



Lovecraftian-Style Retro FPS with Adaptive Game Environmental Storytelling

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Dedication & Acknowledgements

This project is dedicated to my lovely Mam and Dad, Anne and Peter, who have been my staunch supporters from the beginning, always having my back no matter what. I find it hard to put into words just how much I love and appreciate them. But I can also somehow manage to write 17k+ words for this report. It is also dedicated to all my little sweethearts, without whom I could not have gotten through university. They are Molly, Lucy, Pins, Needles, Reilly, and Süß.

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1. Introduction & Outline

This project delves deep into the intersection of narrative and gameplay mechanics by creating a retro first-person shooter (FPS) that tells a story through its environment. This game is not just about shooting and surviving; it is about experiencing and influencing a world that changes with every player's death. The focus is on how these deaths corrupt and transform the world and its inhabitants, making every playthrough a unique narrative journey. The project aims to merge the nostalgic appeal of retro FPS games with the immersive, narrative-rich experience provided by environmental storytelling, all set within a Lovecraftian horror-inspired universe.

1.1 Motivation for Project

The motivation behind this project is rooted in the desire to push the boundaries of environmental storytelling within the context of a retro FPS game. There has been a notable revival of retro first-person shooters in recent years, and now the market boasts many of them, focusing primarily on shooting gameplay (Spencer 2021). This project distinguishes itself by incorporating a unique narrative/storytelling mechanic to set it apart from the standard approach.

Traditional storytelling in games often relies on direct narrative techniques, such as cutscenes or dialogue. Environmental storytelling offers a more immersive and interactive form of narrative that allows players to discover and influence the story through their actions and interactions within the game world (Game Maker's Toolkit 2020). Lovecraftian horror, known for its emphasis on cosmic fear and the unknown, provides a rich thematic ground for narrative exploration. By combining these elements, this project seeks to offer a fresh, engaging experience that pushes the boundaries of what retro FPS games can be. It aims to captivate players with its gameplay and engage them on a deeper narrative level. The following considerations drive this project:

- **Innovation in Narrative:** How can environmental storytelling elevate the gaming experience by creating a more immersive and interactive narrative?
- **Player Engagement:** How does changing the game world in response to a player's death increase engagement and investment in the game's outcome?
- **Technical Challenge:** What are the technical requirements and challenges of implementing a dynamic, responsive game environment in a retro FPS format?
- **Artistic Expression:** How can the themes of Lovecraftian horror be effectively conveyed through game mechanics and environmental changes?

1.2 Research Question

The central research question this project seeks to address is: “To what extent is it possible to implement environmental storytelling in a retro first-person shooter game in Godot?”. This question opens a few sub-questions:

- How can the principles of environmental storytelling be adapted to the fast-paced, action-oriented context of a retro FPS?
- How can a player’s death be a narrative and game mechanic to alter the game world and story?
- What are the technical and design challenges in creating adaptive environments in the Godot game engine?

1.3 Objectives

The primary objectives focus on environmental storytelling, aiming to create a narrative linked to the game’s environment. Every action the player takes is designed to have a lasting impact, meaningfully altering the world and its inhabitants, particularly concerning player death. Additionally, there is a strong emphasis on the technical implementation within the Godot game engine, developing a system that enables the game environment and its narrative components to adapt to player death.

The secondary objectives ensure the game maintains the feel of a classic retro FPS, preserving the aesthetic and gameplay characteristics of the genre, being fast, fluid, and visually reminiscent of the genre’s classics while integrating modern narrative techniques. Moreover, the project seeks to weave in the essence of Lovecraftian horror, utilising its themes to cultivate an atmosphere filled with cosmic dread and mystery, enriching the storytelling and enhancing the overall experience for the player.

1.4 Overview of Chapters

This report is organised into distinct chapters, each focusing on the project’s pivotal aspects. Chapter 2, the literature review, lays the groundwork for the research, examining the essence of retro FPS games, environmental storytelling, the principles of Lovecraftian horror, and an in-depth comparison of game engines with a rationale for selecting Godot over other options. Chapter 3 is the project’s methodology, detailing the entire process from analysis to testing, and examines organisational strategies and asset management. These initial chapters set the stage for the critical examination and narrative groundwork that define the project.

In Chapter 4, the project results are presented and evaluated, followed by a discussion that ties the findings to existing literature, assesses the project’s contributions, and explores the challenges and choices found and made throughout. The final chapter summarises the entire dissertation, answering the research question and sub-questions, reflecting on the project’s limitations, and suggesting avenues for future exploration, thereby encapsulating the research journey and its scholarly contributions.

2. Literature Review

This literature review is the foundational framework for understanding the project's goals and approach. It aims to dissect and synthesise the vast array of relevant academic and industry insights, linking the game's unique objectives with the broader context of video game development. It is divided into four main sections:

- **Retro First-Person Shooters:** This section explores what constitutes a retro FPS, how it differs from modern counterparts, and the essence of its design and aesthetics. It identifies similar works and delineates how this project diverges from existing games.
- **Environmental Storytelling:** The focus here is on defining immersive narrative and its differentiation from other storytelling methods. It discusses narrative techniques influenced by game mechanics, ensuring relevance to the project and contrasting with other works in the field.
- **Lovecraftian Horror:** Exploring Lovecraftian horror's principles and previous gaming applications. This part examines the unique aspects of cosmic horror and how they can be integrated into the game's environment and narrative.
- **Game Engines & Godot:** An introduction to what a game engine is and why Godot was chosen for this project. It compares Godot with Unity and Unreal Engine, discussing the advantages and disadvantages of each.

2.1 Retro First-Person Shooters

A retro first-person shooter, or boomer shooter, is a genre that revives the essence of 1990s FPS games, an era marked by pioneering 3D graphics and gameplay mechanics. These games are characterised by non-stop action, minimalist storylines, streamlined gameplay, and a distinct visual style featuring pixelated textures (Croshaw 2022; Retro FPS n.d.). The original retro FPS games, such as DOOM (id Software 1993) and Quake (id Software 1996), are celebrated for their fast-paced, maze-oriented level designs and an arsenal of distinctive weapons that emphasise strategic engagement over realism. While nostalgic, modern iterations of the genre are not mere replicas; they leverage today's technology to enhance graphics, introduce fluid movement mechanics, and offer more intricate level designs, thereby innovating upon the classic formula.

The appeal of retro FPS games lies in their ability to blend the nostalgic charm of '90s gaming with contemporary design innovations, as noted by CNRMRY (2023) and Veilleux (2023). Titles like DUSK (Szymanski 2018), Ion Fury (Voidpoint, LCC 2019), and ULTRAKILL (Patala 2020) exemplify this blend, maintaining the core fast-paced, action-centric gameplay while incorporating modern enhancements for a fresher experience. Retro FPS games continue to be a significant and influential part of the gaming landscape, offering a unique experience that honours the past while continually evolving to excite modern players.

2.1.1 Characteristics of a Retro FPS

Movement mechanics are one of the hallmarks of retro FPS games, emphasising rapid player movement. This is achieved through high player movement speeds and often includes mechanics like strafe-running, bunny hopping, or rocket jumping that allow players to traverse levels quickly and fluidly (Croshaw 2022). Implementing such mechanics requires careful consideration of physics and player control responsiveness. Then, at the core of a fast-paced retro FPS is a control system that feels responsive and intuitive. This means ensuring that player inputs result in immediate and predictable responses, allowing for quick manoeuvres, accurate shooting, and seamless navigation through the game world (Spencer 2021).

Maze-like, non-linear level design encourages fast-paced exploration and combat. To implement this, developers can focus on creating sprawling, interconnected environments that offer multiple routes and encourage swift navigation. Verticality and varied terrain can also enhance the pace, as players must rapidly assess and navigate complex spaces. (Veilleux 2023).



Figure 1. Quake is one of the first fully 3D FPS games and a pioneer in the genre.

Enemy encounters and AI in retro FPS games typically feature aggressive enemies that can be taken down quickly. The fast-paced action is partly due to the sheer number of adversaries and the player’s need to react swiftly to threats from multiple directions (Croshaw 2022). Implementing this aspect involves designing aggressive but predictable AI, allowing players to strategise quickly and maintain the flow of action.

The diverse arsenal available to players in retro FPS games is not just about the firepower but also how it complements the game’s pace. Weapons are designed to be distinct, with immediate and satisfying feedback (Retro FPS n.d.). Implementing varied weapons that encourage different play styles and strategies can keep the gameplay dynamic and fast-paced—for example, rapid-fire weapons for close-quarters mayhem and powerful but slow launchers for strategic strikes against groups. Limited HUD (Heads-up display, how information is visually relayed to the player as part of a game’s user interface) elements and streamlined resource management to keep the player focused on action rather than inventory management. This can be implemented by simplifying ammo and health pickups, making them recognisable and easy to collect on the run (Retro FPS n.d.). Additionally, auto-pickup for essential items can prevent gameplay from slowing down.

In retro FPS games, storytelling is executed with minimal interruption, focusing on embedding narrative elements directly into the gameplay environment. There are usually cutscenes or short story messages between levels to break up the gameplay slightly. Rather than lengthy cutscenes or detailed dialogue, developers can subtly convey the game's story through environmental storytelling and visual cues. This approach integrates narrative clues within the level design, such as the aftermath of past battles or mysterious messages, allowing the story to unfold organically without slowing down the game's fast-paced action. This minimalist storytelling method aligns with the genre's emphasis on maintaining a relentless gameplay flow while providing players with a more profound sense of purpose and immersion in the game world (Veilleux 2023; Retro FPS n.d.).



Figure 2. DOOM was not the first FPS but the first FPS game that millions of people played.

2.1.2 State of the Art

The current state of the art in retro first-person shooters is a vibrant and dynamic space where nostalgia meets innovation. Developers are revisiting the genre's foundational aspects and pushing the boundaries with modern technology and creative design. A combination of nostalgia, a desire for more straightforward gameplay, and the flexibility of modern development tools power this resurgence. Here is an expanded look at the state of the art, referencing the provided notes and identifying similar work.

The nostalgic revival and innovation within the retro first-person shooter genre represent a bridge between past and present, where games like DUSK, Ion Fury, and AMID EVIL (Indefatigable 2019) are not merely reviving the old style but actively reinventing it for today's audience. As Croshaw (2022) notes, these modern homages capture the essence of retro FPS and infuse it with contemporary sensibilities, including improved graphics and refined mechanics, creating a blend that feels simultaneously familiar and novel. Furthermore, these titles leverage current technology to enhance performance and control while introducing more intricate level designs. This technological evolution allows for complex enemy behaviours and more detailed environments, offering a more polished and immersive experience (CNRMRY 2023).



Figure 3. The very beginning of DUSK.

Regarding innovative gameplay mechanics, modern retro FPS games push the boundaries of what was traditionally possible. Advanced movement mechanics such as bunny hopping, rocket jumping, and parkour elements are becoming commonplace, adding a new dimension of depth and skill to the gameplay. ULTRAKILL exemplifies this trend, incorporating fast-paced and fluid movement that significantly enhances the intensity and satisfaction of combat (CNRMRY 2023). Additionally, newer titles explore interactive environments, allowing players to engage with the game world more meaningfully, including destructible scenery and complex physics puzzles that respond dynamically to player actions.

Several representative titles have made significant contributions to the genre:

- **DUSK:** It is revered for its dark, unsettling atmosphere and fast-paced action. It pays homage to classics while offering new twists like complex-level designs and an eerie narrative that unfolds throughout the game.
- **Ion Fury:** Developed using the BUILD engine, which powered many classic ‘90s shooters but with modern enhancements. It bridges the past and present, showcasing how far the genre has come while staying true to its roots.
- **ULTRAKILL:** It combines retro aesthetics with high-octane, stylish action. Its focus on movement and combat mechanics introduces a level of depth and replayability that’s distinctly modern.

2.1.3 Project Differentiation

This project carves a distinct niche within the retro FPS landscape by diverging from the genre’s traditional paths and infusing fresh, innovative elements. Unlike the typical retro FPS, which, as Croshaw (2022) and CNRMRY (2023) describe, often focuses on fast-paced action and minimal narrative, this project intertwines a deep, evolving narrative into the core gameplay that the fast-paced action affects. Drawing inspiration from the eldritch horrors and unsettling atmospheres of Lovecraftian horror, it offers a narrative depth not often seen in the genre.

A significant departure from the more static worlds of typical retro FPS games (Croshaw 2022), this project introduces environments that morph and corrupt in response to player actions, particularly deaths. This dynamic environmental storytelling enriches the narrative and adds layers to the gameplay, transforming familiar territories into unknown realms with each playthrough and encouraging players to adapt their strategies.

The game elevates the minimalist storytelling typical of retro FPS titles to a more immersive and interactive level. Whereas games like DUSK and ULTRAKILL have pushed the boundaries of level design and movement (CNRMRY 2023), this project integrates the story directly into its gameplay mechanics. Every player's decision and death weaves into the broader narrative, creating a personalised and deeply immersive experience.



Figure 4. *ULTRAKILL*'s exceptional combat.

2.2 Environmental Storytelling

Environmental storytelling is a narrative approach utilised in video games and various forms of media. Instead of relying on dialogue or explicit narrative explanations, this technique conveys story and context through the game environment. Leveraging the game's space, objects, and setting allows players to engage with and interpret the narrative through exploration and interaction. The essence of this method lies in weaving narrative elements into the spaces that players traverse, transforming them into participants in the storytelling process. Game Maker's Toolkit (2020) highlights that it entails utilising set decoration, architecture and other environmental intricacies to craft scenes that offer insights into the game's world, history and characters.

2.2.1 Characteristics of Environmental Storytelling

Environmental storytelling relies heavily on the physical space and the objects within it. Each area, room, or object is designed to contribute to the overarching narrative. This technique is exemplified in games like BioShock (Irrational Games 2007), where the opulent decay of Rapture tells a story of grandeur and downfall. Similarly, in Portal (Valve 2007), juxtaposed sterile test chambers with hidden chaotic scribbles create narrative tension. This characteristic emphasises that environments are not just backdrops but active participants in storytelling (Game Maker's Toolkit 2020; The Last Bacon 2019).

Environmental storytelling relies on players' interpretation and deduction skills to unravel the narrative. This form of storytelling immerses players, transforming them from spectators to active investigators (Worch and Smith 2010). As they navigate the setting and engage with their surroundings, players gradually piece together the storyline, creating a unique experience for each individual. This element is underscored by Shepard (2014), who explores how games such as Portal and Dead Space (Visceral Games 2008) leave narrative hints for players to uncover and decipher (Shepard 2014).



Figure 5. Clues of Portal's Rat Man.

Environmental storytelling blurs the line between narrative and gameplay, using the environment to tell a story and influence gameplay decisions and strategies. For example, the level design in Half-Life 2 (Valve 2004) or Dishonored (Arkane Studios 2012) does not just convey a story; it directly impacts how players navigate and approach challenges. In Half-Life 2, City 17 sets the scene of a dystopian regime through visuals like propaganda and patrols, cueing players into the game's conflict. In Dishonored, Lady Boyle's Party contrasts opulence with poverty, requiring players to use social stealth to uncover their target amidst a grand ball. This integration ensures that the story is not separate from but integral to the gameplay experience (Game Maker's Toolkit 2020; The Last Bacon 2019).

Environmental storytelling allows for dynamic and emergent stories where the narrative unfolds uniquely for each player based on their interactions. This is seen in games like The Last of Us (Naughty Dog 2013), where the environment holds stories of past inhabitants that players might discover in different orders or interpret differently. As Shepard (2014) mentioned, the environment provides resources for emergent narratives, offering a playground for players to create their own stories within the larger narrative framework. Its subtlety and layers of meaning often characterise environmental storytelling. Rather than overtly presenting the story, it embeds narratives in subtle details and symbolism, as seen in the meticulously designed worlds of The Last of Us or Enslaved: Odyssey to the West (Ninja Theory 2013). This approach invites players to look closer and think deeper, turning the environment into a puzzle of narrative clues (Worch and Smith 2010; Lawardorn 2020).

The game world's architecture and design often reflect the story's societal and cultural aspects, for example, the division between high and low status in Assassin's Creed (Ubisoft Montreal 2007) or the reflection of societal collapse in BioShock. This characteristic underscores how environmental storytelling can comment on broader themes and societal issues, enriching the narrative depth (The Kingdom 2022; Lawardorn 2020).



Figure 6. Samples of BioShock's environmental storytelling of the fall of the ideal.

2.2.2 State of the Art

The state of the art in environmental storytelling involves an advanced integration of environmental cues seamlessly woven into the gameplay and narrative. Games like BioShock and Portal are pioneers, using their environments to subtly suggest backstories, hint at future plot developments, and influence the player's emotions and choices. The art has evolved to create worlds where every detail, from the architecture to the placement of objects, serves a narrative purpose, enriching the gaming experience without the need for explicit exposition (Game Maker's Toolkit 2020; The Last Bacon 2019).

Contemporary video games increasingly feature dynamic environments that respond to player choices, enhancing the narrative's adaptability. Such environments evolve based on decisions made during gameplay, crafting a distinct narrative path each time the game is played. For example, in The Witcher 3 (CD PROJEKT RED 2015) or Red Dead Redemption 2 (Rockstar Games 2018), player interactions can trigger various environmental and narrative shifts, demonstrating an advanced form of environmental storytelling that continually evolves. This progression in game design enriches the player experience and reflects a growing trend towards more personalised and engaging storytelling techniques in gaming (Lawardorn 2020; Shepard 2014).

The depth of worldbuilding in current games has reached new heights, with developers paying meticulous attention to environmental details that flesh out the game world's history, culture, and society. Games like Cyberpunk 2077 (CD PROJEKT RED 2020) continue this trend, using their environments to create rich, immersive worlds. The environment tells its own story, providing insights into the world's past events, current status, and societal norms without a single line of dialogue (The Kingdom 2022; Lawardorn 2020).

Modern video games are progressively harnessing the environment to delve into their narratives' psychological and emotional landscapes. This approach includes crafting environments that mirror the protagonist's psychological condition or the overall emotional ambience of the story. A notable example is Hellblade: Senua's Sacrifice (Ninja Theory 2017), where the surroundings manifest the protagonist's mental state, subtly impacting the player's psychological engagement and emotional trajectory throughout the game. This method of environmental design enriches the gameplay experience and deepens the narrative's emotional impact (Game Maker's Toolkit 2020, Shepard 2014).



Figure 7. *Hellblade: Senua's Sacrifice*.

Games are now achieving narrative complexity that rivals traditional media, offering multi-layered stories where the environment holds multiple narratives, each interweaving and affecting the others. This complexity allows for a richer exploration of themes and characters, with the environment as a canvas for these intricate narratives. Players might uncover different layers of the story based on their exploration and interaction with the game world, making each playthrough a unique narrative discovery (Worch and Smith 2010; Shepard 2014).

2.2.3 Project Differentiation

In the landscape of environmental storytelling, this project carves out a unique niche by transitioning from the traditional static storytelling models to a dynamic, ever-evolving narrative framework. In contrast to games where the setting remains static and unchanged, this game features a system in which every player's demise triggers environmental alterations. This dynamic mechanism reshapes the physical space and the narrative context, making the storytelling deeply responsive to player actions.

The project amplifies the player-driven aspect of gameplay by ensuring that these environmental transformations are not isolated events but part of a continuous, accumulative process. Each alteration builds on the previous, reflecting the cumulative consequences of the player's decisions and actions (Shepard 2014). This feature boosts the game's replay value and deepens player engagement by actively influencing the game world.

Through this innovative approach, the game shifts the paradigm of environmental storytelling from a passive to an active element of gameplay, offering players a powerful tool to influence and experience the story in a manner that evolves uniquely with each playthrough. This integration of dynamic environmental changes positions the project at the forefront of narrative innovation in game design, promising a richer, more immersive player experience (The Last Bacon 2019; Lawardorn 2020).

2.3 Lovecraftian Horror

Emerging from relative obscurity at his death in 1937, Lovecraft's work, notably the "Cthulhu Mythos", has since permeated the fabric of modern horror, inspiring countless writers and creators across various media (Sandford 2016). Lovecraft's contribution to the genre is undeniable, with his notions of cosmic horror and the insignificance of humanity becoming almost cliché through their widespread adoption and adaptation.

While H.P. Lovecraft's contributions to the horror genre are significant, his legacy is complicated by his overtly racist and antisemitic views, which were notably extreme even during his era (Sandford 2016). These prejudiced beliefs are embedded within his narratives, creating a challenging paradox for contemporary audiences and creators who admire his imaginative creations yet grapple with the ethical implications of his ideologies (Sandford 2016). Despite these issues, Lovecraft's mythology continues influencing a broad spectrum of writers and artists who celebrate and critically reassess his contributions. This ongoing engagement ensures that Lovecraft's influence endures within the literary realm, serving as a critical reference point for delving into the depths of horror and the boundaries of the imagination while also addressing the problematic elements of his legacy.

Lovecraftian horror, or cosmic horror, delves into the profound fear of the unknown and the vast, incomprehensible universe (Haahr 2023; Blanchford 2022). This subgenre is characterised by its philosophical depth, where humanity stands insignificant and vulnerable against ancient, cosmic entities beyond understanding, such as Cthulhu and Nyarlathotep (Hull 2006). These beings symbolise the universe's indifference and the futility of human existence. The genre's essence lies not in the monstrous adversaries themselves but in the existential dread they evoke, revealing the universe's alien nature and humanity's inconsequential place within it (Hull 2006). Unlike traditional horror, which presents a definable and conquerable fear, Lovecraftian horror thrives on the unknowable and the incomprehensible, suggesting truths so alien that their mere perception can lead to madness or death (Haahr 2023).

The critical element of Lovecraftian horror is its focus on the unknown, with antagonists and phenomena that defy human comprehension and control (Blanchford 2022; Ralickas 2008). It is a genre where the most profound terror arises not from overt threats but from realising our insignificance and the vast, mysterious forces of an uncaring cosmos (Hull 2006; Ralickas 2008). Lovecraftian horror does not rely on jump scares or visceral horror but on a creeping

dread and existential terror, emphasising humanity's fragile place in the cosmos. This genre is about confronting the terrifying vastness of the unknown, where the quest for knowledge might lead to despair, making it a narrative of cosmic dread, existential terror, and the haunting realisation of the ultimate futility of human endeavour in the face of the universe's incomprehensible scale and indifference (Blanchford 2022; Haahr 2023).

2.3.1 Characteristics of Lovecraftian Horror

The characteristics of Lovecraftian horror stem from a deep philosophical underpinning that frames humanity as an insignificant speck in an uncaring and incomprehensible universe. This genre is distinguished by several key features that evoke a profound sense of dread and existential terror.

Lovecraftian horror is characterised by its emphasis on the unimaginable scale and complexity of the cosmos. It suggests that the universe is far older, vaster, and stranger than humanity can comprehend. This notion is encapsulated in 'denied primacy', where humans are neither the first nor the most significant civilisation (Haahr 2023). The genre posits that other beings and civilisations have existed long before and will continue long after humanity's brief tenure, dwarfing our achievements and existence.

The 'forbidden knowledge' theme is central to Lovecraftian horror. This is the idea that some truths are so fundamentally alien and disturbing that understanding them can only lead to madness (Haahr 2023). This understanding is frequently connected to beings like Cthulhu, Nyarlathotep, and Yog-Sothoth. They are ancient and otherworldly, often beyond human understanding, their mere existence challenges the protagonists and the readers' perception of reality and place in the universe.



Figure 8. "Vision of Terror" (Jacinto (n.d.)) showcases Cthulhu, one of Lovecraft's most famous creations.

Furthermore, Lovecraftian horror often features an 'illusory surface appearance' where the veneer of normalcy and the familiar world conceals a much darker, more terrifying reality (Haahr 2023). This characteristic speaks to the fear of the unknown and the dread of what lies

beneath the surface of our perceived reality. The realisation that our everyday world is just a thin, fragile layer covering a much more horrific truth is a recurring theme in Lovecraft's work.

Additionally, 'unwholesome survival' suggests that certain entities or knowledge persist beyond their natural existence, encroaching upon the human world with malevolent or indifferent intent (Haahr 2023). These ancient beings and their knowledge are not bound by the same physical and moral laws that govern humanity, making their existence a source of terror and fascination.

Lastly, Lovecraft's works often blur the line between reality and dreams, a concept known as 'oneiric objectivism'. Dreams may become real and hold more truth than actual reality. They can be portals to other dimensions or reveal hidden, terrible truths about the universe (Haahr 2023). This ambiguity between dream and reality further destabilises the protagonist's and reader's sense of security and understanding.



Figure 9. "The Unknown" (PATVIT 2018).

At its core, Lovecraftian horror transcends mere encounters with otherworldly monsters and deities hidden in the universe's shadows. Instead, it centres on the existential terror that arises from recognising humanity's triviality against the vast, mysterious expanse of the cosmos. This genre deeply probes the fear of the unknown and the unfathomable, instilling a pervasive sense of disquiet and reflective unease (Hull 2006; Ralickas 2008).

2.3.2 State of the Art

The current landscape of Lovecraftian horror in video games showcases the genre's dynamic evolution, tailored to suit the unique interactivity and immersive qualities of gaming. This progression embodies the core themes of Lovecraftian horror—humanity's triviality, the dread of the unknown, and the grim repercussions of delving into forbidden realms, themes prominently discussed by authors such as H.P. Lovecraft (Blanchford 2022; Haahr 2023).

Direct adaptations of Lovecraft's works in video games like Call of Cthulhu: Dark Corners of the Earth (Headfirst Productions 2006) demonstrate the inherent difficulties in translating

Lovecraftian horror into interactive media. These adaptations often grapple with preserving the core of Lovecraftian horror, which is challenged by the empowering nature of video games. In *Dark Corners of the Earth*, players initially experience vulnerability, navigating a minimally guided world with an interface that forgoes conventional health and ammo displays for a more immersive experience. However, as players advance, acquiring skills and weapons, their growing empowerment contradicts Lovecraft's theme of human insignificance against the backdrop of cosmic horrors (Garrad 2021). The game's shift from vulnerability to empowerment challenges the persistent dread and sense of futility essential to the Lovecraftian atmosphere. The ultimate challenge is crafting a game that sustains this feeling of overpowering dread and trivial human existence, aligning with Lovecraft's vision of existential horror without a definitive goal, thereby deepening the player's engagement with the thematic elements of cosmic insignificance.



Figure 10. *Call of Cthulhu: Dark Corners of the Earth*, the attack of Dagon.

Lovecraft's influence extends beyond direct adaptations, seeping into various popular games. This widespread incorporation speaks to the versatility and enduring appeal of Lovecraftian themes. However, embedding these elements into various genres, from high fantasy to survival horror, presents challenges. In games like *Terraria* (Re-Logic 2011) or *World of Warcraft* (Blizzard Entertainment 2004), where Lovecraftian creatures become just another enemy to defeat, the essence of cosmic horror — the overwhelming and incomprehensible nature of these beings — can be diluted. The challenge for game developers is to incorporate Lovecraftian elements in a way that respects the source material's emphasis on the unknown and unknowable, ensuring that these elements contribute to the game's atmosphere and themes rather than merely serving as aesthetic choices (NeverKnowsBest 2020).

Indie games often excel in capturing the psychological aspects of Lovecraftian horror, focusing on the internal deterioration of the mind when faced with cosmic incomprehensibility. *Darkest Dungeon* (Red Hook Studios 2016) is a prime example, where the gameplay mechanics — particularly the stress and affliction systems — are designed to reflect the psychological toll of confronting eldritch horrors. The game's grim atmosphere, challenging gameplay, and relentless portrayal of the adventurers' descent into madness capture the essence of Lovecraftian despair and futility. These indie interpretations, unbound by larger studios' commercial constraints, can explore psychological horror and the subtler aspects of Lovecraft's themes in depth, offering players a more nuanced and immersive experience (NeverKnowsBest 2020).



Figure 11. Darkest Dungeon implements Lovecraftian horror through its worldbuilding and visuals.



Figure 12. Darkest Dungeon's excessive stress mechanic leaves an impactful negative result or trait on the character.

Bloodborne (FromSoftware Inc. 2015) stands out as a landmark in Lovecraftian gaming, weaving the genre's themes into every aspect of its design. The game's narrative arc mirrors a Lovecraftian story, with the protagonist initially battling seemingly conventional beasts before the true, cosmic nature of the horror is revealed. This gradual revelation is not just a narrative device but also a gameplay mechanism, with the player's increasing "Insight" stat revealing more of the game's true horrors. Bloodborne also distinguishes itself by creating its mythology, inspired by but not beholden to Lovecraft's specific creations. This approach allows the game to explore the themes of cosmic horror, forbidden knowledge, and the insignificance of humanity in fresh and innovative ways, making the experience uniquely terrifying and engaging. The game's success demonstrates that Lovecraftian horror in video games can be both profoundly thematic and wildly popular, offering a model for future titles in the genre (Boehm 2020).



Figure 13. Bloodborne's insight mechanic reveals an abomination that has been observing the player the whole time.

2.3.3 Project Differentiation

Unlike direct adaptations of Lovecraft's work, which often struggle due to the inherent contradiction between the defeatist nature of Lovecraftian narratives and the goal-oriented structure of most video games, this project circumvents this issue. Traditional games require a victory condition, a concept at odds with Lovecraft's themes of inevitable defeat and the futility of understanding (Garrad 2021). However, this project embraces these challenges, weaving the inevitability of defeat and the superficiality of victory into its core mechanics. Instead of seeking to conquer the unknown, players are encouraged to experience and survive it, knowing that any victory is temporary and any understanding is fundamentally flawed.

Traditional video games often feature opponents who can be defeated and scenarios where winning is possible (Haahr 2023). This project diverges from the norm by integrating the core Lovecraftian theme that some horrors are beyond human understanding or overcoming. Rather than presenting clear-cut enemies and winnable battles, it introduces antagonistic forces that are cryptic, overwhelming, and often indifferent to human struggles. This approach ensures that the sense of dread and the unknown is maintained, reflecting the true essence of cosmic horror.

In conventional games, knowledge is power. However, in Lovecraftian horror, knowledge often leads to madness and despair (Haahr 2023). This project incorporates this concept by acquiring knowledge, a risky endeavour that can lead to both in-game advantages and psychological consequences for the player's character. As players uncover more about the game's universe (as they die and restart), they must balance the benefits of this knowledge against the increasing instability of their character's mind. Prolonged survival is typically a sign of success in games. However, in a Lovecraftian context, it is a testament to the character's diminishing sanity and the increasing bleakness of their situation (Haahr 2023). This project redefines survival not as a triumph but as a continued descent into a nightmarish reality. The longer one survives, the more they are exposed to the cosmic horrors and the more their grasp on reality wavers.

By tackling the difficulties of translating Lovecraftian horror into an interactive format and embracing concepts of the unknowable, unavoidable defeat, and the perils of hidden knowledge, this project delivers a distinct and captivating experience that differentiates it from similar works in the genre. Rather than merely narrating a tale within a Lovecraftian setting, it immerses players in the existential anguish and cosmic dread quintessential to Lovecraft's narratives.

2.4 Game Engines & Godot

Game engines are foundational software frameworks tailored explicitly for video game development, equipped with an array of visual tools and reusable software components that streamline the creation of games. According to Vohera et al. (2021), these engines play a crucial role in the game development landscape by accelerating the integration of diverse gaming modules such as animations, graphics, artificial intelligence, and physics. Furthermore, they enhance the scalability and flexibility of game development by reusing components. These versatile engines support development on various platforms, including consoles, mobile devices, and personal computers, and facilitate essential game development functions such as graphic rendering, data analysis, physics simulations, and memory management.

Game engines encompass a variety of components crucial for game development. According to Studytonight (n.d.), these components include input handling for diverse devices, graphic generation with support for 3D assets and effects, physics engines for simulating real-world physical systems, artificial intelligence for character behaviour, sound engines for audio effects, and networking for multiplayer capabilities. These engines simplify complex development tasks by providing an abstraction layer that handles the underlying complexities, allowing developers to focus on creating engaging and innovative gameplay experiences.

Lewis and Jacobson (2002) further clarify that a game's engine comprises modules that manage input, output (including 3D rendering, 2D drawing, and sound), and the generic physics of game worlds without directly specifying the game's logic or environment. This separation enables developers to modify game mechanics and environments using game-specific scripting languages and advanced development environments, often provided by the game engine. A key component is a rendering engine that efficiently renders the player's view from a complex 3D model, showcasing the engine's capability to bring virtual worlds to life.

2.4.1 Unity vs. Unreal Engine vs. Godot

According to the GDC 2024 State of the Game Industry survey, Unreal Engine and Unity are the popular game engines, with 33% of developers each choosing them as their primary toolsets. These were followed by proprietary/in-house engines and the open-source game engine Godot (Elderkin 2024).

From Elderkin (2024), Unity stated in September 2023 that it would begin collecting a “Runtime Fee” based on the number of game installs. This sparked much criticism and led to the new policy being amended. Following these advances, one-third of respondents stated they had explored switching game engines in the previous year or had already done so, while almost half said they had not considered switching.

Unity, Unreal Engine, and In-house engines/Godot are some of the most used engines in the industry. All are also powerful 3D engines, which are needed for the project. From Ahamed (2023), with slight adjustments from findings by Vohera et al. (2021), the following table was created:

Feature	Unity	Unreal Engine	Godot
Cost	Freemium with paid pro plans	Subscription-based, royalty-free for first \$1 million in revenue	Open-source and completely free
Ease of Use	Beginner-friendly interface, extensive tutorials and resources	Hard learning curve, but powerful tools and features	Simple and intuitive editor, tailored for individual developers
Graphics Quality	Capable of impressive visuals, but requires skilled optimisation	Renowned for stunning visuals and cutting-edge rendering technology	Good visuals but lacks high-end graphical elements
3D Asset Compatibility	Massive asset store with pre-made models, animations, and effects	Huge library of high-quality assets, provided often with royalties	Growing asset library, but limited compared to larger engines
2D Game Development	Strong 2D capabilities with dedicated tools and plugins	Primarily focused on 3D, but 2D tools are improving	Built-in 2D engine with robust features and dedicated scripting language
Mobile Development	Excellent multi-platform support, including mobile deployment	Powerful mobile development tools, but requires specific knowledge	Native mobile development support, ideal for budget-conscious projects
VR/AR Development	Dedicated VR/AR plugins and tools	Industry-leading VR/AR capabilities, often used in high-end projects	VR/AR support through community plugins and initiatives
Scripting Languages	C#, JavaScript, and custom UnityScript	C++ primarily, with Blueprint visual scripting for beginners	C# and GDScript, a dedicated language for Godot
Community and Support	Large and active community, extensive online resources	Huge and engaged community, professional support available	Growing community, primarily focused on online forums and tutorials

Table 1. Unity vs. Unreal Engine vs. Godot (Ahamed 2023).

Unreal Engine is not a contender for this project because of the steep learning curve, particularly for beginners or those coming from simpler engines. Mastering the comprehensive toolset and functionalities may require time and effort. The graphics prowess of Unreal Engine necessitates steep hardware requirements. Creating and operating Unreal projects may necessitate sophisticated technology, thereby limiting accessibility for developers using less advanced platforms (Ahamed 2023).

Unity is a very close choice for the ideal game engine but has been known to have some performance concerns, particularly in resource-intensive games. Because improving performance may necessitate additional effort, developers must be conscious of efficient coding approaches. It uses a subscription-based pricing model for some features and services. While the basic version is free, access to more advanced features and services may need a subscription, which budget-conscious developers should consider (Vohera et al. 2021).



Figure 14. Unity, Unreal Engine, and Godot logos.

Godot is renowned for its robust functionality and adaptability in game development, particularly noted for its performance efficiency, even on minimal hardware resources, necessitating only an OpenGL 3.1 compatible GPU. This efficiency makes it suitable for developing less powerful machines and various operating systems, including Linux (Gamefromscratch 2023). As an open-source engine licensed under the MIT license, Godot provides developers exceptional flexibility and control over their projects, contributing to a vibrant, collaborative community that actively contributes to its ongoing enhancement and stability (Gamefromscratch 2023; DevWorm 2023). Moreover, it offers a unique blend of freedom and cost efficiency, enabling developers to alter, distribute, and monetise their games without the burden of licensing fees or revenue sharing.

The engine's architecture, specifically tailored for 2D and 3D game development, provides an intuitive, node-based structure that simplifies game design and coding through GDScript (or optionally C#), a Python-like language crafted exclusively for Godot. This design philosophy ensures a seamless integration of features and an efficient workflow, making it an ideal choice for beginners and experienced developers. This is further enhanced by a detailed documentation system (DevWorm 2023; Rock Milk 2017). Godot's comprehensive debugger, callback system, and quick file processing contribute to its appeal, fostering a robust and collaborative community around its development (DevWorm 2023).

Godot's sophisticated 3D graphics capabilities and support for detailed environmental storytelling enable creators to construct deeply atmospheric, narrative-driven worlds essential for conveying the cosmic dread and existential terror central to Lovecraftian horror. The engine's node-based system and GDScript language further streamline the development process, allowing for the efficient implementation of complex gameplay mechanics and interactive storytelling elements necessary for a retro FPS that immerses players in a Lovecraft-inspired universe.

Godot's combination of performance and accessibility, while still having powerful 3D features, makes it an optimal choice for this project.

2.4.2 Godot Architecture

Godot employs a SceneTree and Node architecture, organising all game objects hierarchically. In this architecture, each node can have multiple child nodes but only one parent node, except for the singular root node with no parent. This organisation facilitates the management of complex game scenes featuring multiple nested elements.

Key aspects include:

- **Nodes:** These are the essential building blocks in Godot, capable of representing elements like sprites, sounds, scripts, and game logic. Every node is engineered to perform a specific function and can be integrated with others to create sophisticated behaviours.
- **Scenes:** A scene in Godot consists of a hierarchical assembly of nodes. It could depict a character, a game level, a user interface component, or any other game element. Scenes are designed to be modular, which means they can be saved, replicated, and instantiated, simplifying the reuse of game assets and logic.
- **SceneTree:** Represents the active structure of the game, beginning from a root node and extending downwards. This tree layout supports the orderly organisation of game components, with parent-child relationships influencing how nodes interact, including their transformations and visibility settings.

3. Methodology

This section delves into the procedures followed, the tasks completed, and the rationale behind each step of the project. The content encompasses the groundwork, outlining and planning, execution, and evaluation. Additionally, it briefly addresses tactics, resource handling, and project planning for comprehending how the project evolved and how decisions were made.

3.1 Proof of Concept

This project's proof of concept demonstrated the initial viability of creating a game where each player's death alters the game world, reflecting a descent into corruption. This section details the components, the methodology behind its creation, the environmental changes implemented, potential future issues, findings from this early stage, and a plan for future development.

This proof of concept is comprised of several integral parts:

- **Basic Game Mechanics:** A functional retro FPS gameplay loop including camera and player movement, weapons, shooting mechanics, and a health system.
- **Adaptive Environment:** The initial implementation dynamically responds to player actions or story progression (player death/restarting). A rudimentary example of environmental storytelling shows how the game's setting and objects can narrate a story without explicit dialogue or text.
- **Lovecraftian Elements:** Incorporation of thematic elements and aesthetics indicative of Lovecraftian horror.



Figure 15. Proof of concept level 1, the start of the game.

3.1.1 Implementation

The creation of the proof of concept involved a detailed and methodical approach:

- **Developing the FPS System:** The process began with constructing a robust FPS system in Godot, ensuring smooth camera and player movement, responsive shooting mechanics, and a functioning health system.
- **Creating the Baseline Environment:** The final level, showcasing the ultimate corruption, was designed first. This environment included all the game's elements in their most altered state.
- **Duplicating and Modifying Levels:** The baseline environment was duplicated four times to create earlier levels. For the first level, most elements were removed to represent the least corrupted state, and for each subsequent level, progressively fewer elements were removed.
- **Implementing Visual Changes:** Visual changes were implemented to represent the descent into corruption (Lovecraftian themes), with altered sun and sky colours for each level. The pillars were made taller at each level to symbolise the growing influence of corruption, and the grass floor was gradually changed to sand, more so at each level.

The graphical assets used for the proof of concept were obtained from Walters' (2021) Godot FPS tutorial.

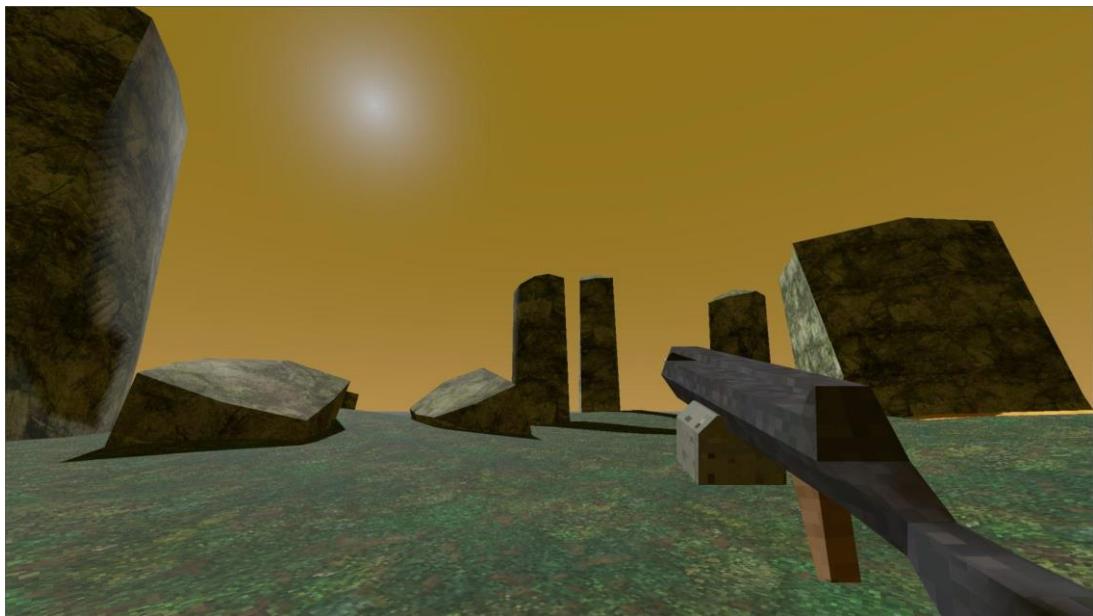


Figure 16. Proof of concept level 2, after dying/restarting once.

3.1.2 Potential Issues

Several challenges could arise from this approach:

- **Change Management:** As environmental modifications become more complex, tracking and managing these changes becomes more demanding. Unexpected interactions between changes in different areas could complicate debugging and iterative adjustments.
- **Propagation of Base Level Errors:** Bugs in the base level could extend into all subsequent modifications, creating extensive issues that might require significant time and effort to address. This situation underscores the need for a robust and modular system design to isolate and manage changes efficiently.
- **Scalability Issues:** As the game develops, the current system for managing environmental storytelling and changes may need to be adapted. If the game's scope increases, the original methods may become impractical, necessitating a thorough reassessment and possible restructuring to ensure sustainability.



Figure 17. Proof of concept level 3, after dying/restarting twice.

3.1.3 Findings

The initial proof of concept demonstrated that the foundational mechanics and adaptive environment are viable, with progressive environmental modifications successfully captivating players and piquing their interest in the story underlying the corruption. The Godot engine could manage the multilayered environmental system and the dynamic modifications necessary for the game. Effective planning and meticulous execution are crucial. Incorporating Lovecraftian themes and environmental storytelling delivered an engaging experience, confirming the project's trajectory. Nonetheless, it also emphasised the need for a solid system design to handle the complexity and maintain stability as the project expands.



Figure 18. Proof of concept level 4, after dying/restarting three times.

3.1.4 Implementation Plan for Full Game

Reflecting on the proof of concept, it informed a detailed strategic plan for past game development, aiming to enrich the gaming experience and lay a robust groundwork for subsequent levels. The priority was to refine the FPS system, which involved honing shooting mechanics, player movement, and enemy interactions to ensure smooth, immersive gameplay. This stage also saw a commitment to advancing the environmental storytelling part of the game, with the creation and completion of the first level as a definitive guide for the game's narrative and mechanics. Each level was thoughtfully altered to deepen the narrative and sense of progression.

An effective change management strategy was employed to navigate the complexity of these evolving systems, utilising tools such as Excel for meticulous planning and documentation, ensuring every modification was well-considered for future applications. This methodology enabled a concentrated development approach where the first level and its systems were finalised and rigorously tested before advancing to the following stages. Constant testing was integral to the process, aiming to detect and resolve foundational bugs early to avert broader issues later in development.

Finally, the project adopted an iterative design philosophy, shaping the game based on QA testing and ongoing technical refinements. This approach guaranteed that the game remained compelling, immersive, and technically robust, with a coherent and engrossing experience that logically evolved alongside the game's narrative journey.

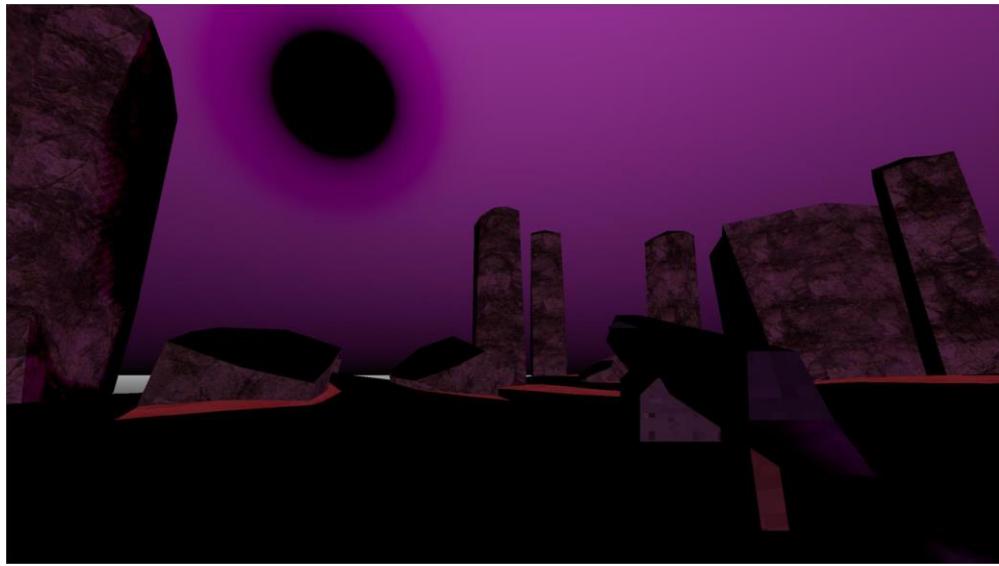


Figure 19. Proof of concept level 5, the final level after dying/restarting four times.

3.2 Game Structure

The game's fundamental narrative positions the player as the Challenger, going to fight off corrupting forces that threaten the town, but they are trials. The game structure is built around this central premise, whereby the player must withstand waves of corruption to prove themselves. Success and failure are demarcated: surviving until the time limit earns the player a new weapon, a gift from the cosmic entity seeking a champion. This reward system is an incentive for player perseverance and a narrative tool, representing the entity's acknowledgement of the player's prowess.

The game's design implements a cyclical structure. Each playthrough starts with the player waking up, interacting with the villagers to underline the narrative's stakes, and then being transported to the Old God's graveyard, the game's primary combat arena. This loop is designed to instil familiarity with the environment, reinforcing the game's fast-paced nature by allowing players to focus on combat rather than navigation. The repetition also heightens the impact of environmental changes after each death, symbolising the growing corruption and escalating threat level.

The game is structured into distinct cycles that alternate between the town and the battlefield for level progression. The levels the player goes through are as follows:

- **Level 1:**
 - **Town level** - Explore and talk to the townspeople (NPCs). Go through the portal in the town centre to go to the next level.
 - **Battlefield level** - Survive 2 minutes to unlock a new weapon. Then, die to go to the next level.
- **Level 2:**
 - **Town level** - Explore and talk to the townspeople (NPCs). Go through the portal in the town centre to go to the next level.
 - **Battlefield level** - Survive 2 minutes 30 seconds to unlock a new weapon. Die to go to the next level.

- **Level 3:**
 - **Town level** - Explore and talk to the townspeople (NPCs). Go through the portal in the town centre to go to the next level.
 - **Battlefield level** - Survive 3 minutes to unlock a new weapon. Die to go to the next level.
- **Level 4:**
 - **Town level** - Explore and talk to the townspeople (NPCs). Go through the portal in the town centre to go to the next level.
 - **Battlefield level** - Survive 3 minutes 30 seconds to unlock a new weapon if missed unlocking one. Die to go to the next level.
- **Level 5:** In town, survive 4 minutes to get the survived ending, or die before then to get the died ending.

The levels are sequentially ordered to gradually escalate in difficulty and complexity, with the first four levels serving as training and storytelling mechanisms. By the time the player reaches the fifth cycle, the expectation is that they have mastered the combat system and collected all the weapons. This level, where the town becomes the battlefield, is designed to disrupt the player's sense of security and routine, signalling the narrative's climax and the ultimate test of the skills honed throughout the game.

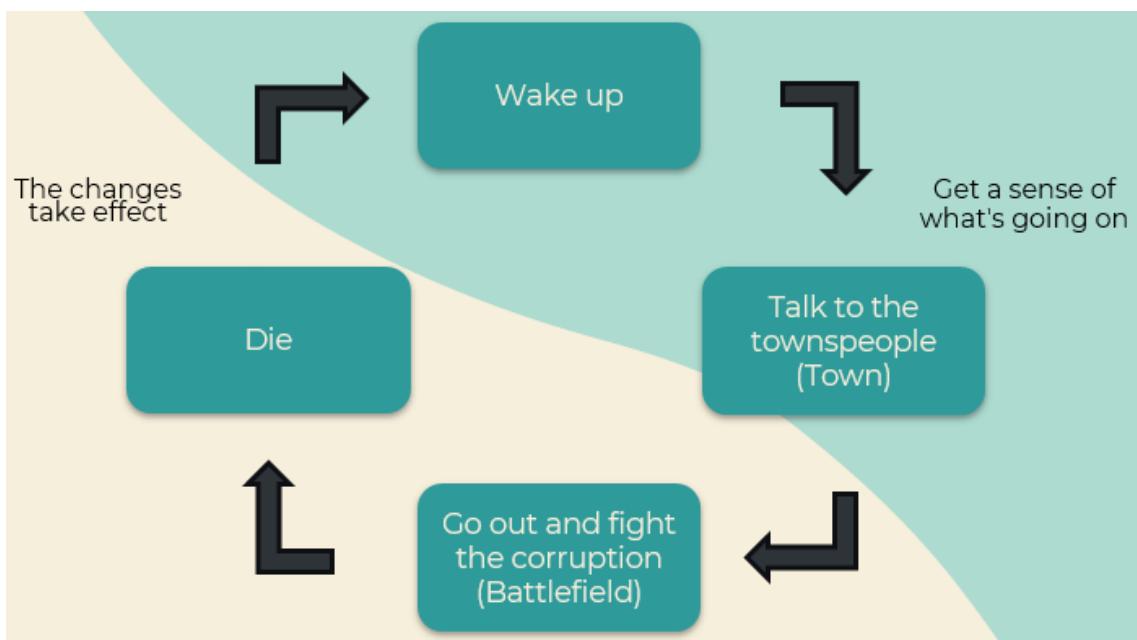


Figure 20. The basic game cycle.

The reason for selecting this design is to establish a gaming cycle that enables players to observe and value subtle changes. This mechanism supports both the storyline and the gaming experience. It fosters a bond between the player and the world through repeated engagements and gradual modifications, motivating players to see the storyline unfold until its resolution.

3.2.1 Narrative Overview

Upon awakening, the player is greeted by a woman named Morrigan, a motherly character. This deceptive caretaker indoctrinates the player into enduring a gauntlet of trials, the true nature of which remains obscured until the very end. Tasked with facing endless waves of adversaries, success is initially celebrated as part of a sacred mission of defence. However, by the third or fourth day, the facade begins to crumble, revealing Morrigan's true intentions for bloodshed and destruction as a servant of the Old God, Arakzul.

The transformation from defender to aggressor is gradual but unmistakable. What begins as a seemingly noble quest quickly devolves into a darker journey, shifting the player's actions from protection to outright aggression. The narrative subverts the typical hero's journey, suggesting that even the most virtuous warriors can find themselves becoming the very evil they once vowed to vanquish.

In the narrative's climax, the player faces a choice not explicitly told to them: either become a harbinger of destruction, unleashed upon the world or face accepting death, allowing the cycle of violence to pause momentarily. This cycle, reminiscent of the perpetual struggle and rebirth, sets the stage for the next player, chosen by Morrigan, to attempt the challenge anew. Essentially, the player lives long enough to become the evil creature who destroys everything or gets obliterated, and the next player gets to try and play.

3.3 FPS System

For the FPS system, the focus was on creating an immersive gameplay experience by meticulously fine-tuning camera controls, player movement, and input handling, all essential for delivering the game's dynamic action. Central to the gameplay experience is "game feel" (Swink 2007), which integrates mechanics, visuals, and player feedback to craft a satisfying and engaging combat experience. The weapon systems are also explored in detail, highlighting the diverse arsenal available to the player and the technical mechanisms behind weapon functionality, including attack emitters, animations, and sound design. This section underlines the blend of technical precision and creative design that forms the backbone of the player's interaction with the game, emphasising the seamless integration of combat mechanics with the overall narrative journey.

3.3.1 The Player

In developing a fast-paced retro FPS, implementing the player component was fundamental, involving intricate scripting and design decisions to ensure fluid and responsive gameplay.

Aisling, the protagonist of the game, is female; this was chosen to differentiate from other retro FPS games as all other main protagonists are male except for Shelly "Bombshell" Harrison in Ion Fury. In Lovecraft's work, there are no female protagonists, and as The Gothic Library (n.d.) puts it, "a total of three women across Lovecraft's oeuvre that play significant roles in his stories - Lavinia Whateley (*The Dunwich Horror*), Keziah Mason (*The Dreams in the Witch House*) and Asenath Waite (*The Thing on the Doorstep*)". The aim is to have more representation and variety, especially in these genres, which are severely lacking.

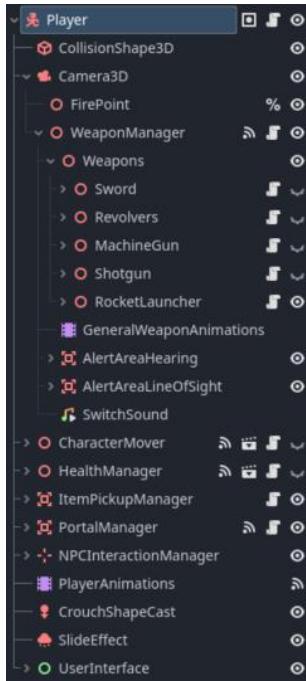


Figure 21. Player scene node structure in Godot.

Movement

The character_mover.gd script governs the player’s movement, which dictates the physics of walking, jumping, double jumping, crouching, and sliding and ensuring realistic acceleration and deceleration, which is crucial for conveying momentum. Jumping mechanics were bolstered by ‘jump_force’ and ‘gravity’, calibrated to achieve a satisfying arc and weight to the player’s jumps, contributing to the game’s dynamic feel. Features like air drag and move drag contribute to a natural and responsive control feel, while the ability to jump and double jump adds verticality to the gameplay.

Features like camera lean, controlled by ‘camera_lean_speed’ and ‘max_camera_lean’, added an extra layer of immersion, simulating the player’s body leaning as they strafe, enhancing the realism of head movement and enhancing the game feel.

Sliding was introduced as a mechanic to accentuate speed and agility, activated under specific conditions like crouching at high speeds. This ability provided practical benefits, such as navigating under obstacles, and played into the stylistic elements of retro FPS games, where fluidity and speed are paramount. The crouching and sliding mechanisms serve as evasive manoeuvres and enable players to navigate the environment strategically. The more options for movement, the higher the ceiling is for the fun and enjoyment of the game.

Controls and Input Handling

The game’s control scheme was designed to be intuitive, mapping essential actions to easily accessible keys and mouse buttons. This included weapon switching through mouse wheel input and hotkeys, allowing for seamless transitions between weapons, a staple in FPS games for maintaining the flow of combat.

The controls for the game are:

- ‘WASD’ to move around.
- ‘Mouse look’ to look around.
- ‘Mouse 1’ (left-click) to attack.
- ‘Space’ to jump and press it again while in the air to double jump.
- ‘Ctrl’ to crouch. Hold it while moving to slide (this gives the player more speed). Hold it while in the air to gain more speed and control.
- ‘E’ to talk to the townspeople (NPCs). While talking, press ‘Mouse 2’ (right-click) to go to the following dialogue or skip it.
- ‘Esc’ to open the settings menu and pause the game.

The implementation of crouching and sliding mechanics was also tied to player inputs, with checks in place to ensure these actions could only be performed under appropriate conditions, such as sufficient speed for sliding. This approach maintained the balance between player agility and game challenge.

Health System

The health_manager.gd script establishes a comprehensive health system that monitors and adjusts the player’s health status, addressing damage and recovery phases. It actively responds with updates that modify both the game’s conditions and the user interface based on changes in health. This dynamic feedback is crucial as it empowers players to strategically choose their approach and risk levels during gameplay. The ‘health_changed’ signal refreshes the UI to reflect current health levels. Moreover, health pickups, which drop randomly from defeated enemies, encourage players to adopt a more aggressive style of play. This drives the narrative forward by increasing the chances of player death and testing their prowess and endurance in the game.

Evaluation of Effectiveness

The effectiveness of these implementations was evaluated through iterative playtesting, focusing on the fluidity of movement, the responsiveness of controls, and the overall feel of gameplay. Feedback was instrumental in refining the mechanics, ensuring they aligned with the intended fast-paced, engaging experience characteristic of the retro FPS genre. Godot’s robust support for 3D physics and scene tree architecture allowed for an efficient and understandable implementation of complex player interactions with the game environment.

In conclusion, the player’s implementation within the FPS system was meticulously designed to capture the essence of retro FPS games, prioritising fluid movement, responsive controls, and immersive gameplay mechanics. This approach served the project’s stylistic goals and laid a solid foundation for further gameplay elements to be built upon, driving towards creating a compelling and enjoyable retro FPS experience.

3.3.2 Weapon Systems

In the fast-paced retro FPS under development, the weapon system is the cornerstone of the player's interaction with the game environment, enabling both offensive strategies and an immersive game experience.

Weapon Implementation

A Weapon class in Godot was created as a template for all weapon types. This class was built to be flexible, enabling each weapon to possess characteristics like different damage values, ammunition capacity and how rapidly it can fire.

Five possible weapons can be obtained in the game:

- Melee Sword
- Dual Revolvers
- Machine Gun
- Shotgun
- Rocket Launcher

Each weapon is instantiated as a Node3D object with its script, connecting it seamlessly with the game's physics and animation systems. This approach encapsulates the functionality of each weapon, ensuring a modular and easily manageable codebase. The weapons are treated within the code as objects that can be activated or deactivated, swapped, and used to perform attacks through input from the player.

Recoil implementation is nuanced, providing a realistic feedback loop for the player. It is achieved through a series of steps that adjust the camera's rotation, simulating the weapon's kickback.

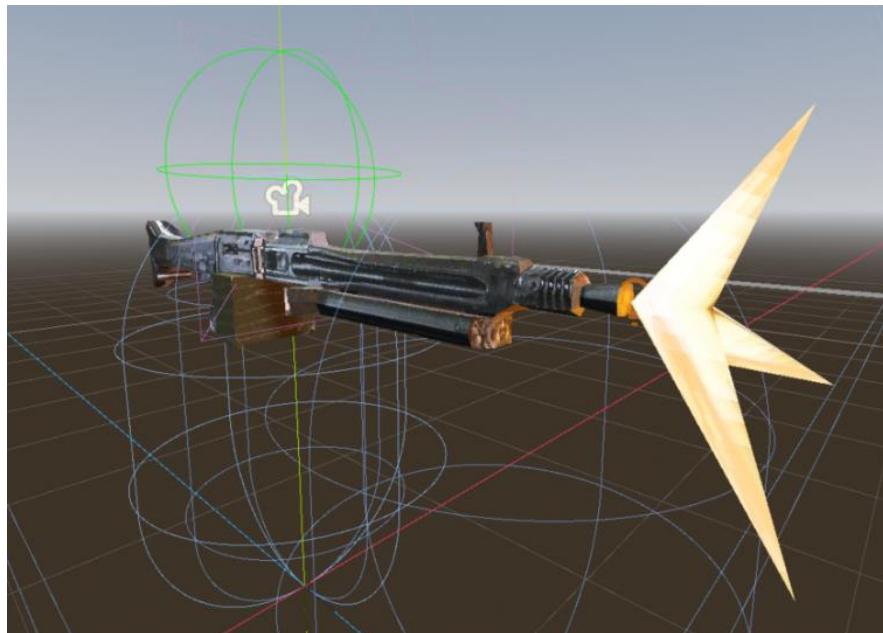


Figure 22. The player with the machine gun.

Attack Emitters

Attack emitters are components in the weapon system that execute attack strategies like hit detection and damage handling. They are created as extensions of weapon nodes, with their positioning aligned to the firing point of the weapon to enhance precision and authenticity in projectile or hit scan operations. Unique attack emitters are designed for each type of weapon, such as the burst and spray emitter for shotguns and the projectile emitter for rocket launchers.

Animations, Audio, and the Crosshair

Animations play a pivotal role in conveying the feel of each weapon. General weapon animations are managed to sync with the player's movements and actions, such as weapon sway while moving, jumping and landing animations, and switching animations. This creates a cohesive experience and visual consistency between the player character's movements and weapon animations, essential for an engaging and believable game.

The audio system enriches the firing action with varied pitch scales for each shot, augmenting the realism and variety of weapon sounds; sound effects further reinforce the tactile sensation of each shot or strike.

The crosshair, a visual cue for aiming, is integrated into the camera's viewport. It adapts to weapon firing and movement, spreading more around the screen and returning to the original look after a timer if nothing is done. This subtlety adds to the game feel for the FPS system.

Overall Significance

The weapon system is pivotal in delivering the intended game experience. It encapsulates the game's pacing, requiring players to make quick weapon choices and manage their resources effectively. The system's robust design ensures that each weapon is distinctive, responsive, and satisfying to use, directly contributing to the fast-paced and engaging nature of the game.

3.3.3 Enemies

The methodology for developing enemy AI and mechanics in the retro FPS game focused on creating engaging combat scenarios to complement the fast-paced action. There are three distinct enemy types, each with unique behaviour patterns and challenges to encourage different player strategies.

Melee Bird Enemy

- **Spawn Mechanics:** Implemented to spawn in large numbers, creating hordes to overwhelm the player.
- **AI Behaviour:** Programmed with aggressive pursuit patterns to swarm and attack the player in close combat.
- **Balance:** Their frailty is offset by their numbers, necessitating the player to employ area-of-effect or rapid-fire weapons.

Ranged Bird Enemy

- **Spawn Mechanics:** Designed to appear in smaller groups compared to melee counterparts.
- **AI Behaviour:** Scripted to maintain a safe distance from the player while employing hit-and-run tactics.
- **Player Interaction:** They compel the player to prioritise targets and use movement mechanics to dodge projectiles.

Melee Reptile Enemy

- **Spawn Mechanics:** Introduced sparingly within levels as special enemies.
- **AI Behaviour:** Encoded to hunt the player with a balance of aggression and resilience.
- **Challenge:** Presents a higher threat level, encouraging players to utilise more powerful weapons or strategic retreats.

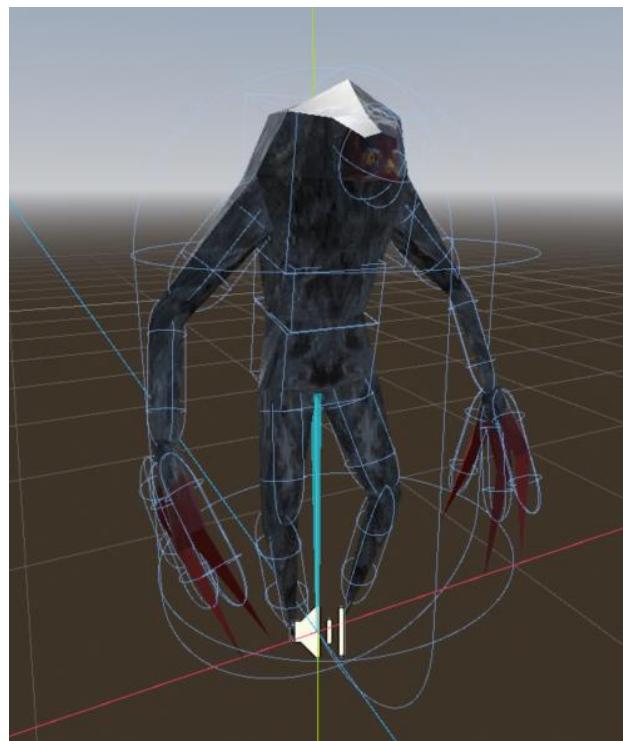


Figure 23. Bird enemy with collision boxes.

Enemy AI

The enemy.gd script is the brain of the AI, using a mix of custom and Godot's NavAgent pathfinding algorithms to ensure that enemies navigate the terrain to engage the player effectively.

The enemy AI in the game utilises a finite state machine with four main states: IDLE, CHASE, ATTACK, and DEAD, each dictating the enemy's actions.

- **IDLE:** Enemies remain inactive until they spot the player, triggering a transition to the CHASE state.
- **CHASE:** Enemies pursue the player, using pathfinding to navigate. If the player is within attack range and visible, the state switches to ATTACK.
- **ATTACK:** Enemies cease movement and attack if conditions are met. If the player escapes range, it reverts to CHASE.
- **DEAD:** Triggered by zero health, this state plays a death animation and turns off further actions, potentially dropping loot.

State transitions are driven by player proximity, line of sight, and enemy health, ensuring dynamic and responsive enemy behaviour that enhances gameplay engagement. The modular design of state functions facilitates easy updates and scalability of enemy AI behaviours.

The attack mechanics vary between enemy types: melee attackers engage in close-quarters combat once within range, while ranged adversaries seek distant positions from which they can launch their attacks, balancing offence with evasion to create a dynamic combat scenario. The AI for ranged enemies is designed to reassess their strategy continuously, keeping the player on their toes with ever-changing encounters.

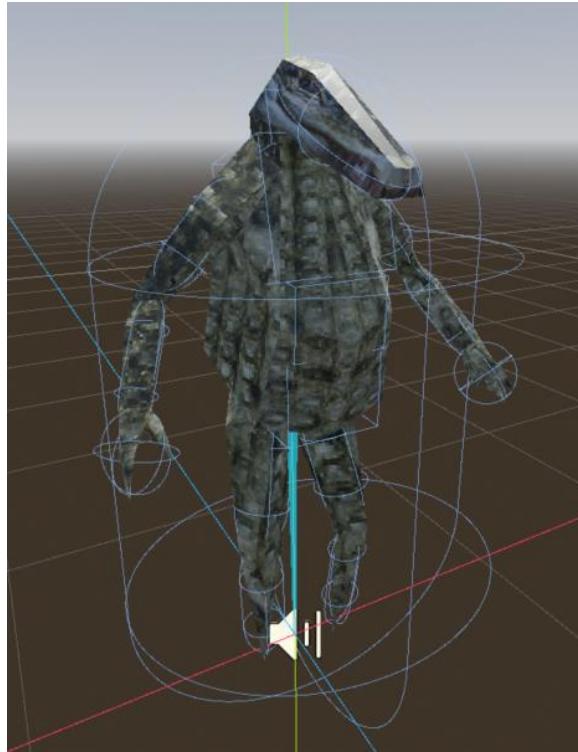


Figure 24. Reptile enemy with collision boxes.

Enemy Spawners

In the game, the centralised `enemy_spawner_manager.gd` script manages enemy spawning across the game environment, ensuring no single area becomes overcrowded by setting a global enemy limit. Individual spawners handle the creation of enemies, adhering to set spawn intervals and maintaining diversity through a weighted system that controls the probability of each enemy type's appearance.

Each spawner monitors its limit on active enemies, adjusting spawning activities based on real-time gameplay conditions. Spawned enemies are tracked through their health status and automatically notify the spawner upon despawning, allowing dynamic adjustment to the game's difficulty. Spawners enhance the gaming experience by incorporating visual and audio effects during enemy spawns, enriching the atmospheric immersion.



Figure 25. Battling enemies in the level 2 battlefield.

Health & Ammo Drop System

This system plays a significant role in maintaining the tempo of gameplay. Health and ammunition are set to drop randomly from defeated enemies; this encourages an aggressive playstyle to make the player actively engage with the game while directly rewarding the player's combat prowess. These drops are programmed to prevent resource abundance to sustain the game's difficulty level. This ensures that the player remains challenged and that resource management is integral to the game's strategy.

Health & Damage Systems

Enemies in the game share a health system like the player's, managed by an `enemy_health_manager.gd` script tracks health points and facilitates consistent damage interactions across all entities in the game world. When enemies receive damage exceeding a certain critical threshold, they enter a 'gibbed' state. This mechanic serves as a spectacular visual cue and empowers the player, reinforcing the combat's feedback loop and amplifying the satisfaction of overcoming challenging adversaries.

The weapon system is intricately tied to the enemy mechanics. Enemies are programmed to provide visual and auditory cues in response to various weapon impacts. This immediate feedback upon hits and enemy death is vital for an engaging combat experience. Moreover, focusing on combat satisfaction ensures that gory details, such as the gib effect, are emphasised. These elements contribute to a visceral combat feel, enhancing player gratification and maintaining high engagement throughout the gameplay.



Figure 26. Battling enemies in the level 4 battlefield.

3.4 Adaptive Environment Implementation

The environmental development strategy for the game was to perfect the initial level, ensuring it was as free from bugs as possible and served as a high-quality template. Subsequent levels were created by duplicating this template, implementing planned changes from a detailed spreadsheet, and layering modifications to reflect the game's progression. This was done for both the town and battlefield levels.

Some non-adaptive environmental storytelling in the game:

- The outside walls are facing the outside, conveying a feeling that the walls are supposed to make sure the townspeople are kept inside and do not leave.
- In the town harbour section, the black spot/glitch is the first sign of corruption since the first level. Making the glitch, something that was unable to be fixed, into a feature.
- In the past there was just the harbour, the town used to be by the sea. It was taken over by people who then built land. With the sand rising, the sea will take over again, and the cosmic entity, Arakzul, will return. The enemies are birds and reptiles, representatives of the sky and sea.

3.4.1 Graphical & Audio Changes Per Death

The changes to the environment and audio happen to both the town and battlefield levels:

- **Fog:** Starts with no fog and progressively foggiest with each death.
- **Rain:**
 - Level 1 & 2 - No rain.
 - Level 3 - Light rain in both colour and amount.
 - Level 4 - Heavier and darker rain.
 - Level 5 - Blood rain.

- **Sky Colour:**
 - Level 1 - Bright blue.
 - Level 2 - Yellow.
 - Level 3 - Orange.
 - Level 4 - Red.
 - Level 5 - Dark green.
- **Sun Colour:** Reflects the sky colour.
- **Sun Brightness:** Brightest on the first level and gets darker and darker per death.
- **Sun Position:**
 - Level 1 - High in the sky, leaving few shadows.
 - Level 2 - Lower with more shadows.
 - Level 3 - Lower with more shadows.
 - Level 4 - Lower with more shadows.
 - Level 5 - Very low in the sky with strong shadows.
- **Terrain Roughness:**
 - Level 1 - Completely flat.
 - Level 2 - A few pieces of rough terrain.
 - Level 3 - About half rough terrain.
 - Level 4 - About three-quarters rough terrain.
 - Level 5 - Completely rough terrain, no flat parts.
- **Sand:**
 - Level 1 - No sand.
 - Level 2 – A small bit of sand is creeping in.
 - Level 3 - Half sand.
 - Level 4 - Roughly three-quarters sand.
 - Level 5 - Terrain is all sand.
- **Nature (trees, bushes, and grass):**
 - Level 1 - Green and healthy (using spring assets).
 - Level 2 - Mostly spring, with a small number of autumn assets.
 - Level 3 - Mostly autumn, with a small number of spring assets.
 - Level 4 - Half autumn and half dead (winter assets).
 - Level 5 - All dead.
- **Ambience:** Starts pleasant with a slight eerie undertone. As the levels go on, it gets more and more eerie. The final level is a corrupted version of the level 1 ambience.

Section	Details	Level 1	Level 2	Level 3	Level 4	Level 5
Town & Battlefield	Fog (more fog as more deaths)	No fog	Very light fog	Light fog	Medium fog	Heavy fog
Town & Battlefield	Rain (heavier as more deaths)	No rain	No rain	Light rain (lighter colour, half amount)	Medium rain (darker colour, double amount)	Blood rain
Town & Battlefield	Sky (colour of sky conveys emotion)	Blue	Yellow	Orange	Red	Dark green
Town & Battlefield	Sun Colour (colour of light wanted for level)	Yellow	Matches sky colour	Matches sky colour	Matches sky colour	Night dark
Town & Battlefield	Sun Brightness (brightest on the first levels, gets darker and darker per death)	Bright	Slightly darker	Darker	Evening darkness	Matches sky colour
Town & Battlefield	Sun Position (starts high, goes lower after each death)	High in the sky, few shadows	Lower, more shadows	Lower, more shadows	Lower, more shadows	Very low in the sky, strong shadows
Town & Battlefield	Sun Position (rough terrain after each death, fully flat at the start)	Fully flat terrain	1/2 flat terrain	Rougher	Rougher	Rougher
Town & Battlefield	Grassy/rocky ground to sand as more deaths	No sand	Small bit of sand	More sand	More sand	Fully sandy
Town & Battlefield	Nature (trees, bushes etc.)	Green and healthy (spring assets)	Mostly spring, little autumn (assets)	Mostly autumn, little spring	Half autumn, half dead (winter assets)	Fully dead
Town & Battlefield	Ambience/Music	Regular with a little bit of eeriness	More eerie	More eerie	More eerie	Corrupted version of level 1
<hr/>						
Towns	WEEPING ANGEL STATUE	1 Statue	2 Statues	3 Statues	4 Statues	5 Statues
Town	NPCs	All alive	1 dead total (unimportant)	3 dead total (unimportant)	6 dead total (unimportant)	Only the 5 important NPCs alive
Town	NPC Dialogue	Completely fine	More worried	More corrupted	More corrupted	Fully corrupted
Town	NPC Corruption Notice	Normal pitch	Lower pitch	Lower pitch	Lower pitch	Lowest pitch
Town	Fires (sporadic fires in towns as game goes along)	No fires	5 fires	14 fires	26 fires	No fires
Town	Harbour town rising a little bit every death (convey that town is sinking)	Almost level with ground	Higher up	Higher up	Higher up	Sunk with the sand
Town	Transport Portal Colour + Effect	Blue + Standard	Dark green + More volatile	Dark red + More volatile	Multi-colour + More volatile	Gone

Figure 27. Graphical, audio, and NPC changes in the spreadsheet.

Extra graphical changes that happen to the town but do not to the battlefield:

- **Weeping Angel Statue:** One extra statue gets added with each death.
- **Fire:**
 - Level 1 - No fires.
 - Level 2 - 5 fires.
 - Level 3 - 14 fires.
 - Level 4 - 26 fires.
 - Level 5 - No fires.
- **Harbour Town Section Rising:**
 - Level 1 - Level with the ground.
 - Level 2 - Higher up.
 - Level 3 - Higher up.
 - Level 4 - Higher up.
 - Level 5 - Sunk into the ground with the sand.
- **Transport Portal Colour & Effect:**
 - Level 1 - Blue and calm.
 - Level 2 - Dark green and more volatile.
 - Level 3 - Dark red and more volatile.
 - Level 4 - Multicolour and more volatile.
 - Level 5 - Gone.



Figure 28. The first thing the player sees in level 1 town.

The alterations implemented with each death were systematically layered, enhancing the game's realism and continuity. For instance, the trees begin with half a vibrant spring green and the other half with autumnal yellow and orange hues. As players progress to the next level, the green trees shift to yellow, and the previously yellow ones turn into a stark, winter-like dead appearance. This structured transition ensures a natural progression that is perceptible to

attentive players. The process of designing the first and last levels stood out as simpler than others, as these levels could fully embrace their distinctive themes without balancing transitional aesthetics.



Figure 29. The first thing the player sees in level 2 town.



Figure 30. The first thing the player sees in level 3 town.



Figure 31. The first thing the player sees in level 4 town.

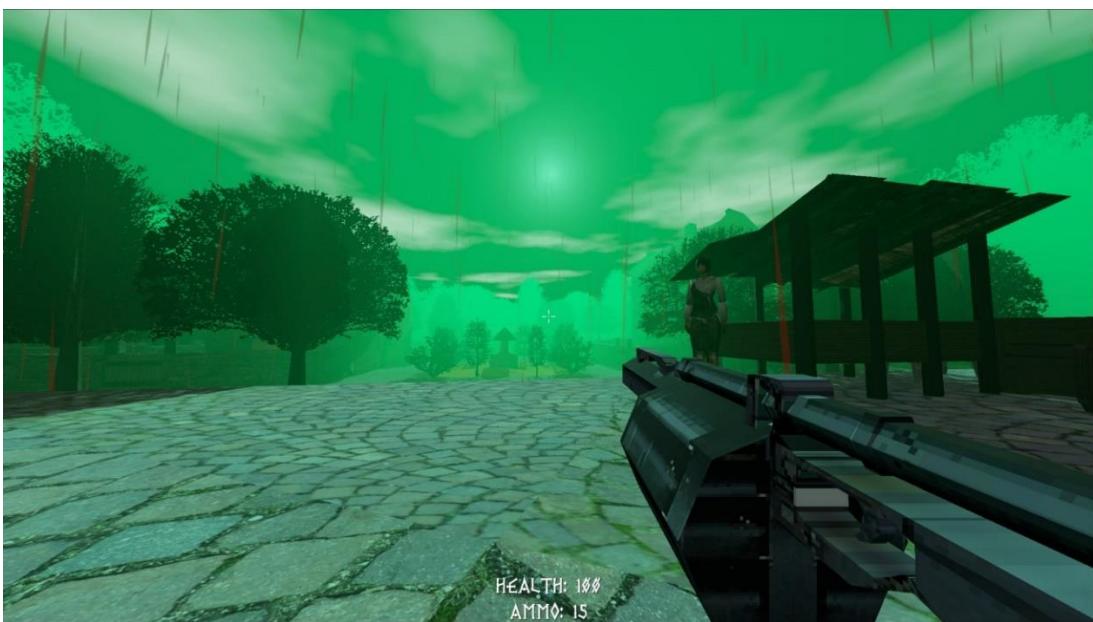


Figure 32. The first thing the player sees in level 5 town.

3.4.2 Gameplay Changes Per Death

Every change the enemies undergo each level:

- **Enemy Types & Spawn Rates:**
 - Level 1 - 100% Melee birds.
 - Level 2 - 75% melee birds and 25% ranged birds.
 - Level 3 - 60% melee birds, 30% ranged birds, and 10% melee reptiles.
 - Level 4 - 40% melee birds, 40% ranged birds, and 20% melee reptiles.
 - Level 5 - 25% melee birds, 45% ranged birds, and 30% melee reptiles.

- **Enemy Spawn Intervals:**
 - Level 1 - 3 to 6 seconds.
 - Level 2 - 2 to 5 seconds.
 - Level 3 - 1 to 4 seconds.
 - Level 4 - 1 to 3 seconds.
 - Level 5 - 0 to 1 second.
- **Enemy Spawn Effects:**
 - Level 1 - Orange-red fire.
 - Level 2 - Red-blue fire.
 - Level 3 - Blue-green fire.
 - Level 4 - Green-black fire.
 - Level 5 - Black-purple fire.
- **Spawn Effect Sound Pitch Scale:**
 - Level 1 - 0.9 to 1.1.
 - Level 2 - 0.8 to 1.0.
 - Level 3 - 0.7 to 0.9.
 - Level 4 - 0.6 to 0.8.
 - Level 5 - 0.5 to 0.7
- **Enemy Health:**
 - Level 1 - Lowest.
 - Melee bird - 60.
 - Level 2 - Higher health.
 - Melee bird - 70.
 - Ranged bird - 50.
 - Level 3 - Higher health.
 - Melee bird - 80.
 - Ranged bird - 60.
 - Melee reptile - 160.
 - Level 4 - Higher health.
 - Melee bird - 90.
 - Ranged bird - 70.
 - Melee reptile - 170.
 - Level 5 - Highest.
 - Melee bird - 100.
 - Ranged bird - 80.
 - Melee reptile - 180.
- **Enemy Damage:**
 - Level 1 - Lowest.
 - Melee bird - 20.
 - Level 2 - More damage.
 - Melee bird - 25.
 - Ranged bird - 18 (x2).
 - Level 3 - More damage.
 - Melee bird - 30.
 - Ranged bird - 21 (x2).
 - Melee reptile - 45.

- Level 4 - More damage.
 - Melee bird - 35.
 - Ranged bird - 24 (x2).
 - Melee reptile - 50.
- Level 5 - Highest.
 - Melee bird - 40.
 - Ranged bird - 27 (x2).
 - Melee reptile - 55.
- **Enemy Speed:**
 - Level 1 - Slowest (10 speed).
 - Level 2 - Faster (12 speed).
 - Level 3 - Faster (14 speed).
 - Level 4 - Faster (16 speed).
 - Level 5 - Fastest (18 speed).
- **Enemy Size:**
 - Level 1 - Smallest (1.1 scale).
 - Level 2 - Bigger (1.3 scale).
 - Level 3 - Bigger (1.5 scale).
 - Level 4 - Bigger (1.7 scale).
 - Level 5 - Biggest (1.9 scale).

Battlefield	Enemy Types	Melee bird 100% Melee birds	Melee birds & ranged birds 75% Melee birds & 25% ranged birds	Melee birds, ranged birds, melee reptiles 60% Melee birds, 30% ranged birds, 10% reptiles	Melee birds, ranged birds, melee reptiles 40% Melee birds, 30% ranged birds, 20% reptiles	Melee birds, ranged birds, melee reptiles 25% Melee birds, 45% ranged birds, 50% reptiles
Battlefield	Enemy Spawn Rates	3 to 6 seconds	1 to 5 seconds	1 to 4 seconds	1 to 3 seconds	D-1 seconds
Battlefield	Enemy spawn effects (maybe linked with fires around town?) + pitch scale g	Orange-Red Fire 0.9 to 1.1	Red-Blue Fire 0.8 to 1	Blue-Green Fire 0.7 to 0.9	Green-Black Colour 0.6 to 0.8	Black-Purple Fire 0.5 to 0.7
Battlefield	Spawn Effect Sound Pitch Scale	Lowest	Slightly more	Slightly more	Slightly more	Most
Battlefield	Enemy Health	Melee bird Ranged bird Melee reptile	60 40 140	70 50 150	80 60 160	90 70 170
Battlefield	Enemy Damage	Melee bird Ranged bird Melee reptile	Lowest 20 15 (x2) 35	More deadly 25 18 (x2) 40	More deadly 30 21 (x2) 45	More deadly 35 24 (x2) 50
Battlefield	Enemy Speed (aggression)	Slowest (10)	Slightly faster (12)	Slightly faster (14)	Slightly faster (16)	Fastest (18)
Battlefield	Enemy Size (scale)	Smallest (1.1)	Bigger (1.3)	Bigger (1.5)	Bigger (1.7)	Biggest (1.9)

Figure 33. Enemy changes in the spreadsheet.

Godot's exported variable system and duplicating scenes made making various mechanically different enemies very quick and straightforward. Quick changes could be made with movement speed, damage, and max health.

For the NPC changes each level, only in town:

- **NPC Mortality:**
 - Level 1 - All NPCs alive.
 - Level 2 - 1 dead total (unimportant).
 - Level 3 - 3 dead total (unimportant).
 - Level 4 - 6 dead total (unimportant).
 - Level 5 - Only the five important NPCs are alive.
- **NPC Dialogue:** Everyone is okay, and then they get more worried and corrupted with each death.
- **NPC Dialogue Noise:** Starts with the normal pitch range and gets progressively lower at each level.

3.5 Asset Management

Asset management played a massive role in the project. In Godot, specific asset organisation was set up to improve task efficiency. A detailed spreadsheet was utilised to keep tabs on the game assets and their potential use, including links to them and a section for notes.

3.5.1 Project Architecture

The project structure in Godot is well-organised, adhering to a clear and logical directory system that significantly enhances the development process and ensures that all assets are conveniently accessible. This involved categorising assets into intuitively named folders corresponding to their function and type, such as separating all character models from environmental elements or grouping all audio files.

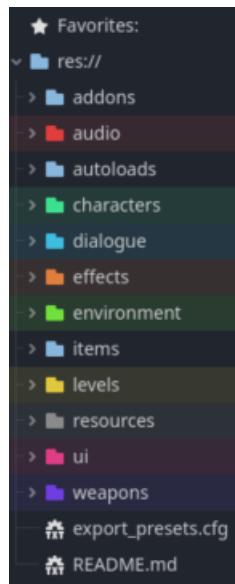


Figure 34. Overall Godot project architecture.

Within this structure:

- **Addons:** Contains plugins and custom modules that extend the functionality of Godot, providing additional tools for developers. This project only used the DialogueManager (Hoad 2022) extension.
- **Audio:** Houses all the sound files, including music, ambience, and sound effects throughout the game.
- **Autoloads:** Contains global scripts and data that need to be accessed across different scenes and scripts, enabling a shared context and persistent data management.
- **Characters:** Includes all character-related assets, such as models, animations, and scripts. Defining player, NPC, and enemy behaviours.
- **Dialogue:** Stores the game's narrative elements, including the dialogue boxes (balloons) and dialogue files needed for in-game conversations.
- **Effects:** Dedicated to visual and special effects assets that enhance the aesthetic appeal and feedback within the game.
- **Environment:** Contains assets related to the game's setting, like environmental objects, textures, and sky materials.

- **Items:** Holds data and assets for in-game items that players can interact with or collect, such as ammo and health packs.
- **Levels:** Stores the individual scene files for different levels or stages in the game, organising the flow and progression through the game.
- **Resources:** Has a scene registry containing all levels and scenes the game will want to change to. It also stores the user's preferences, such as the volume settings and can easily be extended to save more preferences, such as languages and graphics settings.
- **UI:** Contains all the user interface elements, including HUD, menus, and other interactive screen elements.
- **Weapons:** Has the weaponry in the game. This folder includes models, textures, scripts, and anything else related to the game's arsenal.

This hierarchy effectively segments different facets of game development into manageable chunks, promoting an efficient workflow where assets can be found, updated, or referenced without confusion. Giving each folder a specific colour improved navigation and made identifying each part seamless.

3.5.2 Graphical & Audio

The environment folder contains most of the game's assets, with subfolders like ground, nature, village, and sky. Each subfolder houses textures and models pertinent to its label, such as different ground textures for varied and detailed terrain. The nature folder contains assets like bushes and trees, which can be used to populate the game world and enhance the visual fidelity of natural landscapes.

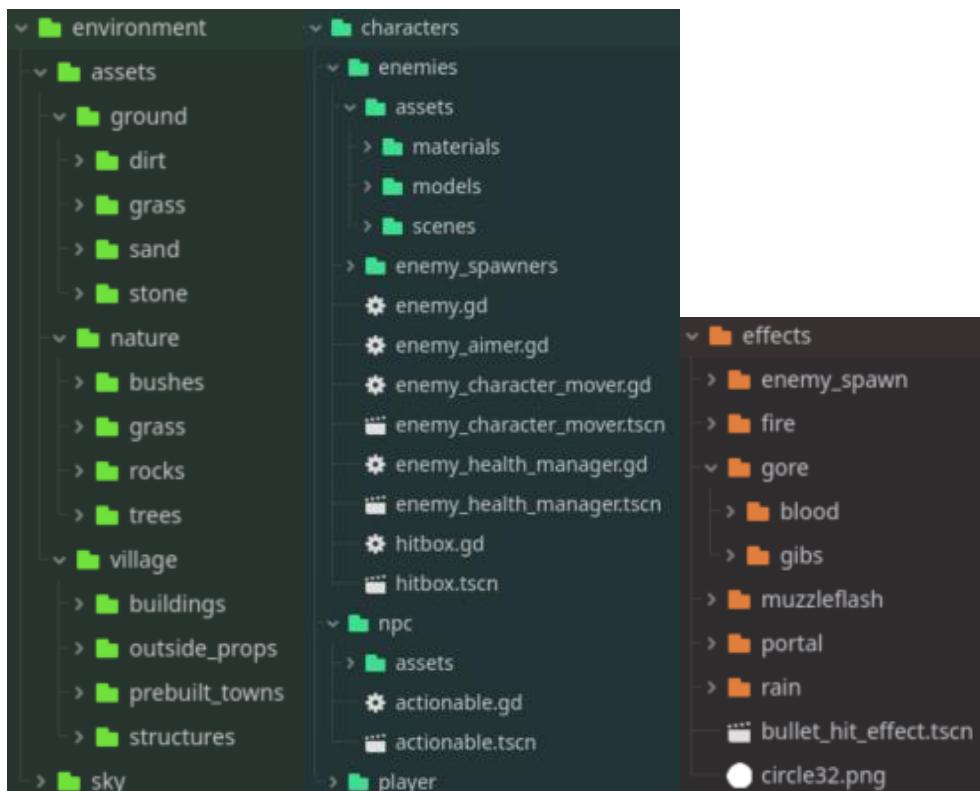


Figure 35. Main graphical assets structure in Godot.

Similarly, the characters folder is split into enemies, NPCs, and player assets:

- Within enemies, further organisation is seen with materials, models, scenes, scripts, and the five different enemy spawners used to manage enemies in the game's five levels. This separation of assets and scripts within the characters directory aids in managing character-related resources efficiently, which is crucial for games with multiple characters and enemy types.
- The NPC folder contains each townsperson's materials, models, and scenes. The NPC structure is designated between key characters (marked important) and background (marked unimportant) NPCs. Important NPCs contain central characters essential to the main narrative, while unimportant NPCs are everyday characters populating the game's setting. Because only four models are used in the game, the unimportant NPCs are further split into subfolders under the model's name to categorise them and to know what they look like immediately. All NPCs are different sizes to help visually differentiate them more.
- The player folder has all of the scripts related to the player, such as movement and the health manager, as well as the player scene.

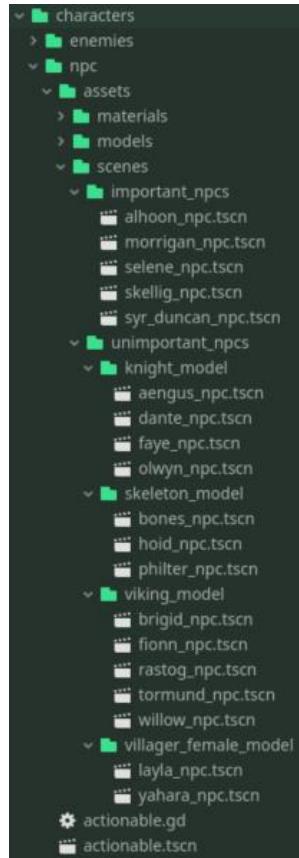


Figure 36. A detailed view of the NPC folder in Godot.

The effects folder encapsulates various visual effects crucial for the game feel, such as enemy spawn animations, environmental effects like fire and rain, and combat effects like blood and muzzle flashes. From there, the world feels alive, and players impact the game world.

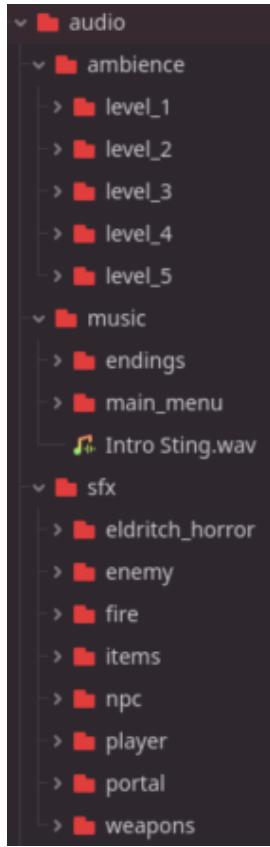


Figure 37. Audio assets structure in Godot.

The ambience folder contains a variety of environmental sounds tailored to each level of the game, enhancing the atmosphere and immersion. These could include natural soundscapes for the town and battlefield areas.

Under the music category are the endings and main menu folders, which respectively contain the music for the two different endings and the main menu music played at the start of the game. It also contains the intro sting sound used when the player wakes up each time they are loaded into the town.

The SFX folder is broken down into categories representing different sound sources within the game, such as enemy, fire, items, NPC, player, portal, and weapons. This classification allows for quick and easy access.

Some examples of SFX are the enemy subfolder, which contains growls, attack sounds, and death cries that give life to adversaries. The weapons subfolder would store the various noises that different weapons make when fired, out of ammo, or switched to. Folders like eldritch_horror have thematic sound effects specific to the Lovecraftian elements of the game, such as otherworldly growls, shrieks, unsettling whispers, or rumbling. This attention to detail in audio design is essential for creating a rich and believable game world that can engage players on an auditory level.

It is split between important and unimportant (general) NPCs. Important NPCs contain central characters essential to the main narrative; they have the most dialogue and are alive until the final level. While unimportant NPCs are everyday characters populating the game's setting, each with a line or two for dialogue and are marked to all die before the final level.

The spreadsheet serves as a comprehensive script, organising the dialogue by character and by the game's progression. This allows for a streamlined workflow where it is possible to navigate through the dialogue needed for various game stages quickly. It also allows tracking the evolution of character interactions and unfolding the game's story, ensuring consistency and continuity in player experience.

Character Name	Model Used	Role	Level Dialogue	Dialogue Line(s)
Important NPCs				
Morrigan	Villager Female	Mother-type	1: Main 2: Main 3: Main 4: Main 5: Main	Wake up, sleepy head. You were in such a deep long sleep. We are still at Oldtown, the last bastion of hope for the Harbingers. Once, many Challengers from the far lands sought the power held in here. The streets were filled with life, but the infidels took The Dread Moon approaches, and time is short. The seasons are shifting. What once was Summer shall soon turn to Autumn. The world will change, and with it, the people. You are the last of your kind. You are the last of the last. You are remarkable. Yes, more, more... are you so close? I am the One. The One to bring an end to these accursed times. The One to bring an end to these accursed times.
Skellig	Viking	Has beef with Syr Duncan over who is tougher	1: Main 2: Main 3: Main 4: Main 5: Main	Whachoo lookin' at? Thinkin' you better'n me, just 'cause I couldn't beat da se'nd stage? Come back if you survive ev'n dat long. Held yerself pretty well if I do say so myself. Next stage is da real deal. Only one feller managed to do it wot I ev'r 'erd of. He's a Ow da 'ell'd you manage dat! Ne'er seen da likes o' it afore. Survivin' da horror is only da first step. Haf'n to figure out 'ow to Yer makin' me believe again. After da old fool Syr Duncan failed, I was afeard wot'd ne'r see a Challenger approach again in me Last stage... (heavy panting)... prove you are what I know you to be. Master dem, control dem, prove dey shoul'dn follow you. Take
Selene	Knight	Blesses player as they leave. Changes dramatically each day	1: Main 2: Main 3: Main 4: Main	Please accept this blessing as my duty. Should your soul be set adrift from this mortal coil, I shall pull you back to this time Hmm... you did well, and the blessing did work. You have returned to us. And I'm not seeing any signs of harm... that's strange. Still looking good. It's strange, like, none of the weird hoodoo magic we do to pull your soul back is having any effects on your Okaa... People are getting weird, and what's happening to the sky? What are you doing out there? Morrigan says it's working, but what is it? She keeps me in the dark on so many things. She needs my powers to send you to the island and pull you back, but she won't tell me anything else. If what you're doing can fix things, please save us! Please save us!
Alhoon	Skeleton	Knows what is actually going on	5: Main	The Harbinger has arrived! Bring the Reaping to the Unworthy. If they will not kneel, they will be cut down! Oh, Unholy Challenger p of Orochi! You have descended from powers to ruin and smite first creatures that dwell below... and then those that dwell above. Rep them all! (laughing hysterically)
Syr Duncan	Knight	Took an arrow in the knee and can't fight	1: Main 2: Main 3: Main 4: Main 5: Main	Run from here before it is too late... Ah, a seed of madness has already set root in your flesh. You must remove it as I have, lest it grow. Remove the flesh, not the seed. Continue this path at your own peril. There is no good end for you here. You speak to false prophets and of false gods. The best way is to Foolish meat sack. Skellig lost his ferocity, and Duncan lost his heart. Were you truly so naive to think playing with such powers Well, that's it. We're all fucked now. I hope you're happy with yourself. There's going back now. Guess you might as well just Fair tidings, new Challenger! Wish it was myself out there, but alas, even my indomitable presence was not enough to turn the Splendid knight, good sir. Almost as mad as myself when I faced the same. At this rate, you will soon surpass off Skellig. He was a Your mettle is mighty, and your fury ferocious. Take you on as a square? Should you pass the next trial, I may be looking to you for It was supposed to be me... I was supposed to be the hero... how come you get to lead the hoard? It's not fair... even that fool If I CAN'T be The Harbinger then THERE IS NO PLACE for me HERE! End it BEFORE you END Everything! END ME!!

Figure 39. Dialogue spreadsheet with the important characters.

General NPCs		What Level They Are Dead In		
Olynn	Knight	Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark 5: Bark	So you're the new Challenger? Keep up the good work! More...more!
Willow	Viking	Dead in level 3	1: Bark 2: Bark 3: Bark 4: Bark	Red sun... dark omens... it approaches... Are you here to save us?
Faye	Knight	Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	My hero, I shall be waiting for your return, come meet me for a reward.
Tormund	Viking	Dead in level 4	1: Bark 2: Bark 3: Bark 4: Bark	Hard to keep up with the hustle and bustle of big town life. Strange disturbances in town. Some fellas went mad and just attacked some people... never did find out what that was about.
Rastog	Viking	Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	Murder rates are at an all-time high. Almost like the people are just... going mad... hehe.
Aengus	Knight	Dead in level 3	1: Bark 2: Bark 3: Bark 4: Bark	Light is dead. Night brings dread. Beautiful day we're having, isn't it? Have you noticed the fog? It's common in the morning but rarely lingers this long. What's up with this accursed fog? It won't seem to lift.
Layla	Villager Female	Dead in level 4	1: Bark 2: Bark 3: Bark 4: Bark	I hope you're not looking to disturb this quiet town.
Brigid	Viking	Talks about the murders happening. Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	Trouble brewing ever since you showed up. It better not get any worse, or I'm coming for you.
Bones	Skeleton	Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	When surrounded by fire, fight like fire. Here that everyone? More fire!
Hoid	Skeleton	Portal master. Notices that things are repeating. Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	HehheeeehhhhEEEEEaaaaAAAAGGGHHH..
Philter	Skeleton	Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	Do you have any idea what you're signing up for? You'll probably face new threats in the trial ahead Challenger.
Yahara	Villager Female	Dead in level 2	1: Bark 2: Bark 3: Bark 4: Bark	I love the scent of the flowers blooming this time of year. Is it just me, or does the sky seem a little... different today? Why does the sky grow more dissatisfied every day? What will keep the dark from us should it fail?
Dante	Knight	Dead in level 5	1: Bark 2: Bark 3: Bark 4: Bark	Have you spoken to everyone in town yet? Why haven't you gone to the portal yet? Dear lord, someone killed Yahara in the night! Who would do such a thing?
Fionn	Viking	Dead in level 4	1: Bark 2: Bark 3: Bark 4: Bark	First Yahara, now Willow and Aengus... who is this happening. Shouldn't you be stopping this? Layla! FIONN!!! You've taken everyone else already. Take me! Take me to the reaping!

Figure 40. Dialogue spreadsheet with the unimportant characters.

The DialogueManager extension (Hoad 2022) is a specialised extension for managing in-game dialogue. It follows a format that allows for global-level dialogues applicable across various game levels and character-specific dialogues that can evolve as the game progresses. This structure supports dynamic storytelling, where dialogue can change in response to in-game actions or player choices. It also contains dialogue balloons that display the text in-game.

```

1 ~ start
2
3 # Name: Morrigan
4 # Role: Mother-type
5 # Important character
6
7 if Global.is_level_1:
8   MORRIGAN: Wake up, sleepy head. You were in such a deep long sleep. We are still at Oldtown, the last bastion of hope for the Har
9   MORRIGAN: Though many have come before, none have yet bested the Challenge. Are you indeed the Holy Warrior we dreamed of that ca
10  MORRIGAN: Stretch your legs and have a look around, it may take some time to regain complete control. Head to the portal in the t
11
12 elif Global.is_level_2:
13   MORRIGAN: Once, many Challengers from the far lands sought the power held in here. The streets were filled with life, but the inf
14   MORRIGAN: Please make us carry it no longer. Keep it up, I can feel the powers in you grow.
15
16 elif Global.is_level_3:
17   MORRIGAN: The Dread Moon approaches, and time is short. The seasons are shifting. What once was Summer shall soon turn to Autumn.
18   MORRIGAN: The place is a lot quieter than it used to be...
19
20 elif Global.is_level_4:
21   MORRIGAN: The powers within you swell. Soon, what is shall pass, and what is to be will come. You have already proven more remark
22   MORRIGAN: Nothing is left for you but to push forward and take what is yours. A little more... you are almost there.
23
24 elif Global.is_level_5:
25   MORRIGAN: Yes, more, more. You are so close! I can feel it. Maybe you really are the One. The One to bring an end to these accurs
26   MORRIGAN: Do it! Achieve what you were created for! End it all! (her eyes are deranged)
27
28 => END

```

Figure 41. Glimpse of the DialogueManager extension with Morrigan's dialogue.

The Godot dialogue structure uses a system where each NPC has a dedicated dialogue file. Each possesses scripts containing spoken lines, branching dialogue options, and any specific logic related to their characters' interactions. This method ensures that the narrative flow can be easily managed and updated as needed without affecting the overall dialogue system. Each file is then attached to the specific NPC scene to allow the player to speak to them.

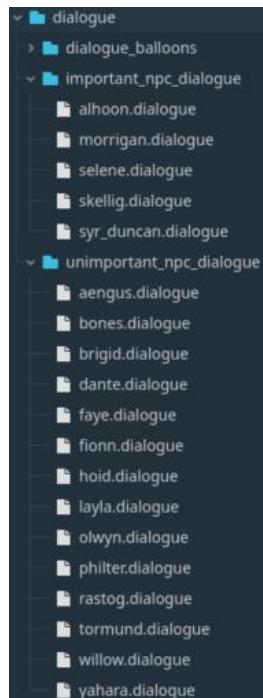


Figure 42. The dialogue files in Godot.

3.6 Lovecraftian Horror

The integration of Lovecraftian horror into the game was executed to immerse players in a universe where cosmic dread and the unknown govern the atmosphere. This was achieved through a deliberate fusion of audiovisual elements, narrative techniques, and game structure, each carefully crafted to enhance Lovecraft's eerie and otherworldly essence.

The audio design is crucial in fostering a Lovecraftian horror atmosphere in the game. The soundscape features layered ambient sounds that blend environmental noises with eerie, discordant notes, creating a sense of unease. Dynamic audio cues respond to player actions and game progression, heightening tension with intensifying music in areas of growing corruption. Environmental sounds, such as howling wind and distant, unidentifiable noises, deepen the mystery and fear of the unknown. Voice effects and dialogue are modulated, going down in pitch at every level, emphasising the theme of corruption. The audio is crafted to enhance the immersive experience and uphold the game's theme of a world teetering on the brink of cosmic horror.

The game's visuals are carefully crafted to evoke Lovecraftian horror, focusing on eerie skies, unsettling weather, and manipulated lighting to enhance the atmosphere. Dense fog, unnatural cloud formations, and deep shadows amplify feelings of isolation and vulnerability, key to the genre. Environmental details like decaying structures and subtly integrated arcane symbols within the portals deepen the sense of a hidden, malevolent reality. Enemy designs blend familiar and alien traits with unnatural movements, suggesting disturbing otherness. Together, these visual elements create a compelling, immersive world that instils both dread and curiosity in players.



Figure 43. The eerie atmosphere of town level 5 combines the fog, sky colours, blood rain, and ambience.

The dialogue in the game intensifies the Lovecraftian horror atmosphere by highlighting themes of cosmic dread and the unknown through conversations with townspeople and allies. The narrative deepens the player's sense of isolation as they express their fear and confusion about the world's corruption. Characters discuss ominous powers, strange happenings, and local myths with increasing desperation, mirroring the game's escalating corruption cycle. This dynamic dialogue progression, growing more cryptic and unhinged, blurs the lines between reality and nightmare, enhancing player immersion in a world overtaken by existential dread.

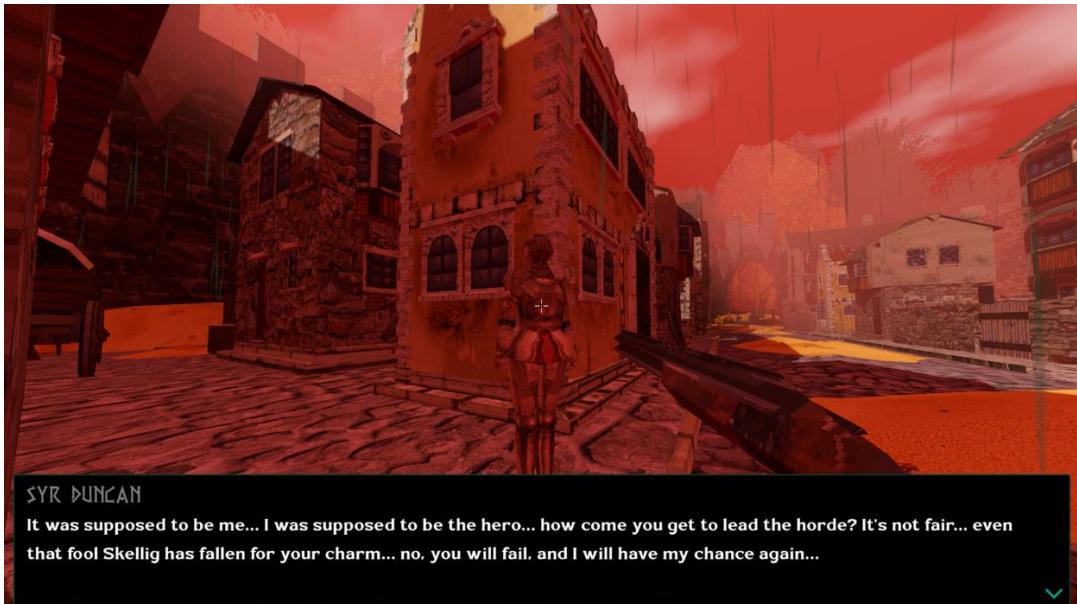


Figure 44. Level 4 dialogue example.

The game's structure is designed to enhance the Lovecraftian theme of inevitable doom through a repetitive cycle, deepening the world's corruption with each iteration and escalating tension and unease. This mechanic drives the narrative and immerses players in a sense of cosmic entrapment, with subtle changes in the environment, enemy behaviour, and dialogue revealing more about each day's overarching threat. The repetition underscores the genre's theme of insignificance, as efforts seem futile against ancient evils, making the game's atmosphere progressively more oppressive and alien.

Enemies in the game are not merely antagonists but manifestations of otherworldly corruption, their forms distorted and unnatural. These designs draw heavily on aquatic and abyssal imagery, aligning with Lovecraft's frequent association with the sea as a source of primordial terror. The enemies are constant reminders of the game world's ongoing corruption, their presence a visual and interactive element that continually challenges the player.



Figure 45. Level 5 dialogue example.

Through these methods, the implementation of Lovecraftian horror was about crafting a setting or a narrative and evoking a profound emotional response from the player. The game's environment, dialogue, and antagonists were all designed to contribute to a cohesive, disconcerting and compelling experience, staying true to the essence of Lovecraft's disturbing vision.

4. Results & Discussion

In this chapter, the outcomes are presented and interpreted while linking them to the literature review and highlighting the challenges and choices found and made along the way. It is an opportunity to assert the project's contributions and position within the broader game industry.

The game contains:

- Nine levels total (town and battlefield) with multiple environmental adaptations for each after the player dies.
- A diverse arsenal of five possible weapons to use.
- Fast-paced movement with a double jump and slide mechanics.
- Three enemy types, along with changes to each at every level, such as strength, speed, and size.
- Nineteen NPCs to interact with and witness changes in their behaviour at every level.
- More than seventy lines of dialogue.
- A Lovecraftian horror tone that rings throughout the game.
- Two endings that happen depending on player skill in the final level.
- Excellent asset management in creating the game, as detailed in the methodology.



Figure 46. The main menu sets the players up for the experience. It is reminiscent of many retro FPS main menus with its own horror twist.

4.1 Adaptive Environment Effectiveness

In the game, environmental storytelling is enhanced by the progressive corruption of levels, atmospheric changes, and evolving NPC dialogue, deepening the narrative and escalating tension. Atmospheric effects like changing weather and lighting conditions evoke emotional responses that align with the game's themes of decay and chaos. NPC dialogues shift from everyday concerns to expressions of fear and madness, reflecting the deteriorating world and enriching the story. The game's cyclical structure, with repeating levels that show increasing corruption, builds anticipation and highlights the central themes, making each iteration impactful and engaging. This method immerses players and intensifies the narrative experience, emphasising the game's themes of renewal and destruction.

4.1.1 Challenges & Choices

Initially, the plan was to design separate maps for each gameplay session. However, due to limited time, the strategy shifted towards developing a single map and enhancing it progressively. Should the project scale up in the future, adding procedural generation to allow the map to evolve dynamically would be preferable. Regrettably, the essential tools for procedural generation were beyond the project's budgetary and resource limits. The investment required to acquire and master these tools did not align with the expected benefits. Despite these constraints, incorporating procedural generation in future developments remains a promising avenue, offering a dynamic gameplay experience where the map uniquely transforms with each session.



Figure 47. The town centre in level 1.

Integrating a narrative-driven approach to environment design required careful planning and creative solutions. The environment needed to tell a story without words, using visual and auditory changes to convey the progression of corruption and the deepening of Lovecraftian horror. Choosing to represent narrative progression through environmental degradation instead of traditional cutscenes or dialogue presented a unique challenge. It required a deep understanding of visual storytelling and environmental psychology. For example, the gradual transition from natural to corrupted landscapes had to be subtle enough to maintain player immersion but pronounced enough to convey the corruption narrative. Each element added or altered had to contribute to the overarching story of cosmic dread, reflecting Lovecraft's themes of insignificance against ancient, unknowable horrors.

Balancing the impact of environmental changes on gameplay was a critical consideration. It was essential to ensure that changes enhanced rather than disrupted the player's experience. For instance, increasing fog or changing light conditions could frustrate players if it severely hindered visibility. Thus, changes were designed to challenge the player and enhance the atmospheric pressure of impending doom without compromising on the core gameplay.

mechanics of a retro FPS. This balance also extended to the pace at which environmental changes occurred. Rapid changes could disorient the player or feel jarring, breaking the immersion. The solution was to tie changes to natural gameplay progression points — specifically, player deaths — to make the environment feel like it was meaningfully reacting to the player's actions.



Figure 48. Evolution of the town centre in level 2.

4.1.2 Reflecting on the Literature Review

The literature review revealed that environmental storytelling is traditionally implemented through static world-building elements like architecture, item placement, and passive environmental changes that do not dynamically interact with player actions. Classic examples include games like BioShock and Portal, where the story is told through the setting and objects within the game world. These games rely on players interpreting environmental clues to piece together the story, thus maintaining a separation between the narrative and the player's direct influence on the environment.

In contrast, this project took a more active approach by making the environment not just a container of the narrative but a participant within it. The environment in this game reacts and evolves based on the player's actions, particularly their failures, as represented by player deaths. This dynamic interaction goes beyond traditional environmental storytelling by creating a game world that feels alive and responsive, enhancing player immersion and engagement. This approach reflects a shift in environmental storytelling towards more interactive and dynamic methods, as discussed in the literature on modern narrative techniques in gaming.



Figure 49. Evolution of the town centre in level 3.

The literature highlights Lovecraftian horror's reliance on themes of cosmic insignificance and the unknowable, often represented through static world elements that suggest a more profound, often disturbing reality beneath the surface of the game world. This project integrated these themes by embedding them into the very fabric of the environment's transformation. Each player's death alters the physical world and deepens the narrative of encroaching cosmic dread, making the player's repeated failures a crucial narrative device.

4.1.3 Industry Insights & Contributions

This adaptive environment model contributes to the game development community's understanding of storytelling and player engagement. It serves as a case study in pushing the boundaries of how a game environment can enrich narrative and gameplay simultaneously. Moreover, it shows evidence of Godot's flexibility in implementing such systems, which can encourage further exploration and adoption among independent developers.

The effective implementation of an adaptive environment that reacts to player inputs opens fresh avenues for game development, promoting unique, personalised storytelling experiences. This advancement may reshape game design practices for developers, highlighting the importance of adaptive narrative components that create deeper, more emotive player interactions. Such advancements could herald a new era in game design, where the consequences of player actions visibly transform the game environment, enhancing engagement and deepening the narrative experience.

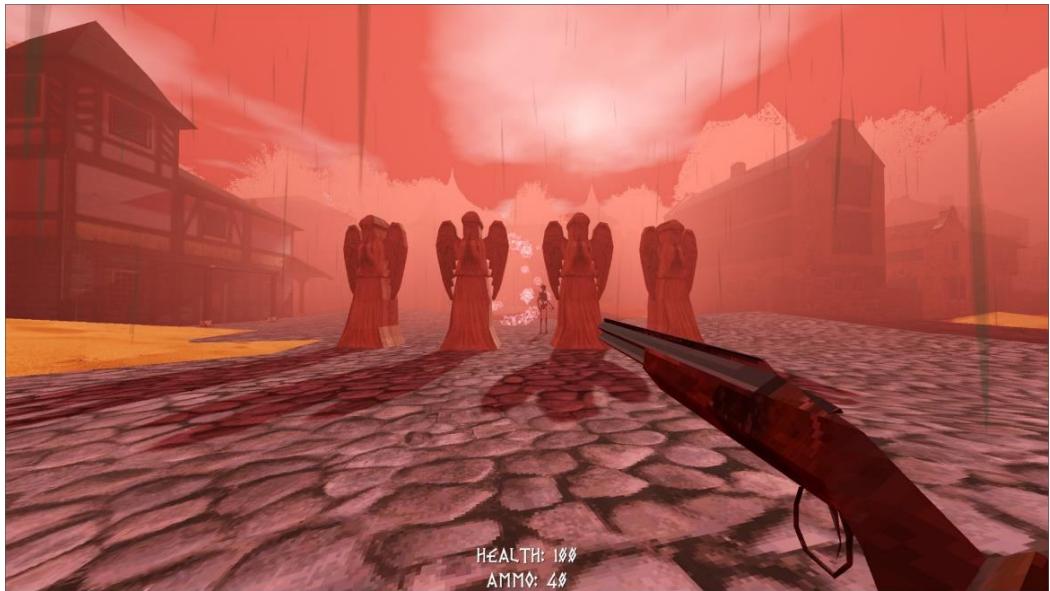


Figure 50. Evolution of the town centre in level 4.

The outcomes of this project also reflect the broader implications for the industry. There is an evident appetite for more profound narrative experiences within game genres traditionally focused on action. This project underlines the potential for genres of games that focus on something other than their narrative to provide rich storytelling without sacrificing their core gameplay appeal.

This project's thorough documentation and analysis offer a rich educational resource for budding and experienced game developers. By outlining the encountered obstacles and the implemented resolutions, this project is a practical reference for those looking to explore similar narrative techniques and technical applications in their game designs. This contributes to a deeper comprehension of environmental storytelling and its transformative impact on game narratives, fostering more innovative and story-focused game development moving forward.

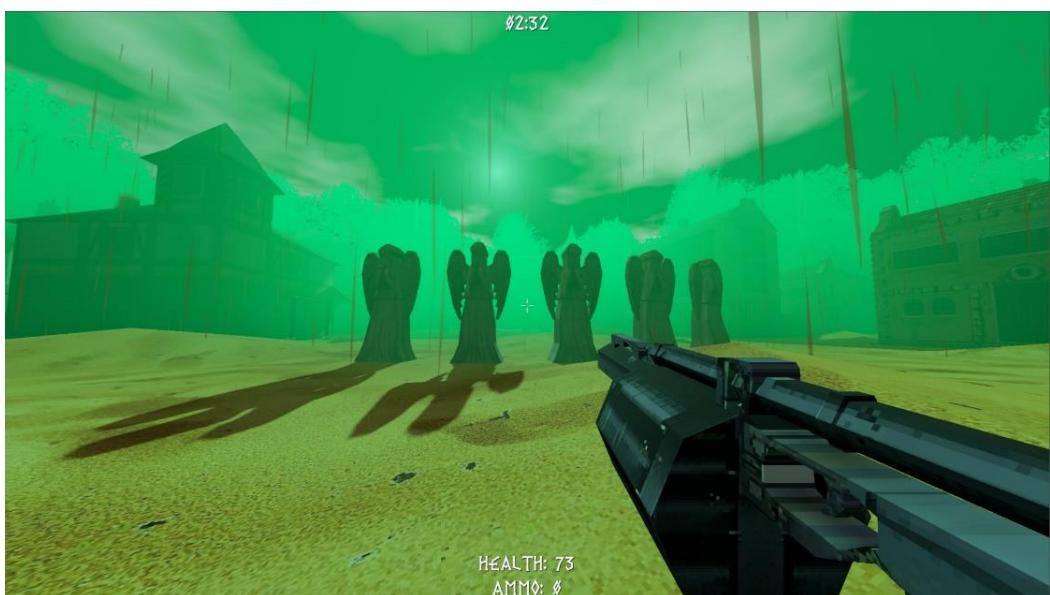


Figure 51. The final evolution of the town centre in level 5, the complete collapse.

4.2 Retro FPS Potency

The evolving enemy types across different levels enhance environmental storytelling and mirror the narrative's escalation, with increased difficulty reflecting the growing corruption. This keeps gameplay varied and engaging, encouraging players to adapt strategies as they progress. Responsive weapon mechanics further enrich combat dynamics, ensuring immersive and tactically satisfying encounters. These retro FPS elements effectively maintain player interest, seamlessly integrate the narrative, and provide a dynamic combat experience that deepens player immersion and connection to the game world.

4.2.1 Challenges & Choices

A significant challenge involved effectively incorporating environmental storytelling within a retro FPS game's fast-moving, combat-centric structure. These games prioritise swift action and combat dynamics, usually sidelining in-depth narrative elements. To tackle this, the game utilised player deaths as a trigger for environmental changes, integrating the narrative elements directly into the core gameplay mechanics.



Figure 52. Using the sliding movement mechanic to engage enemies.

Utilising player death as a critical narrative and game mechanic posed the risk of frustrating players if not handled carefully. The challenge was to make each death feel like a meaningful part of the story rather than a setback. Each death in the game reshapes the narrative context and the player's understanding of the game world, influencing subsequent playthroughs. This approach mitigates frustration with repeated failures and deepens engagement by layering the narrative discovery across multiple attempts.

Integrating enemies into the retro FPS game posed several challenges. Designing AI behaviours that were both challenging and varied across game stages was crucial to maintaining player engagement and avoiding predictability. Additionally, ensuring these enemies fit within the

adaptive environments without overwhelming players required careful balancing of enemy aggressiveness and environmental navigability. Performance optimisation was also critical, as the addition of complex enemy behaviours needed to be managed efficiently by the Godot engine, especially given the dynamic changes in the game's environment. The decision to evolve enemies behaviourally with each level enhanced the game's dynamism and directly linked gameplay to the overarching narrative of corruption and transformation. This approach added depth to the gameplay and enriched the narrative, ensuring that the enemies' progression aligned with the game's thematic elements and increased the overall cohesion and engagement of the player experience.

4.2.2 Reflecting on the Literature Review

The literature emphasised the defining characteristics of retro FPS games, such as fast-paced action, minimalistic storytelling, and straightforward level designs, which focus on player skill and quick reflexes. Classic examples cited include DOOM and Quake, which provided foundational gameplay mechanics that influence modern retro FPS games. The project successfully captured the essence of retro FPS gameplay by implementing high-speed player movement, responsive enemy encounters, and engaging weaponry. These elements were enhanced by modern graphical improvements and gameplay mechanics, ensuring a blend of nostalgia and innovation.

The review highlighted how modern retro FPS games like DUSK and ULTRAKILL have innovated within the genre by integrating advanced graphics and more complex storytelling while maintaining the '90s aesthetic. By utilising the Godot engine, it was possible to craft visually engaging environments and detailed textures that paid homage to the classic era of FPS games, with dynamic lighting effects and shader techniques that enriched the visual experience without straying from the retro feel.



Figure 53. Battling the enemies in the town in level 5. The player's safety and familiarity with the town have been taken away.

4.2.3 Industry Insights & Contributions

The revival of retro FPS games marks a notable trend in the gaming industry. This project's exploration of the genre aligns with a broader industry movement towards nostalgia and classic gameplay, which appeals to both indie developers and mainstream audiences. This revival often stems from a preference for straightforward, less complex gameplay mechanics instead of the intricacies found in contemporary triple-A games. The project sheds light on how retro FPS games can deliver richer narrative experiences without sacrificing their foundational gameplay elements by weaving modern narrative techniques and environmental storytelling into a retro FPS framework. This development offers insights into game design, highlighting how narrative integration can boost player engagement and broaden the appeal of genres traditionally focused on gameplay.

The project enhances comprehension of how adaptive environments can increase players' emotional engagement with the game. By crafting an environment that reacts to player actions, the game weaves a narrative that actively involves players, fostering a more personalised and immersive gaming experience.

4.3 Lovecraftian Horror Influence

Initially aiming to blend retro FPS mechanics, environmental storytelling, and Lovecraftian horror in equal measure, it became clear that fully realising all elements within the project's timeline was unrealistic. Consequently, the focus shifted primarily towards developing robust retro FPS gameplay and intricate environmental storytelling. Lovecraftian themes were scaled back to subtle atmospheric enhancements rather than deep narrative integration. This strategic realignment prioritised core gameplay elements, ensuring the project was manageable and completed efficiently while providing an engaging, eerie backdrop reflective of Lovecraft's influence.

Lovecraftian horror is characterised by the theme of the unknowable and incomprehensible forces that dwarf human understanding and capability, often leading to madness and despair. In aligning with these themes, the game was designed to make the player increasingly aware of their insignificance as their environment became distorted and alien. The implementation was achieved through several key strategies:

- **Environmental Transformation:** Each player's death resulted in subtle yet profound changes to the game's world, altering the physical landscape and deepening the eerie and foreboding atmosphere. This continual transformation of the game space played a critical role in enhancing the Lovecraftian horror aesthetic, emphasising the game's narrative of corruption and the decay of reality.
- **Narrative Integration:** The narrative unfolded through environmental cues and changes more than direct storytelling, emphasising the mood and setting rather than explicit dialogue. This approach mirrored the Lovecraftian technique of revealing horror through descriptive, atmospheric detail rather than confrontation with monsters.

4.3.1 Challenges & Choices

Delivering a nuanced Lovecraftian narrative within a game genre renowned for its straightforward storytelling presented a substantial challenge, especially without extensive dialogues or cutscenes that might interrupt the gameplay. The narrative was intricately woven into the game environment, with each element and level crafted to reveal story segments. Visual symbols, transformed landscapes, and enigmatic audio cues were strategically placed to provide hints, allowing players to create a broader narrative. Opting for environmental storytelling instead of direct narrative techniques, the game allows players to uncover and interpret the story independently, enhancing the depth and replay value while preserving the fast-paced action.

Retro FPS games are characterised by fast-paced action and minimal narrative interference, contrasting sharply with the slow, creeping horror and complex storytelling typical of Lovecraftian themes. Balancing these could potentially alienate fans of the traditional retro FPS experience. The choice to maintain the core mechanics of retro FPS—rapid movement, fluid combat, and straightforward objectives—while weaving the narrative subtly into the environment and game effects. This was achieved by making the storytelling elements primarily environmental rather than explicit, using visual and audio cues to build an atmosphere of dread without slowing down the gameplay. Keeping the fast-paced gameplay intact while subtly integrating the narrative ensured that the game remained true to its retro FPS roots, thereby not alienating traditional players but offering a new experience.

Horror elements, especially those inspired by Lovecraft, can often lead to helplessness or despair, which might conflict with the empowerment typically experienced in FPS games. Instead of debilitating the player to invoke horror, the focus shifted to existential dread and atmospheric tension. The horror stemmed from the game's ambience and the looming threat of the unknown rather than confrontation with unbeatable foes. This choice allowed the game to remain engaging and fun from a gameplay perspective while still delivering a strong emotional and psychological impact, staying true to the essence of Lovecraftian horror.



Figure 54. The dialogue in the game helps enforce the looming threat of the unknown.

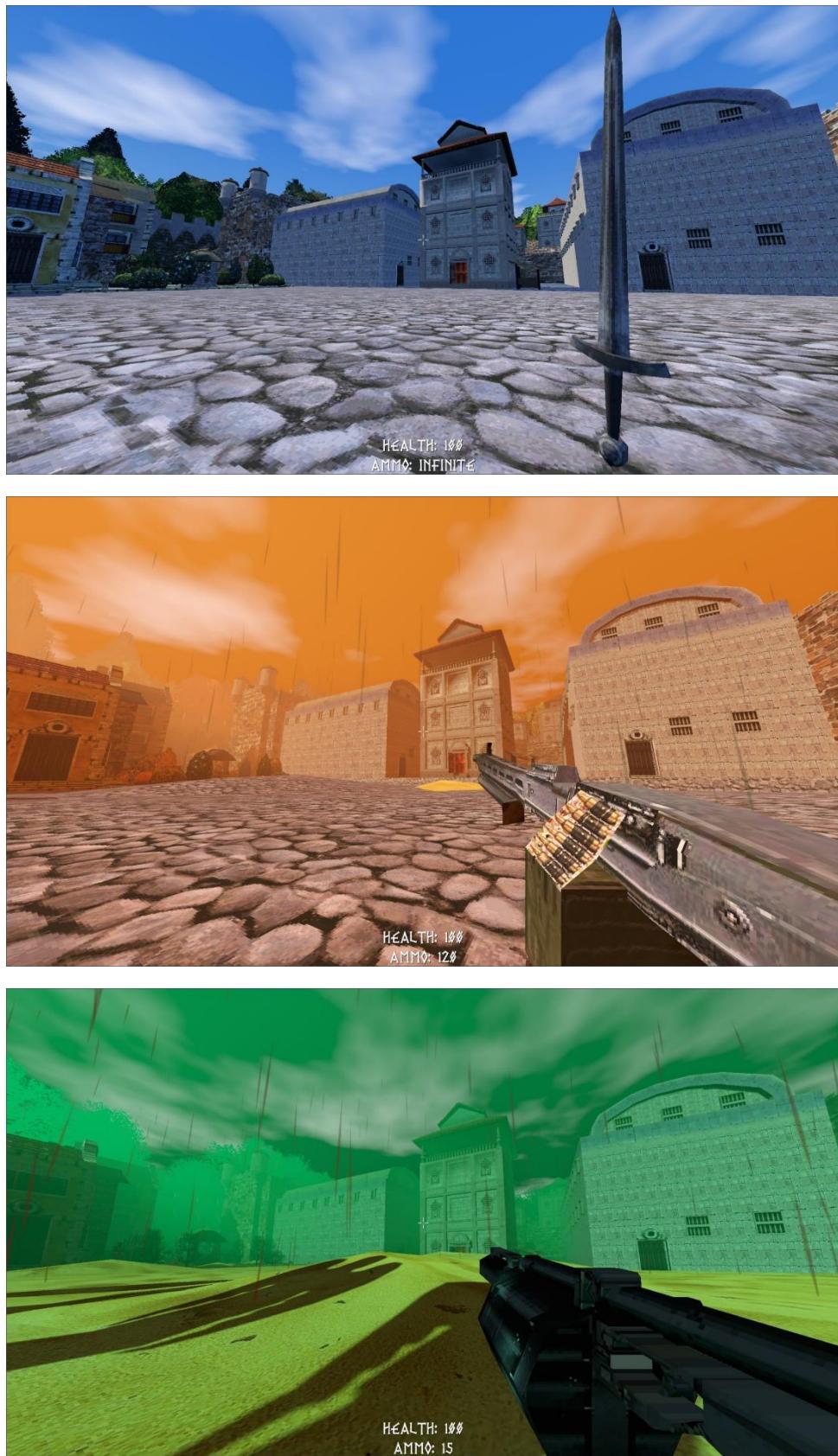


Figure 55. The decay and corruption of the land is gradual throughout the levels, a result of the eldritch monstrosity, Arakzul.

4.3.2 Reflecting on the Literature Review

Adapting Lovecraft's themes within interactive media, particularly video games, is an inherent difficulty. The project effectively incorporates Lovecraftian horror themes by using its structure and player deaths to enhance the narrative. Each death alters the environment, deepening the corruption and visual decay, reflecting Lovecraft's themes of cosmic dread and human insignificance. This cyclical gameplay not only escalates the game's difficulty but also intensifies the sense of foreboding and inevitable doom, aligning with the existential dread central to Lovecraftian horror. By focusing on the atmosphere and progressive environmental changes rather than confrontations, the game maintains the thematic essence of cosmic horror, offering a unique blend of interactive storytelling and atmospheric immersion.

From the literature, giving players the agency to uncover the story at their own pace through exploration and interaction could enhance engagement. This prompted the decision to incorporate narrative hints within the game's environment, enabling players to explore the story to their desired depth.

4.3.3 Industry Insights & Contributions

The project also discusses the feasibility and effectiveness of adapting literary themes into interactive media. By integrating Lovecraftian horror, known for its complex and philosophical themes, into a game, the project provides a practical case study on the challenges and strategies of adapting narrative-rich literature into an interactive format. This adds to the growing knowledge of cross-media adaptations, offering a blueprint for future studies and developments. Make sure there is an understanding of the material and what it is before unquestioningly adapting it.

4.4 Godot Feelings & Findings

A notable difficulty with the Godot engine is the complexity of importing assets. Introducing a new asset into Godot requires multiple steps to ensure proper functionality in the game environment. This process involves creating a material, associating it with the object, defining the object as a scene, and attaching a collision box. Repeating this procedure for each asset can be tedious and time-intensive, especially when dealing with numerous assets. Such intricacies can decelerate the development process, especially in larger projects or teams that must become more acquainted with Godot's operational procedures.

Despite the challenges with asset management, Godot offers significant advantages that facilitate game development, particularly through exported variables. These variables are a powerful feature for fine-tuning gameplay elements because they allow developers to adjust variables directly from the Godot editor interface. This capability is especially beneficial during the testing and development phases, enabling quick iterations and modifications without digging into the code each time an adjustment is needed. Exported variables streamline the process of balancing gameplay, testing different scenarios, and making real-time changes to game dynamics, which can significantly enhance productivity and ease of development.

The decision to use Godot was driven by its open-source nature, robust 2D and 3D support, and the flexibility of GDScript. This choice was validated by the engine's performance and the

community support available, which proved invaluable in solving specific technical issues related to environmental storytelling and dynamic content management.

Godot's scene and node system facilitated a modular approach to game design. Each game element, from individual enemies to story-driven environmental changes, was built as separate scenes that could be instantiated dynamically. This modular architecture made it easier to manage complex interactions within the game world, allowing for detailed storytelling and adaptive gameplay.

Built-in tools such as the animation player and signals enhanced player immersion and interaction. These tools enabled a smoother integration of gameplay mechanics with narrative elements, such as triggering environmental changes subtly in response to player deaths, which were central to the game's Lovecraftian storytelling approach.

The successful implementation of adaptive environmental storytelling and Lovecraftian horror in a retro FPS using Godot highlights the engine's suitability for projects requiring a tight narrative and gameplay integration. This could encourage more developers to consider alternative tools like Godot for game development, particularly in indie and mid-sized projects where flexibility and cost are significant concerns.

5. Conclusion

This report encapsulates the development and findings of an innovative video game project that explores the integration of environmental storytelling within a retro first-person shooter framework utilising the Godot engine. The project's central aim was to dynamically evolve the game environment in response to player actions, particularly player deaths, which would alter the game's narrative and aesthetic elements.

This project effectively addressed the central research question: "To what extent is it possible to implement environmental storytelling in a retro first-person shooter game in Godot?" The findings affirm that environmental storytelling can be seamlessly integrated within the context of a retro FPS using Godot, enhancing both the narrative depth and gameplay experience.

Answering the research question and sub-questions:

- **Adapting Environmental Storytelling to a Retro FPS:** The project successfully adapted environmental storytelling to a retro FPS's fast-paced, action-oriented context by linking game mechanics directly with narrative progression. Changes in the game environment, triggered by player deaths, dynamically altered the game world, making the storytelling an integral part of the gameplay rather than a background element. This method maintained the high-energy gameplay characteristic of retro FPS games while enriching it with a narrative layer that responded to player actions.
- **Player Death as a Narrative Mechanism:** The project innovatively used player death not just as a setback but as a critical narrative and game mechanic. Each death altered the game environment, shifting the visual and audio elements to reflect the growing influence of cosmic horror. This approach deepened the narrative immersion, allowing players to experience the consequences of their actions directly within the game world, making each playthrough uniquely responsive to the player's journey and choices.
- **Technical and Design Challenges:** Implementing adaptive environments in Godot presented several technical challenges, including managing the scalability of dynamic changes and ensuring smooth gameplay despite complex environmental transformations. The project leveraged Godot's robust 3D rendering and scene management features to create a dynamic environment that could evolve in real time based on player interactions. The technical exploration provided valuable insights into optimising performance and scalability when implementing sophisticated environmental storytelling in game design.

Meeting project objectives:

- **Primary Objectives:** The primary objective of creating a narrative linked to the game environment was met by developing a system where player actions, particularly deaths, directly influenced environmental changes. This setup supported dynamic storytelling and ensured the narrative elements were deeply integrated into the gameplay, enhancing the overall engagement and thematic depth.
- **Secondary Objectives:** The game maintained the feel of a classic retro FPS, preserving fast, fluid gameplay and the aesthetic characteristics of the genre. Modern narrative techniques were effectively integrated, enriching the gameplay with an extensive narrative experience. Including Lovecraftian horror elements added a layer of cosmic

dread and mystery, aligning with the game's atmospheric goals and further enriching the player's experience.

The successful integration of these objectives within the Godot engine showcased its capability to support complex narrative and gameplay integration, demonstrating its suitability for innovative game development projects. This project answered the research question affirmatively and set a precedent for future explorations into combining traditional gameplay mechanics with rich, dynamic storytelling in the game development field.

Future research could explore the use of advanced procedural generation techniques to enhance the dynamism of game environments further. Extending the narrative complexity and depth of environmental interactions could provide even richer player experiences. Research could also explore optimising performance to accommodate more significant environmental transformations without sacrificing gameplay fluidity.

Recommendations for future projects include deeper integration of narrative elements with gameplay mechanics, ensuring each component enhances the other without overwhelming players. The successful incorporation of adaptive environments suggests that further innovations in game design could focus on enhancing player immersion and emotional engagement through environment-driven narratives.

In conclusion, Eldritch Echoes not only forwards the game development field by demonstrating the practical applications of environmental storytelling in retro FPS games but also serves as a foundation for further exploration into merging complex narratives with engaging gameplay. The insights gained from this project can significantly contribute to the evolving narrative possibilities within the game development community, promoting more immersive and responsive gaming experiences.

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