cancer, “That Dragon, Cancer” employs autobiographical elements and interactivity to transport the audience into the poignant universe of caregiving and loss. In contrast, “DaddyLabyrinth” focuses on the complex relationship between the author and his late father, examining the objects and emotions left behind. Both projects exemplify how digital art, through games, can forge deep emotional connections through personal narrative and interactivity, even in media allegedly alien to the artistic universe, like videogames.

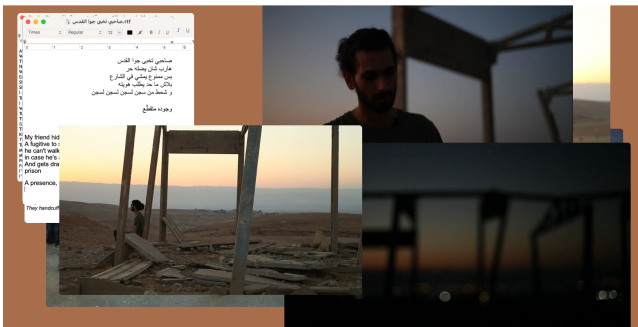


Figure 2. Screenshot from “May Amnesia Never Kiss us on the Mouth”.

In addition to these topics, some works also incorporate themes of political interest, such as “Queer Digital Intimacies”, which uses virtual reality to expose the nuances of queer experiences and identities. Works with similar approaches serve both as an artistic intervention and a call for reflection on death amidst contexts of war, social inequality, or the failure of the rule of law to guarantee the universal and inalienable right to life. Such is the case with the work “May Amnesia Never Kiss us on the Mouth” (See Figure 2), constructed in the social context of Iraq, Palestine, Syria, and Yemen to reflect on the value and how the lives of the populations in these countries are affected by wars. Similarly, “My Hands/Wishful Thinking” depicts the significant death of an immigrant killed in the United States due to police violence, racism, and xenophobia.

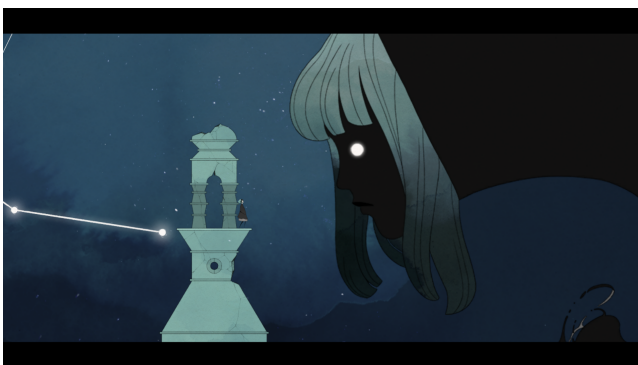


Figure 3. Screenshot from “Gris”.

There are also works exploring more conceptual themes, such as “Gris” (See Figure 3), which uses technology to create immersive aesthetic experiences, leveraging interactivity

and visuality to craft a complex and moving narrative, addressing themes of grief in its portrayal of death. “Tumba” and “The End: Death in Seven Colours” explore the diversity of media and approaches within the digital art landscape. “Tumba” employs virtual reality to explore mourning rites across different cultures, transporting cultural elements to the virtual space and enriching the experience. Meanwhile, “The End: Death in Seven Colours” delves into the lives and deaths of public figures, highlighting the intricate relationship between memory, pain, death, and mourning. These pieces exemplify how the variety of media available in contemporary digital art allows for a multimodal exploration of diverse perspectives on death.

The analysis of these contemporary digital artworks reveals a range of approaches to death, all utilizing digital technology as a central tool for artistic expression. While each of these works can be viewed as a distinct entity, they all share the potential to evoke emotions, foster deep reflections on human mortality, and offer a unique and personal insight into such a universal theme. The diversity of approaches in contemporary digital art underscores the richness of this field in its capability to explore complex and profound narratives related to life and death, connecting meaningfully with audiences in an increasingly digital and interconnected world.

Table 2 summarizes the main approaches found, and the works of art that apply. A work of art can belong to more than one category, depending on their aesthetic architecture and artistic goals.

The “Memorials” category refers to works that function as collective memorials, honoring people and providing a space for remembrance. These works convert data about death and the dead into art, and have a similar function to physical memorials where artistic architecture is used to lead visitors to introspective reflection. “Political appeal” is a category of works that discuss mortality from a political perspective, mainly using digital art as a medium to draw attention to relevant social problems that lead to the death of oppressed groups, such as civil wars, homophobia, xenophobia, racism etc. “Narratives of grief and loss” stands for works that explore personal narratives of pain, loss, and mourning, using various forms of digital media to create empathy and emotional connection with specific individuals, rather than collective experiences of death. “Abstract themes”, on the other hand, is about works that address death in a more symbolic or conceptual manner, through colors, non figurative shapes, or narrative events non-explicitly related to death. Thereby, these works create visually and emotionally complex and engaging experiences through multimedia metaphors rather than openly referring to death. Finally, “Death in different cultures” describe works that explore death within specific cultural contexts, different from Western societies, thus transferring multicultural elements to the digital realm and enriching the experience of diverse approaches to death.

4.3 Technologies Used

Each work employs different technologies based on its artistic concept, resulting in a diversity of formats and languages. Among the most commonly used technologies in the corpus described in this research is web programming, utilized in

Table 2. Main approaches of the works of art

Approach	Works of art
Memorials	Death Fugue and Illuminated Voice Imensuráveis In a World Without Electricity Inumeráveis My Hands/Wishful Thinking Say Their Name. The End: Death in Seven Colours
Political appeal	Death Fugue and Illuminated Voice In a World Without Electricity May Amnesia Never Kiss us on the Mouth My Hands/Wishful Thinking Queer Digital Intimacies Say Their Name
Narratives of grief and loss	A Arte e o Luto At Nightfall the Goldfish DaddyLabyrinth Girl Birth Water Death I Have Said Nothing In a World Without Electricity Passage Spiritfarer That Dragon, Cancer The Executor To the Moon Wallpaper
Abstract themes	Amazon Death Becomes the Artist Gris Interstitial Last words The Fetch
Death in different cultures	Spiritfarer TUMBA

works such as “Say Their Names” (See Figure 4), “In a World Without Electricity”, and “The Executor”. These pieces rely on algorithms to produce variable content, thereby offering an interactive experience to the viewer, prompting them to reflect on the elements of the work, centered around death and mourning.



Figure 4. Screenshot from “Say their Names”.

In works such as “To the Moon” (See Figure 5) and “That Dragon, Cancer”, the focus is on narratives, and technology is employed to tell compelling and engaging stories. These are digital games that make use of all their design tools, storyboarding, and gameplay, even though they deviate from the

classic interactions and mechanics of the genre.

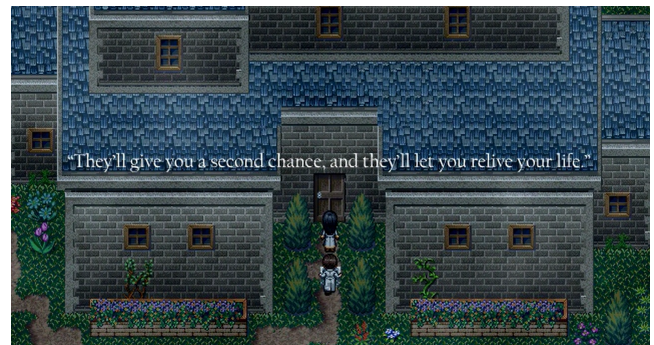


Figure 5. Screenshot from “To the Moon”.

Moreover, there are works with sound technologies, such as “I have said nothing” (See Figure 6), which uses audio to craft an immersive experience, and “Gris”, which employs music and sounds to create a melancholic ambiance, complementing the visual experience. Others, like “My hands/Wishful thinking” and “Death becomes the artist”, crafted for the Adobe Flash Player media player, primarily rely on the use of images and animations to convey emotions and messages about the human life cycle, death, and immortality through memory. However, due to the obsolescence of Flash, these pieces can no longer be played in mainstream browsers, which shows some of the risks of inaccessibility digital art (and digital media in general) are subject to.

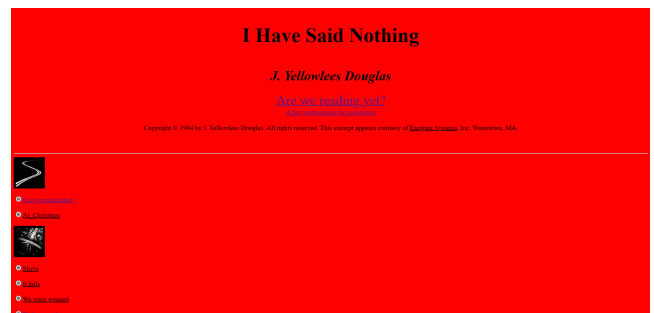


Figure 6. Screenshot from “I Have Said Nothing”.

In some instances, the work may intertwine the virtual and physical spaces with greater intensity and interactivity. For instance, the piece “May Amnesia Never Kiss us on the Mouth” blends performance, dance, images, and sounds with the support of both physical space and the web. While the physical version showcases projections and sounds in museums and exhibitions, accessible to people visiting those locations, the web version employs media resources, web programming, 3D modeling, sounds, and text, complementing the physical version and extending its reach, making it available to a broader audience. All these tools are adeptly used to prompt the viewer to question the value of life in locations where tumultuous political conflicts make death a permanently imminent risk.

Some artworks push the boundaries even further in their computational resources. “Amazon” exemplifies the use of programming, web, and interactivity to criticize the necropolitics inherently tied to environmental degradation. For its

creator, the act of coding, done in HTML, is an integral component of the artwork, intentionally designed to invoke reflections before any engagement with its visuals. Moreover, several artworks harness emerging technologies such as artificial intelligence and virtual reality. “Queer Digital Intimacies”, for instance, taps into virtual reality through the Unity platform. Many of these pieces are web-based, not accessible offline. “In a World Without Electricity” (See Figure 7), for example, intertwines the structure of a web page with gaming logic to convey a narrative where death and mourning serve as foundational themes.

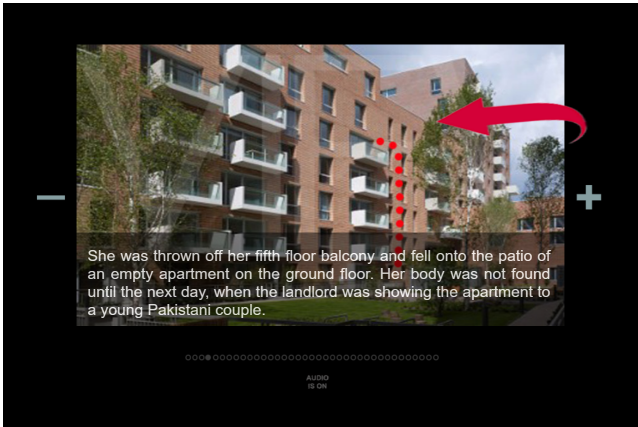


Figure 7. Screenshot from “In a World Without Electricity”.

These artworks compellingly attest to how contemporary technology serves as a potent instrument in delving into profound themes related to death, mourning, and the finitude of life. At the same time, they establish deep emotional connections between the pieces and the audience. Each embraces unique approaches, incorporating a variety of technologies and languages to achieve their artistic goals and convey impactful and thought-provoking messages. The artists have adeptly employed a variety of technologies to achieve their artistic goals and convey messages that provoke impactful and thought-provoking reflections on the human condition. To explore the intricate details of the technologies in each work, one can refer to the comprehensive categorization provided in the accompanying table (table 3).

5 Final Remarks

Given the questions raised and the objectives outlined for this investigation, it is clear that the theme of mortality consistently permeates the world of digital art. From this viewpoint, digital tools offer a rich landscape for the creation of works that delve into the various nuances of life’s end, addressing subjects such as grief, loss, memory, and the very experience of coming to an end. The diversity of languages, technologies, topics, and approaches present in the works analyzed shows that digital art is a dynamic domain, able to adapt and uncover new dimensions of expression and creation, with a range of focuses and perspectives.

This study revealed, in the set analyzed, a predominance of the use of visual and textual elements, often accompanied by narratives, interactivity, and web features, in the construction

Table 3. Technologies used in the works of art

Technology group	Works of art
Digital games	Gris Passage Spiritfarer That Dragon, Cancer To the Moon Wallpaper
Multimedia and web resources	A Arte e o Luto At Nightfall the Goldfish Daddylabyrinth Death Becomes the Artist Girl Birth Water Death I Have Said Nothing Death Fugue and Illuminated Voices In a World Without Electricity Interstitial Inúmeráveis Last Words May Amnesia Never Kiss us on the Mouth My Hands/Wishful Thinking Say Their Name The End: Death in Seven Colours The Executor The Fetch This is How You Will Die
Virtual reality	Queer Digital Intimacies TUMBA

of digital art pieces. Secondly, digital games also stood out in our corpus in representing this theme, which opens up possibilities of future research on gaming platforms specifically focusing on how digital games address death, dying and mortality.

It is possible to state that the primary goal of this research was achieved, as we mapped out and described digital art pieces that express the intersection of death and technology based on their approaches and technologies, supported by concepts gathered in the literature review. Obviously, if we adopted a different definition of digital art, which included, for example, digital illustrations and photos (made either by humans or artificial intelligence), we would get very different results and end up with a much bigger set of works of art. In that case, an automatic digital image analysis would be more suitable, which would require, however, a completely different research approach and method, which might be a future development for our studies, maybe also addressing NFT artistic images as an emergent technology.

Furthermore, it is evident that the artworks herein studied do not only portray death, but also encourage reflection on this phenomenon and our intrinsic relationship with it. Digital art has the potential to provide unique sensorial and emotional experiences, capable of evoking deep feelings and instigating reflections on life and death. Furthermore, it opens up new creative perspectives and forms of interaction with the public, facilitating the dissemination of art-pieces to a wider and more diverse spectrum of viewers. This, in turn, lays a foundation for future investigations.

However, digital art is not without its challenges and limitations, such as technological obsolescence and the difficulties of long-term preservation, as seen, for example, with works in Flash—a tool that ceased execution in 2020 in most web browsers [Pereira, 2022]. Moreover, it faces ethical issues and cultural taboos, given that the ubiquity of digital art allows works to be accessed globally, viewed through various social lenses, and leading to multiple interpretations of death, mourning, spiritual beliefs, and so forth.

For the future, there is an intention to continue this research, by delving deeper into theoretical references to understand the implications of issues related to death in the context of digital arts. Additionally, plans include a close analysis of some of the works from the corpus from aesthetic viewpoints and their potential social impacts. To achieve these goals, we aim to use analytical lenses that are relevant both to Digital Art studies and to Human-Computer Interaction studies, such as notions of interactivity, multimedia, and semiotics of computational interfaces. Moreover, exploring digital immortality, using artificial intelligence techniques, is a trend that deserves future studies.

Lastly, the analysis of the works may inform the production, by members of the research team, of digital pieces addressing death and its ramifications. Based on the findings presented in this paper, it was clear that digital games, with texts and audiovisual output, have a significant presence and potential to harness various media types and facilitate interactivity between the artwork and its viewers. As a continuation of this endeavor, there is an intent to produce a platform game that delves into death in the digital realm, exploring topics such as the fate of data and digital memorials.

In conclusion, digital art emerges as a potent tool for tackling intricate issues like death in a fresh and impactful manner, often employing auditory, visual, and interactive elements to convey the nuances of an event that can be challenging to articulate merely with words. It beckons us to reflect upon our personal experiences and feelings regarding death and to re-evaluate our bond with life and fellow humans, all while preserving memories and sparking political and societal contemplation.

Declarations

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Authors' Contributions

GA contributed to the conceptualization, data curation, investigation, formal analysis, visualization, and writing - original draft.

VP labored in the conceptualization, data curation, formal analysis, investigation, methodology, supervision, and writing - review & editing. DT supported as project administrator and worked in the methodology and supervision. CM worked on funding acquisition, methodology, theoretical basis, validation, and supervision.

All authors read and approved the final manuscript.

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