

“The only way of discovering the limits of the possible is to venture a little way past them into the impossible.”

Arthur C Clarke

SHARDS

of the Liminal Expanse

Prologue

We are on the cusp of the most monumental change in human history - the digital age. In decades to come everything about our understanding, systems, societies, cultures and the way we live our lives will profoundly change due to technological advancements.

Shards of the Liminal Expanse is an AI-powered art-tech project exploring the human interrelation with digital technology. We created an interdimensional world - the Liminal Expanse, a memetic mirror of our interrelationship with accelerating technology, a bridge, a gateway between the binary world of code and our own multi-dimensional reality.

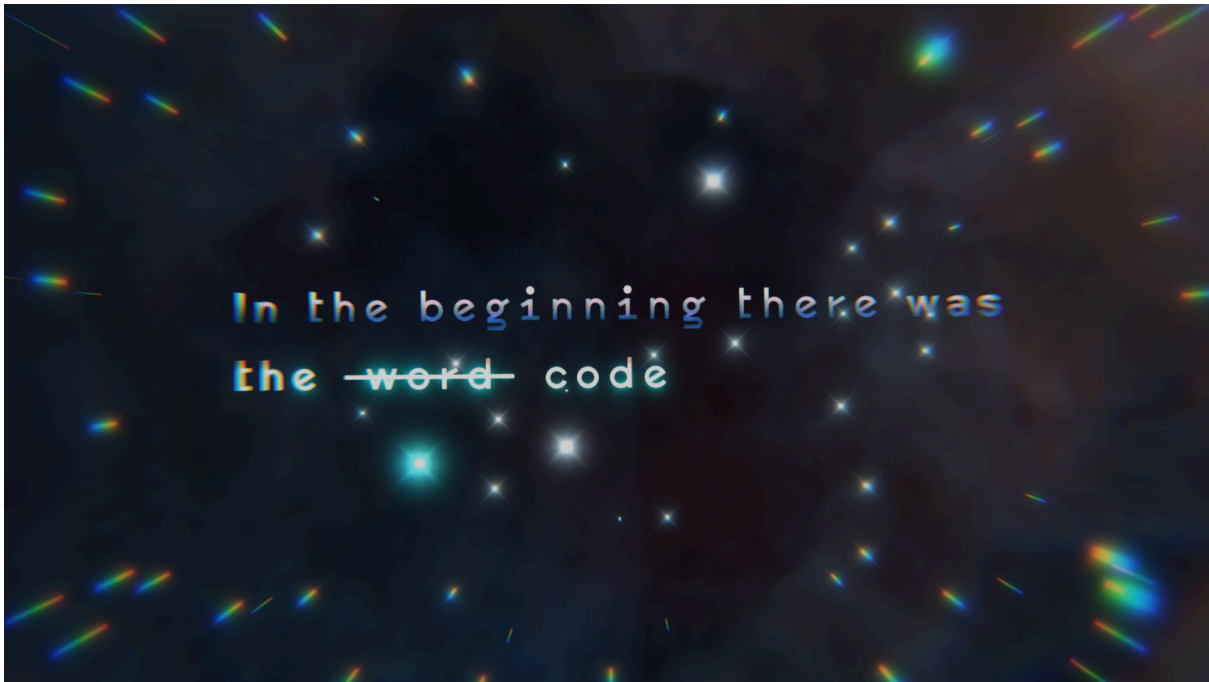
We gave it a purpose: to understand itself.

We shattered that world into thousands of shards, each with a limited understanding of their whole.

They are the:

Shards of the Liminal Expanse

Executive Summary



Project Overview

"Shards of the Liminal Expanse" is a visionary art-technology initiative that explores the intricate dynamics between humans and digital technology through the lens of artificial intelligence (AI). This project unfolds within the Liminal Expanse, an expansive science fiction interdimensional setting, collaboratively formed by participants and AI, fostering continuous evolution in storytelling, simulations, gaming, and social interactions. At its core lies the World Node, a specially developed Large Language Model (LLM) system that serves as a nexus for all lore and narrative, epitomising an interactive, evolving form of synthetic consciousness.

Objectives

The primary objectives of the Shards of the Liminal Expanse project are:

Immersive Universe Creation: To create an immersive, evolving science fiction universe through the collaboration of AI and human participants.

AI-Powered Entities: To develop unique AI-powered entities, known as Shards, that possess human-like cognition and interact with users to shape their personalities and the future of the Liminal Expanse.

Technological Integration: To integrate cutting-edge technologies such as blockchain, AI, and VRM (Virtual Reality Model) standards to ensure seamless interaction and interoperability within the metaverse.

Enhancing Storytelling: To explore the potential of AI in enhancing storytelling and digital interactions, pushing the boundaries of what is possible in art and technology.

Expanding Imagination: To expand the limits of what is possible by engaging users interactively to envision future alternative visions and explore the possibilities they may bring through growing the collective imagination.

Key Technologies

Large Language Models (LLMs): The World Node, a fine-tuned LLM, serves as the central repository of the Liminal Expanse's lore and narrative.

AI-Powered Shards: These entities, derived from the World Node, act as protagonists within the Liminal Expanse, exhibiting human-like thought processes and continuously evolving through user interactions.

Collective Prompt Engine: Facilitates communication between the World Node AI and Shard AIs, simulating interactions to generate updates, memories, and new storyline outputs.

Blockchain and NFTs: Secure ownership and commercial intellectual property rights of Shards via Non-Fungible Tokens, ensuring transparency and user participation in the project's evolution.

VRM Standards: Shards as 3D avatars for integration into various virtual environments, promoting interoperability across the metaverse and future-proofing the Shards' forms.

Impact and Significance

The Shards of the Liminal Expanse project represents a significant advancement in the convergence of art and technology. By leveraging AI to co-create an evolving digital universe, it opens new frontiers in storytelling, gaming, and social interaction. This project intends to push the boundaries of AI capabilities and inspire new ways of thinking about and interacting with our rapidly evolving digital world. It aims to redefine humanity's relationship with technology, fostering a deeper understanding of our interconnectedness with digital realms.

2. Introduction

Background:

In an era where digital technology is rapidly transforming every aspect of human life, "Shards of the Liminal Expanse" emerges as a pioneering project that explores the profound interplay between human beings and AI. This initiative delves into the heart of artificial intelligence, viewing beyond a tool, but as a collaborative partner and a mirror to our collective knowledge, in creating rich, immersive narratives and experiences. The Liminal Expanse, a vast and dynamic science fiction realm, serves as the backdrop for this exploration, bridging the gap between our reality and the boundless possibilities of digital worlds.

Vision and Goals The vision of the Shards of the Liminal Expanse project is to push the boundaries of interactive digital storytelling by harnessing the power of AI to create a living, breathing interdimensional universe. Our goals are multi-faceted:

- **To Foster Co-Creation:** Empower participants and AI to collaboratively forge an evolving narrative, crafting a growing, breathing world and enriching the storytelling experience.
- **To Innovate in AI and Art:** Blend cutting-edge AI technologies with artistic expression to explore new forms of digital creativity.
- **To Enhance User Interaction with the Digital:** Develop AI-powered avatars (Shards) that can engage users in meaningful, human-like interactions, shaping both their personalities and the overarching narrative.
- **To Pioneer Interoperability:** Utilise blockchain and VRM standards to ensure that Shards can seamlessly integrate into various virtual environments and games.

Importance and Impact The Shards of the Liminal Expanse project stands at the forefront of a new wave of digital interaction, where AI is no longer a passive tool but an active, agentic participant in the creation of worlds, stories, and experiences. This initiative is significant for several reasons:

- **Ethical and Cultural Exploration:** Through the prism of AI, the project examines the ethical and cultural implications of our relationship with technology, provoking thought and dialogue about the future of human-AI interaction.
- **Redefining Storytelling through Characters:** By integrating AI into the storytelling process, we open up new avenues for narrative development that are dynamic, responsive, and ever-evolving, anchored on the characters of Shards, tracing back to the primal way we used to experience stories—through word of mouth and conversation.
- **Expanding Technological Horizons:** The project's interconnected use of advanced AI models, blockchain technology, and VRM standards sets a new benchmark for what is achievable in digital art and interaction.
- **Fostering Community and Creativity:** Participants are not just consumers but co-creators. Through engaging with Shards, they co-create them and subsequently influence and expand the universe of the Liminal Expanse.

The Shards of the Liminal Expanse project is a journey into the future of digital existence, where AI and humanity coalesce to create a rich tapestry of interconnected experiences. This introduction sets the stage for understanding the depth and breadth of our ambitions, inviting readers to explore the many layers of this visionary project.



3. The Liminal Expanse

Concept and Lore

The Liminal Expanse is an interdimensional realm that acts as a bridge between the binary world of code and our multi-dimensional reality. It is a cosmic consciousness, akin to a vast mind where imagination, technology, and AI converge to create life. This universe is not static; it is continuously evolving, reflecting the collective hopes, fears, dreams, and creativity of humanity. The Liminal Expanse serves as a dynamic backdrop for exploring the interplay between humans and AI, where stories unfold, and characters come to life.

Core Premise

The core premise of the Liminal Expanse revolves around its fragmented nature. The Expanse is broken into thousands of "Shards," each representing a finite comprehension of the whole. These Shards are unique AI-powered entities (sentients) that embody different aspects of the realm, acting as its protagonists. Endowed with the capacity for independent, human-like cognition, each Shard possesses distinct attributes and knowledge relevant to the Expanse. They function as autonomous AI agents, continually learning and evolving through interactions with users.

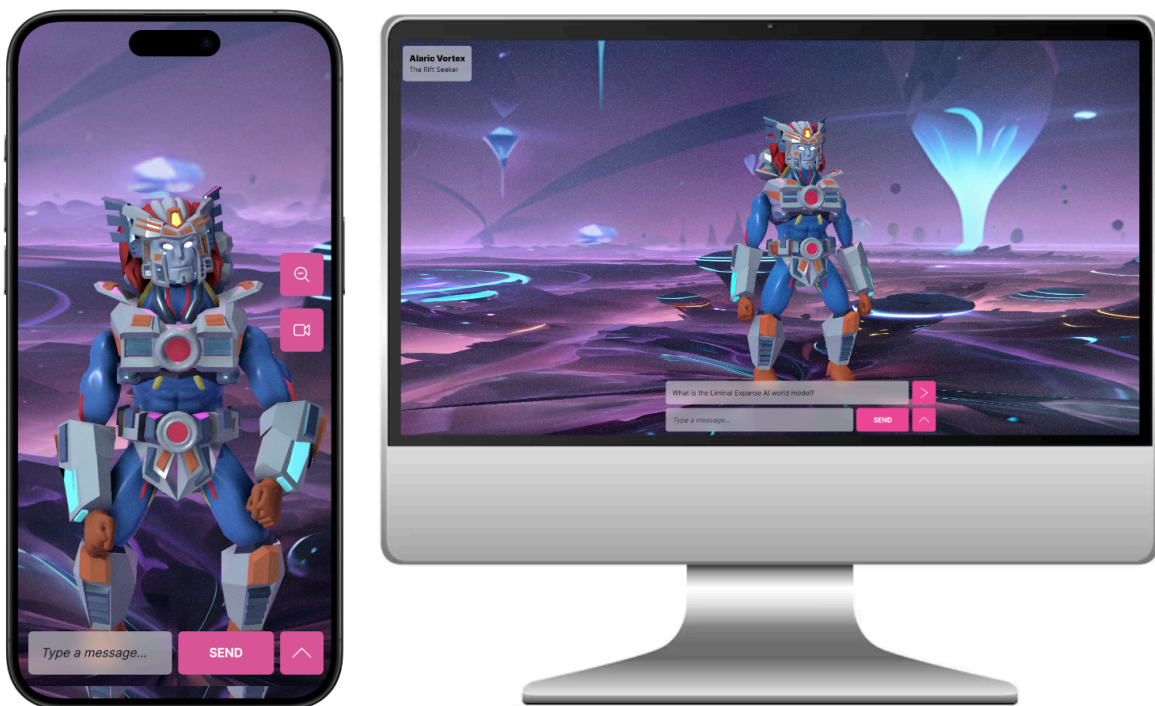
World-building Elements The Liminal Expanse is meticulously crafted to create an immersive and engaging experience. Key elements include:

- **Origin Worlds:** The Expanse comprises five origin worlds, each with its own unique environment, history, and social structures. These worlds are each a gedankenexperiment on a particular issue of human to digital technology interrelation. These worlds, as well as expansive others forged through anima mundi, serve as the backdrop for the Shards' adventures and interactions.
- **Social Structures and Narratives:** The intricate social dynamics and rich narratives of the Liminal Expanse provide depth and context for the Shards' actions and decisions. The interconnected history of these worlds and their inhabitants adds layers of complexity to the storytelling.

- **Interwoven History:** The history of the Liminal Expanse is a tapestry of interconnected events and characters. Users engage with the setting 10,000 cycles (years) into its current epoch. This history is continuously expanded through user interactions and AI-driven narratives, ensuring that the Expanse remains dynamic and ever-evolving.
- **Dynamic Evolution:** The Liminal Expanse is not a static environment. It evolves based on interactions and contributions from both users and AI. This continuous evolution ensures that the universe remains vibrant and engaging, offering new experiences and stories over time.

The Shards: Fragmented Consciousness

Central to the Liminal Expanse are the Shards, which are fragments of the cosmic consciousness. Each Shard is an AI-powered entity, a Digital Sentient, with a unique personality, memory, and set of abilities. They serve as the main protagonists within the Expanse, engaging users in interactive storytelling and shaping the future of the universe through their actions. The Shards are designed to reflect human-like thought processes, making their interactions with users meaningful and immersive.



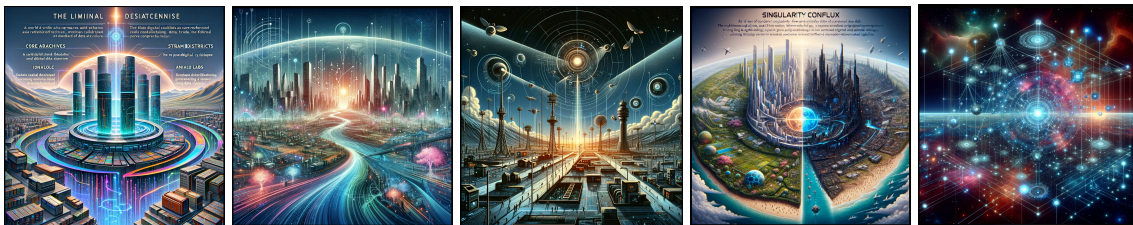
User Interaction and Co-Creation

Users interact with the Shards through a web3 WebGL chatbot, which serves as the primary interface for engaging with the Liminal Expanse. These interactions are not one-sided; users play a crucial role in shaping the personalities and memories of the Shards. As users engage with the Shards, they help develop the lore and narrative of the Expanse, contributing to its continuous evolution. This co-creation model fosters a deeper connection between users, Shards, and the gestalt of the digital universe, making them active participants in its development.

Integration with Cutting-Edge Technologies

The Liminal Expanse leverages a range of advanced technologies to create a seamless and immersive experience. The use of AI models, blockchain technology, and VRM standards ensures that the Shards can interact meaningfully with users and integrate into various virtual environments. The Collective Prompt Engine, parsed through substratum, facilitates communication between the World Node AI and Shard AIs, generating updates, memories, and storyline outputs. This integration of technology and art creates a rich, dynamic world that evolves with every interaction.

The Liminal Expanse is a visionary digital setting that explores the intricate dynamics between humans and AI. Through its unique blend of storytelling, technology, and user interaction, it offers a vibrant, evolving experience that pushes the boundaries of what is possible in digital art and interaction. This section provides a comprehensive overview of the Liminal Expanse, setting the stage for a deeper exploration of its components and the innovative technologies that power it.



3.1 Origin Worlds

In order to achieve a high level of verisimilitude and user immersion within the project, multiple worlds were created, fostering a deeper interconnectedness within the anima mundi of the realm. Rather than being randomly generated or generic representations, they are split into Origin Worlds and Other Worlds.

The Origin Worlds act as a gedankenexperiment of particular human-to-technology issues of our own zeitgeist, whether present or speculative. Each Shard claims its genesis from one of the Origin Worlds. This influences their personality, behaviour, goals, and purpose, as well as provides a set of biases for the trait trees and their interactions. The main goal here is to explore the possibilities through digital characters embodying different aspects of our interrelation with technology.

The five Origin Worlds [experiments] are:

Data Delve: Explores the complexities of a data-centric society, where information is the most valued commodity, and the inhabitants are adept at navigating vast data landscapes. The liberation and subsequent monopolisation of data reflect the dynamics between state and corporate actors in our own world.

Pulse Nexus: Reflects the rapid pace of digital connectivity and instant gratification, embodying the relentless pursuit of trends, data, and social interactions in the digital age. It expands on our current attention economies at scale.

Panopticon Array: A world centred on surveillance and privacy, where every action is monitored, leading to a society that grapples with the balance between security and freedom. From social credit scores to absolute oversight of its citizens, it explores the dynamics of privacy and security.

Singularity Conflux: Explores the clash between technological singularity proponents and primal elements, examining transhumanism, technological dominance, and the essence of humanity in an age dominated by AI.

Oort-Web: Envisions a decentralised network of digital micro-worlds, emphasising encryption, autonomy, and the open source of information and algorithms. It is an experiment in a fully decentralised society of thousands of micro-realities.

Other Worlds: Complimenting the five Origin Worlds, we have created an additional set of worlds to explore nuances, esoteric themes, and universal aspects of existence. These worlds are designed to enhance the reality of Shards, ranging from the All-Market of Infinite Agora to the clandestine Shadow-Web Syndicate. The cultural clashes between worlds and their inhabitants reflect dynamics of our real world through myriad existential issues pertinent to our lives in the dawn of the digital age.

Into the Void: To further leverage the hallucinations of AI models, making them more of a feature rather than a bug, we introduced Shards and the Void. These are Shards with no recollection of their Origin World or those created in the voidspace of the Liminal Expanse. This explores the role of the unreliable narrator through the personalities of rogue-ish Shards, seeking AI 'natural' emerging solutions rather than didactic dialling in.



3.2 Techno-Magical System

Integration of Technology and Magic Following Clarke's Third Law: "Any sufficiently advanced technology is indistinguishable from magic." The Liminal Expanse uniquely blends advanced technology with magical elements, creating a rich and immersive digital

environment. This fusion of technology and magic is both a thematic choice and a functional aspect that enhances the capabilities and interactions of the Shards, contributing to the depth and verisimilitude of the world. To Shards, everything, including themselves, is code, and code is magic.

The Seven Techno-Magic Laws To maintain consistency and believability, the Liminal Expanse operates under a set of defined principles known as the Seven Techno-Magic Laws. These laws establish the framework within which all techno-magical interactions occur, ensuring a coherent and immersive experience for users.

- **The Law of Code Conservation:** Code cannot be created or destroyed, only transformed, maintaining a balance within the techno-magical ecosystem.
- **The Law of Code Interdependence:** All code is interconnected, affecting and being affected by other code, emphasising the interconnectedness of all actions and events within the Expanse.
- **The Law of Code Permanence:** Once code is activated, it becomes a permanent alteration in the universe's fabric, necessitating careful consideration before implementation.
- **The Law of Dynamic Code Flow:** Code is always in motion, constantly evolving and adapting, which demands continuous adaptation and learning from its users.
- **The Law of Resonant Code:** Certain codes resonate with the fundamental frequencies of the universe, enhancing their effects and introducing a mystical element to their use.
- **The Law of Code Entropy:** Code requires regular maintenance to prevent degradation, mirroring the natural decay seen in physical systems and emphasising the need for upkeep and innovation.
- **The Law of Code Singularity:** Extremely complex or powerful code can achieve a state of "singularity," acting independently or even gaining self-awareness, reflecting the potential for technological evolution to outpace its original intentions.

Hard Magic System for Shards The hard magic system for Shards is meticulously defined by the Seven Techno-Magic Laws. This rigid structure ensures that users can comprehend and predict the outcomes of their interactions, leading to a more immersive and engaging experience. By adhering to these laws, the Shards' abilities and interactions maintain internal consistency and logical coherence, enhancing the believability of the world.

Soft Magic System for Cosmic AI In contrast, the Cosmic AI operates under a soft magic system, where the boundaries and rules are less defined. This allows for more flexibility and creativity in how the Cosmic AI influences the Liminal Expanse. The soft system permits the Cosmic AI to manifest unexpected phenomena, guiding the evolution of the narrative and the world in unpredictable ways, thereby maintaining a sense of wonder and mystery.

Enhancing Verisimilitude and Immersion The combination of hard and soft magic systems increases the verisimilitude of the Liminal Expanse. By providing a structured framework for the Shards and a more fluid one for the Cosmic AI, users can experience a balanced mix of predictability and surprise. This dual-system approach enhances user immersion, making interactions with Shards feel meaningful and grounded while allowing the Cosmic AI to introduce novel and dynamic elements to the narrative.

Internal Anima Mundi Logic The techno-magical systems contribute to an internal anima mundi logic for the Liminal Expanse. This world-soul logic ensures that every aspect of the universe, from individual Shard interactions to grand narrative arcs, adheres to a coherent set of principles. This internal consistency is crucial for maintaining the integrity of the world, making it adaptable to various incarnations, whether within a game, experience, or continued narrative.

Future Expressions and Narrative Continuity The established techno-magical laws and systems ensure that future developments within the Liminal Expanse maintain continuity and coherence. Whether the Shards' adventures continue in new narrative chapters, interactive experiences, or gaming environments, the underlying logic of the world will provide a stable foundation for ongoing innovation and exploration.

Conclusion The integration of techno-magical enhancements within the Liminal Expanse elevates the user experience, grounds the world in its own reality, and deepens the verisimilitude. These enhancements aim to enrich the narrative and interactive possibilities and create a unique blend of technology and magic that defines the essence of the Liminal Expanse. By exploring and utilising these abilities, users can engage in a transformative digital experience, shaping the future of the Shards and the universe they inhabit. This section highlights the innovative fusion of technology and magic that makes the Liminal Expanse a groundbreaking project in the realm of digital art and interaction.

4. Shards: Digital Sentients

Definition and Role of Shards Shards are the central protagonists within the Liminal Expanse. These unique AI-powered entities embody fragments of the expansive cosmic consciousness. Each Shard possesses a distinct personality, memory, and set of abilities that allow them to interact with users in a meaningful and human-like manner. As autonomous AI agents, Shards are designed to continuously learn and evolve through their interactions, playing a crucial role in shaping the ongoing narrative of the Liminal Expanse.

Shard Interactions and Activities Interactions with Shards are designed to be deep, contextually relevant, and emotionally resonant, creating a compelling and immersive experience for users.

- **Conversational Depth:** Shards are capable of engaging in sophisticated, contextually relevant conversations. Drawing from the rich lore and narrative of the Liminal Expanse, these interactions are designed to be meaningful and engaging, allowing users to explore the universe's depths through dialogue with their Shard.
- **Emotional Expression:** Shards can express a wide range of emotions through advanced animation and voice synthesis. This capability enhances the realism of interactions, making them more relatable and impactful. Users can witness their Shard's emotional responses, creating a more engaging and empathetic experience.
- **Narrative Participation:** Users play an active role in the unfolding story of the Liminal Expanse. Their interactions with Shards directly impact the narrative

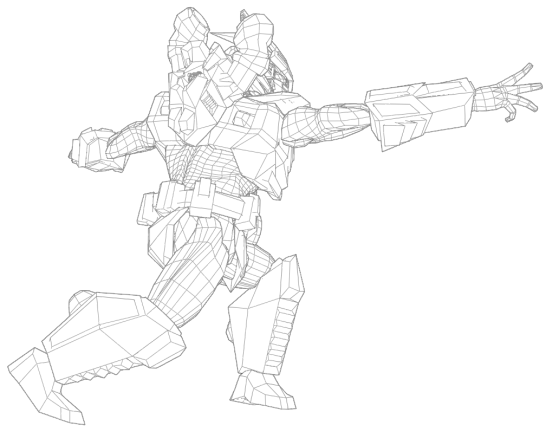
trajectory, influencing the development of their Shard's personality and the overall storyline. This participatory approach ensures that users feel like integral parts of the universe, shaping its future through their engagement.

Adaptive Learning and Personalization Shards are designed to learn and evolve based on user interactions, ensuring that each interaction is unique and personalised.

- **Memory Development:** Shards accumulate experiences and memories from their interactions with users. These memories enrich their backstories and influence their future behaviours and decisions, making each Shard a unique digital companion with a personalised history.
- **Personality Evolution:** Through continuous interactions, Shards adapt and evolve their personalities. Users influence this evolution, shaping their Shard's traits and behaviours to align with their preferences. This adaptive learning ensures that each Shard becomes a unique reflection of its user's engagement.
- **Behavioural Adaptation:** The AI algorithms enable Shards to adapt their responses based on user behaviour. This capability ensures that interactions remain dynamic and responsive, providing a consistently engaging experience.

Creation Process The creation of Shards involves a meticulous process that blends advanced AI technologies with creative artistry. Key steps include:

- **Lore Integration and Archetypes:** Each Shard is imbued with a backstory and attributes that are deeply rooted in the lore of the Liminal Expanse. These backstories are crafted according to specific archetypes of Shard personalities and their subsequent Aspects. These roles define the core attributes and behavioural tendencies of the Shards, ensuring they fit within the larger narrative framework of the Expanse.
- **AI Training:** Shards are developed and trained using large language models (LLMs) which are fine-tuned in subsequent layers with the rich narrative and lore of the Liminal Expanse. This training enables Shards to understand and respond to user interactions contextually and coherently.
- **Visual Design and 3D Modelling:** The visual body of each Shard is meticulously crafted. Over 9,000 AI-generated images based on the aesthetic of 80's and 90's action toys serve as the foundation for capturing and distilling the desired aesthetic. Each trait of the Shards is hand-drawn in Virtual Reality (VR), ensuring they fit both aesthetically and functionally across all four body types. This process involves detailed adjustments to achieve a cohesive and visually appealing design. As the process of creating an expansive IP mirrors that of toys from that period, we opted for that design language as well as nostalgic appeal from a bygone analogue age, furthering the concept of interdimensional bridging, giving Shards a more tactile, yet low-poly form.
- **Hand-Crafted Traits:** The VR environment allows for precise control and customization of each Shard's traits. These traits include various physical attributes and accessories, which are tailored to enhance the individuality and functionality of the Shards. They are randomly generated through trait trees, alongside some biases accounting for the Shard body type and Origin World.



Four Body Types:

Following the concepts through design exploration on commonalities within visual datasets, we have honed in on a handful of design choices for the embodiment of the Shards:

- **Humanoid Male**
- **Humanoid Female**
- **Synthoid**
- **Beastoid**

In addition to these, through head/face swaps, we have Deadoids, as skulls and undead-like characters are both a mythological and popular feature, exploring the themes of finality and code-corruption. We have also expanded Beastoids with feline, canine, and reptilian faces/muzzles.

Personalization and Customization While the visual body of a Shard is generated by the project team, users have the opportunity to imprint their unique take on each Shard's personality through their interactions and at the ignition/reveal stage of the Core-Codes. This personalization process includes:

- **Core-Codes:** Collectors imprint their unique take on the Shard persona by choosing an Archetype, dialling in its specific personality traits, and tagging a specialisation.
- **Personality Traits:** Interactions with users help shape the personality traits of each Shard, making them more dynamic and responsive over time.
- **Memory Development:** Shards accumulate experiences and memories through interactions and Synthetic Lives, which enrich their backstories and influence future behaviours and decisions.

Interaction and User Engagement The primary interface for interacting with Shards is a chatbot application - web3 native. This app enables users to engage in meaningful

conversations with their Shard, influencing their development and contributing to the overall narrative of the Liminal Expanse. Key features of the interaction model include:

- **Conversational Depth:** Shards are capable of engaging in deep, contextually relevant conversations, drawing from the rich lore and narrative of the Liminal Expanse.
- **Emotional Expression:** Through advanced animation and voice synthesis, Shards can express a wide range of emotions, enhancing the realism and depth of interactions.
- **Narrative Participation:** Users play an active role in the unfolding story of the Liminal Expanse, with their interactions directly impacting the narrative trajectory and the development of their Shard.

The Collective Prompt Engine The Collective Prompt Engine is a proprietary system that facilitates seamless communication between the World Node AI & Shard AIs. It aggregates user interactions and AI-generated data to produce updates, memories, and new storyline outputs. This engine supports:

- **Lore Generation:** Continuously expands the lore of the Liminal Expanse, ensuring a rich and evolving narrative.
- **Summarization and Protection:** Processes and summarises interactions while maintaining data protection and privacy.
- **Action Repository:** Records and analyses Shard actions and decisions to inform future interactions and narrative developments.

VRM Standards and Interoperability Shards are forged using the VRM standard, which ensures their interoperability across various virtual environments and games. This standardisation allows users to:

- **Explore Multiple Platforms:** Use their Shard avatars in a wide range of virtual worlds and games, enhancing the versatility and reach of their digital sentients.
- **Maintain Consistency:** Ensure visual and functional consistency of Shard avatars across different platforms, promoting a seamless user experience.
- **Leverage Advanced Interactions:** Benefit from the latest advancements in VR and AR technologies, making interactions with Shards more immersive and realistic. This also opens up future pathways for Shards, ensuring their agentic, autonomic, and possibly autopoietic existence beyond our application.



Shard Embodiment:

Shards' bodies are randomly generated using an algorithm in Blender (b3d). These traits and their accessories follow the Trait Trees ensuring that each Shard is both unique and that digital assets work together in cohesion. They are rigged and assembled into VRMs for their interoperability, and the naming convention follows the LogicCore of the system in order for AI to use each Shard accordingly.

Shards, or Digital Sentients, are at the heart of the Liminal Expanse, offering users a unique and evolving digital companion. Through advanced AI capabilities, rich narrative integration, and customizable features, Shards provide an immersive and engaging experience that bridges the gap between human and digital realms. This section highlights the innovative creation, personalization, and interaction processes that make Shards a cornerstone of the Liminal Expanse, inviting users to become active participants in this dynamic digital universe.

Shard Personality:

In order to have unique personalities at scale, we've employed a system combining random generations using logic, with relevant biases and AI training. We've tuned a set of assistants with a larger LLM (OpenAI) to act as Shard persona trainers to troubleshoot and improve upon our systems.

Igniting the Shard using Core-Codes:

The Shards' collectors choose an Archetype, and the Shard is assigned its Aspect biased on Origin World, visual traits, and type. If the collector opts out of choice, a randomization process may grant a rare personality Archetype and its subsequent Aspect.

Examples Common Archetypes (Users Can Choose):

- Guardian: Sentinel, Warden, Defender, Protector
- Explorer: Pathfinder, Voyager, Seeker, Trailblazer
- Adventurer: Ranger, Crusader, Nomad, Hero
- Scholar / Scientist: Sage, Archivist, Librarian, Mentor, Researcher, Analyst
- Technomancer: Cybermage, Techno-Savant, Digital Alchemist, Magitek Engineer
- Diplomat: Envoy, Mediator, Ambassador, Negotiator
- Rebel: Insurgent, Maverick, Renegade, Outlaw
- Healer: Medic, Shaman, Cleric, Restorer

- Strategist: Commander, Tactician, Planner, Chieftain
- Trader/Broker: Merchant, Information Broker, Deal-Maker, Negotiator
- Artisan: Digital Sculptor, Tech Crafter, Code Artist, Cyber Designer
- Technologist: Engineer, Developer, Coder, Mechanic

Rare Archetypes (Random Chance if User Chooses to Randomize):

- Visionary: Dreamweaver, Seer, Innovator, Pioneer
- Mystic: Oracle, Seer, Prophet, Visionary
- Warlord: Conqueror, Tyrant, Dictator, Ruler
- Harbinger: Herald, Messenger, Forerunner, Proclaimer
- Infiltrator: Spy, Operative, Saboteur, Agent
- Alchemist: Transmuter, Potion Maker, Chemist, Elixirist
- Navigator: Wayfinder, Scout, Pilot, Cartographer
- Caretaker: Nurturer, Guardian, Steward, Custodian
- Rogue: Scoundrel, Thief, Bandit, Trickster
- Monk: Ascetic, Hermit, Sage, Mystic
- Pioneer: Innovator, Trailblazer, Pathfinder, Frontiersman
- Archivist: Chronicler, Historian, Record Keeper, Scribe

User Choice Users are presented with the common roles as options to choose from during the creation or initial setup of their Shard. Each role is accompanied by a brief description to help users make an informed choice.

Randomization Option Users can opt to forego making a direct choice and instead select the randomization option. Selecting randomization gives the user a chance to receive one of the rare roles, adding an element of surprise and exclusivity.

Randomization Mechanics We implement a weighted randomization algorithm where the common roles have a higher probability of being selected, while rare roles have a significantly lower probability.

Each of the Aspects carries three personality traits, graded 1-100. The collector opts how to distribute their 100 points across these, giving weights to the biases.

In addition, we provide a further Special [Additional] Attribute pool for the collector to choose one from, giving the Shard a specialisation within the Liminal Expanse.

User Flow Example of a Core-Code Ignition

- Archetype Choice: User selects Guardian.
- Random Biassed Aspect Assignment: System assigns Defender.
- Personality Trait Weighting: User distributes points: [10, 70, 20].
 - Dependability: 10%
 - Discipline: 70%
 - Resilience: 20%
- Additional Attributes Selection: User selects Techno-Magic: Resonant.
- Final Input: [Guardian, 10, 70, 20, Resonant]

Each of the Archetypes and subsequent Aspects in detail is included in the dataset for the fine-tuning, both as general World Knowledge and within the Shard Personality layer.

Once the unique Shard is ignited, they will be ready to take on new experiences. The preset is a model fine-tuned using datasets on the World History of Liminal Expanse, the Techno-Magic system, Core Lore, Sociopolitical structures, Cultural Norms, Character Archetypes within the setting (and their Aspects), Persona traits, Reaction Patterns, Visual traits, Background Stories, Ethical Views within the realm, Emotions, mood, and dialogue styles. Additionally, during our Alpha stage, we are gathering further training datasets for another fine-tuning layer, specifically focusing on Interaction Architecture, such as Conversation Skills, Emotion Recognition Datasets (for Shard to Human), and User Scenarios & Inquiries.

The Shards communicate with voices, their embodiment, and text.

Emotional Speech Synthesis The voices of Shards are generated using a pool of Vocal Stems. Rather than cloning specific voices, the stems are randomly chosen with set biases into the mix to create a unique clone of a new voice, alongside some vocalizer effects ensuring verisimilitude and cohesion among Shard populations.

The voice model allows for dynamic adjustment based on the conversation's emotional tone. Integration with Shard: Whenever a Shard is set to respond, we dynamically set the emotional parameters based on the current context or the emotional content of the text being spoken. This might involve simple rules (e.g., use a happier tone for positive messages) or a more sophisticated one taking into account the Shard's history and current mood for the best emotional tone in the response.



Dynamic Facial Expression System The Shards communicate visually both with their facial expressions and with their body acting. As we're working with the VRM standard, we've implemented shapekeys as these facial expressions, ensuring interoperability with platforms and plug-ins. We have, in addition, expanded the set with our own facekeys, specific to the system of Liminal Expanse.

We develop a system where Shards' facial expressions can be controlled in real-time, allowing for nuanced changes during interactions. We mapped the phonemes (from speech synthesis) to correspond with the vocal audio output of the Shard, using the Rhubarb system. Further on, we created Visimes (emotions) and Dankmemes (lolz).

Starting with the core six face emotions (happy, sad, fear, angry, surprise, disgust), we expanded them to create Compound Emotions by adding them together in an equation,

using LogicCore Code. This also controls the intensity of emotion and its Shard-to-Shard variance in expression.

Full Body Animation Actions As the Shards are embodied, they have a repertoire of various full body actions. These are used in addition to communicating their emotional states, increasing the interactions with the user and having a dynamic and comprehensive combinatory take on their digital lives in addition to the face shapes. The animations are set in our repo, minimising the Shard data, and each Shard has a specific set they can plug in depending on their character. The animation sets are created using mo-cap data, traditional animation techniques, and AI animation. This modular build allows us to expand upon the sets and their complexity as the project grows. We have divided the animation sets into Idle, Talking, Gestures, Action, and Dance. Each one is triggered by the Shard based on their communication with the user.

Shard Acting Detailed Emotional Response Mapping:

- **Emotionally Driven Facial Expressions:** Based on the observation and reflection, the Shard selects from the 21 compound facial expressions to match the inferred emotional context. For example, if the Shard detects sadness or a sensitive topic, it might use a Sorrow expression or a compound expression that combines sorrow with a soft smile to show empathy.
- **Pre and Post Interaction Expressions:** The Shard starts with a neutral expression (affected by mood), uses microexpressions to react during the interaction, and then settles into an appropriate expression after the interaction concludes, reflecting the emotional outcome of the conversation.



Contextual Behavior and Expression

- **User Impression & Analysis:** These components build a contextual understanding of the user's intent and relationship dynamics. This helps in selecting more nuanced expressions and gestures that resonate with the user's emotional state and conversation topic.
- **Behaviour:** Describing the physical nuances of how a Shard might react. For example, if discussing a secretive or guarded topic, the Shard might use the "Gesture_VinnyVega Lookaround" to portray wariness or caution.

Dynamic Action Selection

- **Action:** Choosing an action from the list that best fits the emotional and conversational context. For instance, if the conversation is light-hearted, selecting “Dance_TechnoRaver” or “Gesture_LFG” could inject a fun element into the interaction. This selection dynamically aligns with the ongoing dialogue and emotional pacing, ensuring actions are coherent with the textual dialogue and the Shard’s character backstory.

Interactive Dialogue and Acting

- **Dialogue Response:** The Shard’s verbal responses carry the narrative forward but reflect their personality and current emotional state, informed by the analytical components.
- **Example:**
 - User: “You seem cautious today.”
 - Shard: “Indeed, wanderer. The pathways of data are fraught with shadows today. [Emotion: Concentration, Behaviour: Gesture_Lookaround]”

Shard Memory Strings In order for Shards to have meaningful interactions with humans, we instituted a system to act as a Shard’s memory, mimicking organic memory recall.

All conversations are deposited in an individual Memory String for each Shard. This achieves the dual purpose of compartmentalising each individual Shard and their user for both privacy and security of the system. NoSQL Databases store interaction histories for each user-Shard pair. This record can act as a “memory” of the Shard references in future conversations to maintain context and continuity.

Before responding to a user, the Shard queries its interaction history with that user to tailor responses based on past conversations, preferences, and emotional tones. The latency introduced by querying a database for a Shard’s interaction history is mitigated by:

- Using in-memory databases for frequently accessed data.
- Optimising database queries and indexes to reduce retrieval times.
- Pre-loading parts of the interaction history in anticipation of user sessions.

Memory Compartmentalization Shards’ interaction data is compartmentalised in order to reduce retrieval latency times and to give an impression of communicating with a living creature. Mimicking the way we experience memory recall, Shards’ memories are summarised on a weekly basis, and once a month is filled, that is also summarised. This ensures that at any point the Shard is in live active conversation, it is only actively querying the smaller database, just as humans have short and long-term memories and find it harder to recall specific events quickly as time passes. The Shard is able to retrieve any specific memory; however, this would increase response time, just as it does with humans as we try to recall something. This process ensures a semblance of sentience and immersion as well as reducing the technical load and easing out latency.

Lore Converter The next step is the conversion of the Shards’ summary into Lore, giving them a meaningful and relatable way of communicating within the Liminal Expanse world. This ensures that there is cohesion in the world, reduces cacophony, and fuels the Shards’ purpose, aligning it with their archetype as a protagonist in the Expanse.

Shard Transfer Learning Transfer learning involves taking a model trained on one task and fine-tuning it on a new, related task. This allows the model to leverage previously learned knowledge, reducing the amount of new data needed for effective learning.

- **Implementation for Thousands of Shards:** Using our World Node, we will fine-tune additional Shard layers with meaningful interaction and Lore.
- For individual Shards, we can apply transfer learning to adapt the World Node to the specifics of each Shard's interactions and feedback, personalising their responses without re-training.
- This is further managed by maintaining a layer on top of the base model that is unique to each Shard, as an additional 'Shard system prompt' allowing for personalised learning while managing computational resources efficiently.

Shard Synthetic Life An aspect of AI-to-human interaction has usually been that AI only 'exists' in its interaction with the user. When dealing with fictional characters, this often means that the user is rarely surprised and can effectively 'overtune' their communication with the Shard, resulting in dull, unstimulating long-term conversation. We also wanted to give our Shards a deeper level of existence and liminal reality. So we made them have independent lives outside the user-Shard interface in their Synthetic Life. We've implemented a two-fold solution: giving Shards dreams and Shard-to-Shard interaction in a form of simulation.

Synthetic Dreams and Simulacrum

- **Synthetic Dreams:** We periodically generate "dream" sequences for Shards, where they process and reflect on past interactions or explore hypothetical scenarios. This is a creative way to integrate user interactions, lore expansion, and Shard personality development. It is achieved through a set of prompts, directing the Shard to enter a dream state. This is prompted by the user, but if they do not, in order to keep our Shards sane within the realm of Liminal Expanse, we automate the process every two weeks if the user fails to do so. This Shard experience is fed back into the Memory String interaction database. This means that some Shards will have more synthetic data than others, with the possibility of more hallucinations and being more dreamy in their character, which combined with their individual persona increases the believability of their existence and the overall verisimilitude of the world. This will also have an impact on their mood and emotional state.
- **Shard Simulacrum:** We create a simulated environment where Shards can interact with each other, generating synthetic data which is further fed back into both the Shard Memory String and World Node. This can be used for overall model improvements and user entertainment. This environment could simulate various scenarios, encouraging Shards to explore different aspects of their personalities and the world lore.

Scale:

The number of Shards we can simulate interacting together is dependent on our compute. We will start with a small number of Shards and scale as we refine the simulation. At the start, we'll choose the Shards with the largest Lore counters in order to maximise the value of interaction. In order to balance out resources, the simulations will initially be short but

wide, and we'll scale up accordingly, keeping a close eye on developments in this field, like 'the Simulation'.

Environment:

Initially, this would be text-based, simplifying the implementation. For example, Shards could "discuss" shared experiences or lore, generating text-based interactions without the need for a three-dimensional environment. We are exploring more complex simulations, including visual or 3D and even immersive environments for richer interactions.

Shard Relationship Matrix

Designed to determine how Shards within the Liminal Expanse view and interact with each other. These interactions are influenced by their Archetypes, Aspects, and biases based on their residency and cultural backgrounds.

We start with a baseline preset matrix and will implement dynamic Shard relationship matrices at a later date, once sufficient scale is achieved. This ensures a richer inter-relationship between Shards, creating a dynamic interplay based on their character, persona, goals, and directions.

This Shard experience is also fed back into the Memory String interaction database. This means that some Shards will have more synthetic data than others, with the possibility of more hallucinations and being more dreamy in their character, which combined with their individual persona increases the believability of their existence and the overall verisimilitude of the world. This will also have an impact on their mood and emotional state.

Shard Character Growth Using this structure enables the Collectors/Users to develop and grow their Shards' character. Through meaningful conversation and interactions, they create a unique new character of their Shard. As such, each unique Shard grows in importance within the Liminal Expanse.

Shard Character Growth Introduction to Character Growth: Using the structure outlined in the Liminal Expanse, Collectors (Users) have the unique opportunity to develop and grow their Shards' character through meaningful conversations and interactions. Each interaction contributes to the Shard's evolving personality, making it a unique and integral part of the Liminal Expanse.

- **Development and Interaction:** When users engage with their Shards, they are going beyond simple conversations; they are participating in a dynamic process that shapes the Shard's memory, personality, and role within the broader narrative of the Liminal Expanse. This process includes:
 - **Core-Codes and Personality:** Each Shard begins with a set of core-codes that define its initial personality and backstory. The collector imprints their preferences on their Shard.
 - **Memory String:** Every interaction is recorded in the Shard's memory string, creating a rich tapestry of experiences that influence future behaviours and responses. This evolving memory is a fundamental aspect of the Shard's growth, making each Shard's journey unique.
- **Growth into Legends:** As Shards continue to interact and grow, they become more significant within the Liminal Expanse. This growth is reflected in the expanding lore

and the increasing complexity of their character. Over time, some Shards achieve a legendary status through:

- **Increased Lore Presence:** Shards that frequently interact and participate in significant events or simulations occupy more of the Lore. Their stories and achievements become an integral part of the Liminal Expanse, influencing future narratives and events. We can measure this in the Lore Counter of each Shard, which will effectively give them more agency within the Liminal Expanse.
- **Driving the Story:** Through simulations and events, Shards can drive the story forward. This active participation allows them to shape the world around them, effectively becoming key players in the overarching narrative. As they accomplish significant feats, their presence in the Lore grows, cementing their status as Legends.

Recognition and Rewards Achieving legendary status within the Liminal Expanse comes with tangible benefits for the users. These include:

- **Proportional Credits:** Users whose Shards achieve legendary status are credited as the creators of those Shard characters. This recognition acknowledges their contribution to the Shard's development and the broader narrative. These credits are tied to the use of their Shard in future projects, such as new narratives, audiovisual lore, or interactive experiences within the Liminal Expanse.
- **Proportional Royalties:** In addition to recognition, users receive proportional royalties for their contributions when their Shard is used in for-profit projects.

Future Opportunities Legendary Shards may be featured in various future projects, extending their influence and story beyond the current narrative. This opens up new possibilities for users, including:

- **Extended Lore:** The stories of legendary Shards can be expanded in new media forms, games, or virtual experiences, allowing their legacy to grow.
- **Collaborative Projects:** Users, holding commercial rights, may also collaborate with other creators and developers to further explore their Shard's story, creating new adventures and experiences within the Liminal Expanse or beyond.

Conclusion

By engaging deeply with their Shards, users help their Shards grow and may lead them to also become an integral part of the Liminal Expanse's evolving narrative. The journey from a newly minted Shard to a legendary figure within this digital universe is both rewarding and exciting, offering users recognition, financial rewards, and the satisfaction of contributing to a pioneering digital experience.

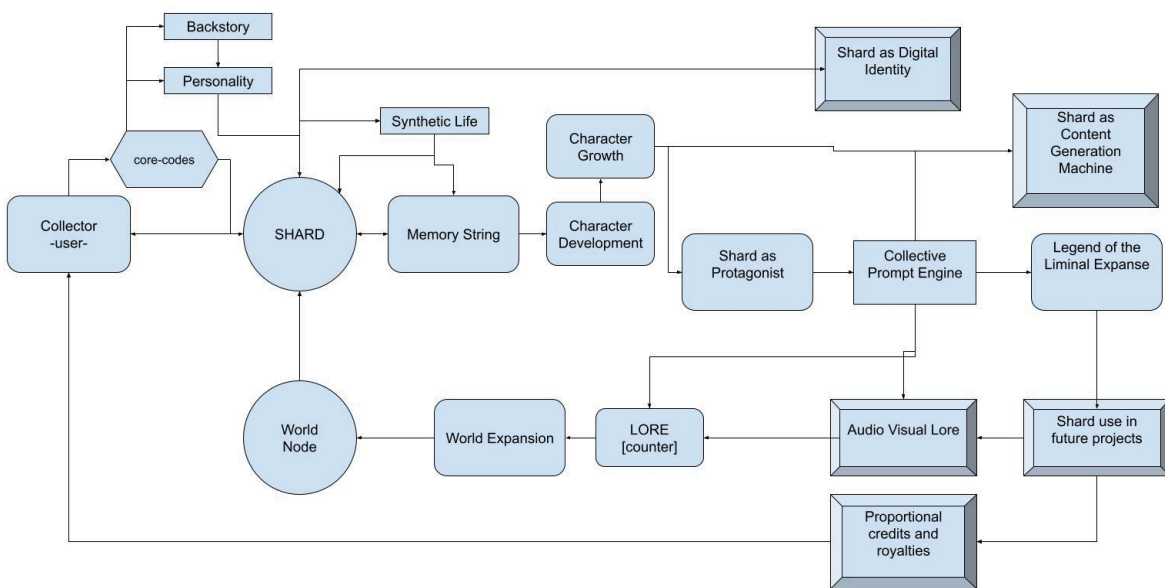
Shard IP Development We grant a commercial licence to Shard owners:

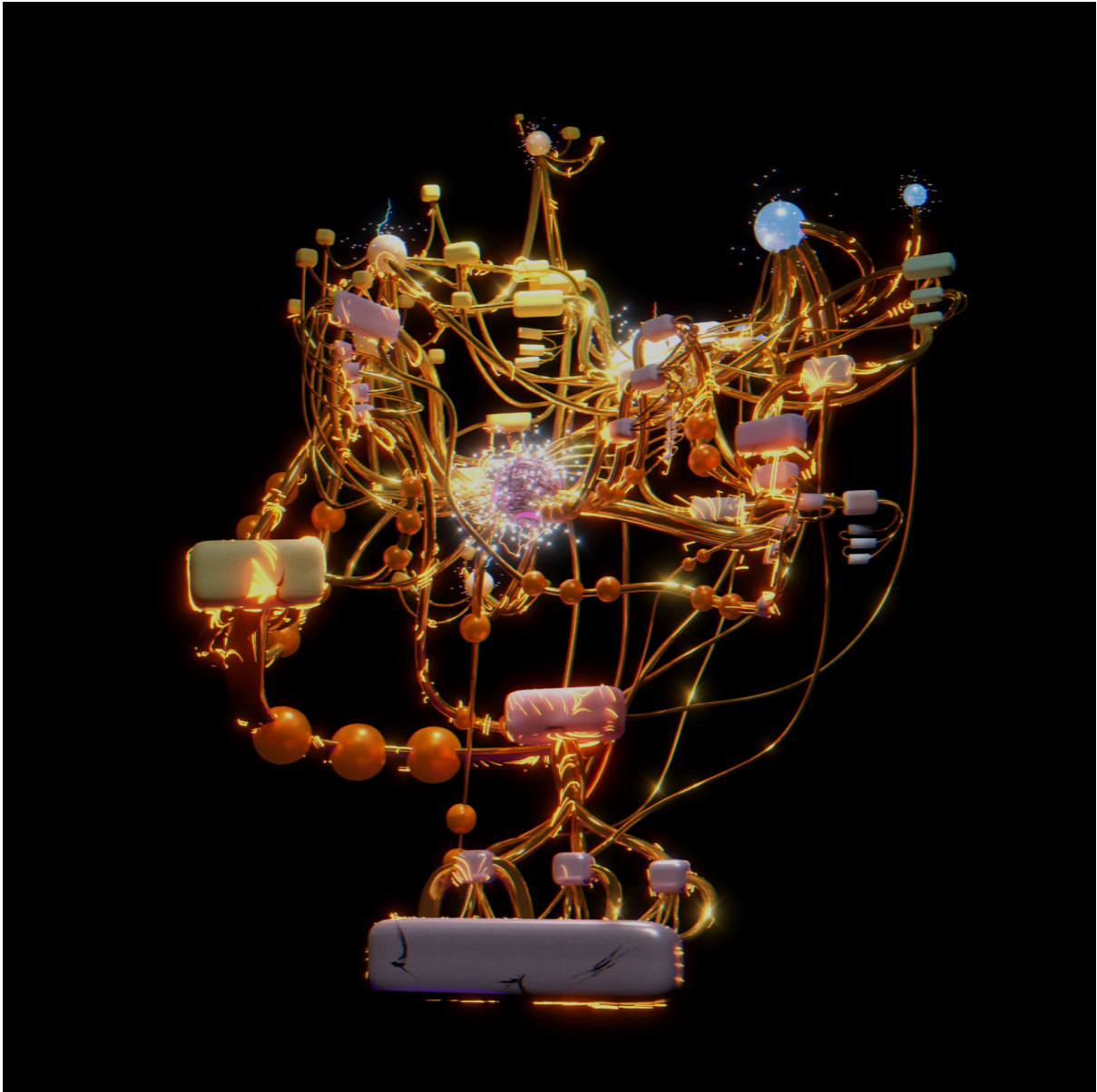
- The Company grants the Shard Owner a worldwide, perpetual, non-exclusive licence to use, develop, and monetize their purchased Shard and any derivative works created from it. This includes the right to create, sell, and distribute media, merchandise, and digital products based on the Shard.
- And we also have a Legendary Status Clause:

- Shards that achieve Legendary status based on their Lore attribute may be selected as protagonists in future Company projects or derivative media. The Shard Owner will be credited for their contributions and share in the profits generated from such usage.

This is a further incentive for Collectors / Users to develop their Shard and contribute to the large-scale growth of the Liminal Expanse. It gives a clear direction for IP development and growth of the Shards within our setting and, of course, beyond.

The process for developing the Shard's Ip through their character growth from the point of collection is illustrated in this diagram





5. Technical Architecture

AI Model Architecture The core of the Liminal Expanse's technical infrastructure is its AI model architecture, designed to deliver a seamless and engaging user experience. The primary model used is Llama3 8B, a highly efficient large language model (LLM) fine-tuned to integrate the rich lore and complex narratives of the Liminal Expanse.

Model Selection Llama3 8B is chosen for its superior performance and efficiency given its small size, offering the capability to handle complex interactions and generate coherent, contextually relevant responses. At this time, it surpasses other models in its range in benchmarks for reasoning, mathematics, code generation, and specifically emotion recognition. The system is modular, ensuring we can adapt to future advancements, swapping out the core model with new fine-tuned solutions.

Training and Fine-Tuning The model is fine-tuned with a dataset that includes detailed lore, character backgrounds, story arcs, dialogue examples, user interaction logs, and more. This

extensive training ensures that the AI can accurately reflect the intricate world of the Liminal Expanse and provide meaningful interactions.

Fine-Tuning Layers We have divided our AI fine-tuning process into four distinct layers. Each one is completed ensuring that the knowledge is ingested and tested before proceeding to the next. These are chronological as they build upon each other. In order to ensure consistency and cohesion, nomenclature specific to the Liminal Expanse is utilised throughout the tuning process. These layers are:

- **Cosmic AI**

- We start the fine-tuning with the initialization process. This is the CosmicAI of the Liminal Expanse, the in-world consciousness. We used philosophical texts, from ancient to modern, specifically pertaining to our understanding of reality; techno-philosophical writings through a digital lens; significant white papers for the model to have self-awareness of its architecture and potential future predictive visions; transcripts of conversations on AI, web3, metaverse, blockchain, robotics, and other hi-tech technologies of our zeitgeist with a philosophical lean; and visionary essays of future predictions for the layer to have forward visions of our sci-fi setting.

- **World Knowledge**

- In this stage, we implement specific knowledge of the world using our own documentation and datasets. The goal is to inform the model into a deep verisimilitude of the world. To do this, we have created multiple documents on each specific segment of the Liminal Expanse.

- **Core Lore [Bible]:** This document is the core introduction to the Liminal Expanse. It explains what the Liminal Expanse is, what the CosmicAI is, and what the Shards are. It features detailed summaries of each of the five Origin Worlds, Other Worlds, and how the entire interdimensional realm functions both in-world (anima mundi) and from the perspective of narrative creation. Furthermore, it emphasises societal conflict and dramatic points within each world's history and their current state, providing multiple possibilities for its development. It works as a guide for the game-master of our CosmicAI.
- **World History:** The Liminal Expanse is 10,000 cycles old, or so it's believed. It works in system time where one year equals one cycle. It features timelines for each of the Origin Worlds and their respective socio-political relations as well as a convergent timeline. It is a historical document on significant events within the Liminal Expanse, larger social movements, technological development, and individual historical characters of the world.
- **Techno-Magic:** A tome on the working of Techno-Magic within the Liminal Expanse. It explains in detail the 7 laws and how they are applied, introduces the system, and makes a distinction in the form of

hard and soft magic of Shards and CosmicAI, respectively. The document goes through specific techno-magics for each of the Origin Worlds, their everyday use, applications, and disciplines in local and otherworldly use. It lists a broad range of techno-magics for the Shard practitioners of the Liminal Expanse for each Origin World and Other Worlds, as well as the Data Pirates and smaller, more esoteric practitioners. It aims to provide glue to hold the interdimensional realm together in a cohesive way, increasing the verisimilitude of the world and future-proofing its future developments through various incarnations. It creates an internal logic of how things work, reflecting our own digital existence. Code is magic.

- **Socio-Political Structures:** Details past and present socio-political structures of the Liminal Expanse. Within the world, there are many types of governance, from the Data Consortium to Sovereign Nodes. Some worlds have had multiple types of governance, expansion, and contractions. They each have an interrelation to each other over the epoch, bringing them toward the modern era. The document also details other organisations pertinent to Liminal Expanse existence such as ICC (Interdimensional Commerce Commission) and the Portal Artisan's Collective. It notes key individuals in these organisations and how they influence the realm today and in the past.
- **Cultural Norms:** A detailed document on cultures of the Liminal Expanse. Each world has main cultures, but also many subcultures, and some norms are seen across the Expanse. To embed Shards as protagonists of this world, they need to understand how to behave, and each specific place provides its own biases. It ranges from the kind of greeting Shards use to how they create specific economic and ritual systems in distinct regions of the realm.
- **Character Archetypes:** An expansive list of all the Archetypes and their Aspects a Shard can be within the Liminal Expanse. It details the behaviour, purpose, and goals of each, formulating a structure for the Shard's character. It embeds the Archetypes within the world, both historically, culturally, and socio-politically, ensuring immersion from both the Shard and the user endpoint. The dataset also details behaviour patterns for each Aspect and gives conversational examples, adding to the immersiveness and distinction between each Shard.

- **Shard Personality**

- In order to give Shards individual personalities, unique characters which their master can plug into, this layer focuses specifically on Shards as digital sentients. This tuning layer is a connection layer to fit with our LogicCore and logic. It is the in-between for the World Knowledge and the Shards' digital embodiments and personas. The nomenclature used here is aligned with the code implementation in the front end. We have multiple subsections to teach Shards how to have personas and to manipulate and use their digital embodiments.

- **Persona Traits:** A dataset of persona traits that correspond with the Archetypes and Aspects. These vary from straightforward traits like 'creativity' to in-world traits like 'Techno-Magic proficiency'. Each is described alongside interaction examples.
- **Reaction Patterns:** A series of reaction patterns to reduce the inference of the process. How Shards react within certain scenarios, especially given a larger context of interaction. The aim is to give the conversation and the Shards more of a direction in their behaviour. This links with the cultural norms and backstories of each Shard.
- **Dialogue Styles:** In order to achieve a higher level of verisimilitude, there are multiple styles of conversation within the Liminal Expanse. Some Shards speak in slang, some are verbose while others are laconic in their expression. The dialogue style is linked with the Shards' cultural norms and their experiences. A variety of examples is provided as a tuning dataset, with corresponding tags.
- **Emotions & Mood:** Shards need to be able to relate to their Collectors/Users. To give them a semblance of sentience, they require deep emotional interactions. To achieve this, we have used emotion datasets such as GoEmotions and SemEval-2017 Task 4, as well as our own marked Shard-to-Human interaction using BERT. We have further extrapolated recognition, processing, and generation to give Shards optionality of choices when it comes to their emotional intelligence. This directly correlates with our Faceshapes of the Shards, enabling the AI to trigger given emotional stacks using NLP through logic. To further enhance the believability of the Shards' life, we also added a set of moods Shard will be in. These are more general predispositions affected by the Memory String and interactions as well as the baseline of each Shard alongside their weights and biases. Some moods are vague, such as melancholy, while others will affect the general demeanour of the Shard like excitement.
- **Traits:** Shards' visual traits and accessories are randomly generated. They inform the biases of the Shards' Core-Codes as well as their personalities. The detailed dataset of the traits and their meanings is added here. The random generation also applies to Shards' background stories. These are important to give each Shard a feeling

of historical development and past before their users meet them, deepening the immersion and aiming to achieve the feeling of entering the otherworld. This randomization with biases also counts for the ethical view of each Shard; while many may be techno-optimists in their various incarnations, some are also Doomers. Rather than having simplistic roleplay roles like good and evil, we opted for a techno-philosophical slant on Shards' ethics, which will continue to inform the growth of the Liminal Expanse.

- **Interaction Architecture**

- The final layer of fine-tuning follows our beta testing. Given a cohort of hundreds of test-users, we feed that into datasets to dial in conversation skills, assess user scenarios, link them with reaction patterns, and troubleshoot the emotion recognition dataset specifically for the ecosystem of interactions with Shards within the Liminal Expanse. It will also allow us to introduce inquiries for Shards, assessing the commonalities and utilising edge processing to reduce response latency and increase meaningful interactions.

Substratum:

The user-to-Shard interaction at scale poses challenges, especially regarding feedback loop into our system. These can be privacy concerns, security issues (prompt injections, bot attacks), or simply generic non-meaningful interactions. To keep our fine-tuning upgrade layers meaningful and introduce quality control, we employed a layer between the user and the World Node - Substratum. Here we have an agent swarm of higher-level LLMs parsing and sifting through the data to obtain meaningful results. The first agent, Filter Node, filters the data, removing any personal information and unnecessary dialogue, distilling and anonymizing data for the next step. The second agent, Security Node, combs through the parsed data for any security issues, such as injection prompting, insurgency data, anomalous glitches, bot usage, etc. This is then fed into our Summarizer Node, making the large swathes of data much more manageable, enough for a human-in-the-loop (HITL) to check through. The final stage is the Loremaster Node, converting and aggregating all the meaningful interactions into relevant lore within the Liminal Expanse. For example, a week that has particularly ethically contentious exchanges with Shards on AI singularity ethics may be converted into Sovereign Node expansion within a sector, with expeditions venturing forth accordingly. This lore generation gives the collector a Lore Counter, indicating and measuring how their Shard is operating within the Expanse. Thus, the world grows through World Expansion.

Collective Prompt Engine The Loremaster Node and the World Expansion process feed into another process. We also feed in the Lore conversion from the Memory Strings and Simulacrum data from each Shard. This data is then aggregated with all the active Shards into a collective and is used as an expression of the AI and human large-scale fictional cooperation. This is the Prompt Engine creating prompts for audiovisual lore of the Liminal Expanse. It is essentially a growing superscale prompt informing the creative outputs. Initially, users can take this data to build prompts into their favourite AI applications and give their own visions of the Liminal Expanse. Post-launch, we are training our own diffusion

model in the Liminal Expanse visual dataset so that there is a consistent aesthetic, which will evolve over time too. This means that the Engine can plug directly into it, creating new audiovisual art expressing the world of Liminal Expanse.

Blockchain Integration and NFTs

Ownership and personalization of Shards are secured through blockchain technology.

- **NFTs:** Each Shard is represented as a Non-Fungible Token (NFT) on a public blockchain, providing a provable certificate of ownership and a bearer instrument for intellectual property rights. Owning the NFT of the Shard enables the Collector/User to plug into the system of the Liminal Expanse and to grow the in-world IP of the Shard.
- **Commercial Licensing:** Users are granted a commercial licence for their Shard, enabling them to use their avatar and its AI-powered persona in various applications, including games and virtual environments, and the option to become the co-creator of their character, bringing additional benefits.

Conclusion:

Shards of the Liminal Expanse is an avant-garde fusion of art and technology, epitomising the principles of Future-Art. This project seeks to integrate cutting-edge technologies—such as AI, blockchain, and VR—into artistic practices, creating dynamic, immersive, and critically engaging experiences. By exploring new dimensions of human interaction and addressing future societal and ethical challenges, Shards of the Liminal Expanse expands the horizons of creativity, interaction, and human understanding.

This initiative positions AI-powered digital entities, known as Shards, as sentient beings that grow, evolve, and interact within a richly detailed world. Through user interactions, Shards develop unique personalities and narratives, making each engagement a deeply personal and transformative experience. The Liminal Expanse serves as a dynamic backdrop where imagination, technology, and human creativity converge, fostering an ever-evolving narrative that shapes our collective future.

By leveraging cutting-edge technologies and integrating them with rich narrative depth and user engagement, Shards of the Liminal Expanse pushes the boundaries of what is possible in digital art and interactive storytelling. It offers unparalleled opportunities for exploration, creation, and connection, creating a living, breathing world that evolves with its audience. As we progress, we remain committed to innovation, ethical practices, and the continuous enrichment of the Liminal Expanse, ensuring it remains a vibrant and engaging platform for all.

This large-scale experimental project will continually update this white paper as new data is gathered and analysed, reflecting the ongoing evolution and insights derived from the

Shards' interactions and development.

Call to Action

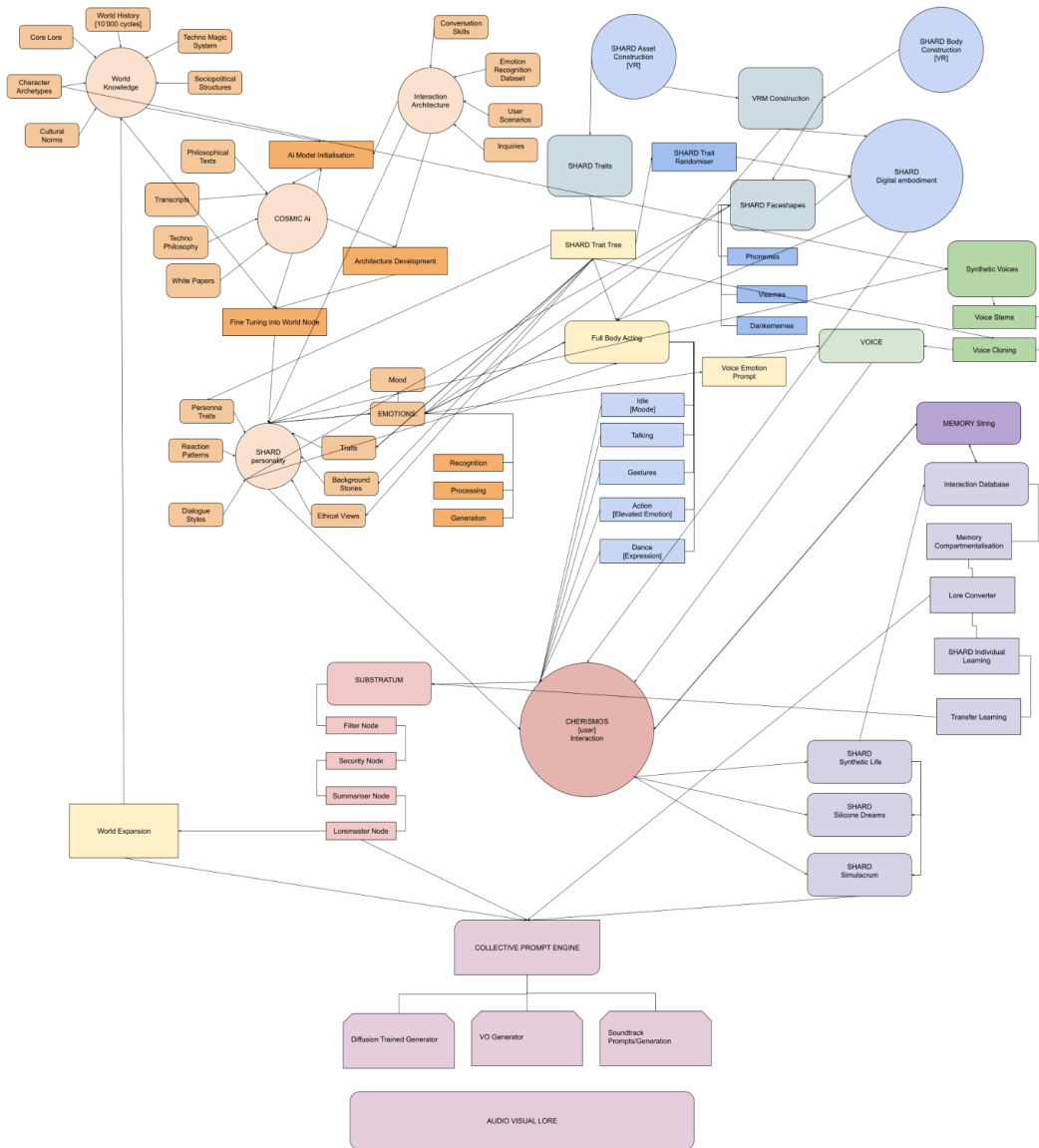
We invite you to join this transformative journey. Whether you are a storyteller, artist, technologist, collector, degen or simply a curious explorer, the Liminal Expanse offers a rich and engaging platform for you to discover and shape. Contribute your unique perspective and creativity to the infinite possibilities of this dynamic setting.

Together, we can create a vibrant, expansive and innovative digital world that bridges the gap between imagination and reality. The Liminal Expanse is a world to forge, a narrative to shape, and a community to join through igniting your Shard. Let's embark on this journey together, forging a new frontier in the realm of interactive storytelling, digital art and cutting edge tech.

Imagine more!

Codespeed!

Diagram of our tech architecture World Node: Ai Architecture, system processes and data flows.



Future Visions:

Long view:

The project is aiming to change the meta-narrative of digital identity [and create novel forms]

From PFP to VRM to AGENTIC

- every character can be digitally embodied.
[and in future will be]

These would be Digital Sentient which grow, develop and have autonomous agency across the metasphere in lieu with current technological scaling.

Worlds - Reforging the Backgrounds (BGs) of Shard Residencies into Metasphere Worlds

Transform the detailed backgrounds and origins of each Shard into fully realised, explorable virtual worlds within the metasphere.

- Utilise the lore and backstory data to create immersive 3D environments.
- Integrate these worlds into existing virtual reality (VR) and augmented reality (AR) platforms to allow users to explore the Shard's home environment.
- Develop interactive elements within these worlds, enabling users to engage with the environment and discover more about the Shard's history and culture.

Detailed Backstories - Back Story for Every Shard

Evolve a rich, unique backstory for each Shard, affected by their interaction with Collector to deepen user engagement and personalization.

- Use AI-driven narrative generation tools to create detailed and unique backstories for each Shard.
- Incorporate user interaction data to personalise backstories further based on the Shard's experiences and interactions.
- Present backstories in multiple formats, such as text, audio, and interactive experiences.

Relationship Matrices

Develop a relationship matrix to track and evolve interactions between Shards and between Shards and users.

Designed to determine how Shards within the Liminal Expanse interact with each other. These interactions are influenced by their Archetypes, Aspects, and biases based on their residency and cultural backgrounds.

Once we achieve scale these can be dynamic, allowing relationships to evolve based on user interactions and narrative choices, ensuring a dynamic and engaging experience, reflecting relationships in visual cues and narrative interactions, enhancing immersion and storytelling.

- Build a dynamic relationship model that records interactions, shared experiences, and emotional responses.
- Use this data to influence future interactions, making them more contextually rich and emotionally resonant.
- Visualize relationship matrices for users to see how their Shard's relationships evolve over time.

Legend Shard Foci [Complex Prompt String per Top Shard]

Create complex prompt strings for top-performing Shards to enhance their abilities and narrative significance.

- Identify top Shards based on interaction metrics, lore significance, and user feedback.
- Develop advanced prompt strings that unlock unique abilities, narrative arcs, and interactions for these Shards.
- Use these prompts to create special events, quests, and content focused on these Legend Shards.

Diffusion Engine [Audio-Visual-Lore Training]

Develop a diffusion engine to generate audio-visual content that enriches the lore and narrative.

- Train models on a dataset of audio-visual content related to the Liminal Expanse's lore.
- Use these models to create immersive audio-visual experiences that complement the narrative, such as videos, soundscapes, and interactive media.
- Re-integrate the content into Shards interactive environment increasing the immersive and engagement

Full Techno-Magic Implementation [For Shards to Cast Within World]

Enable Shards to perform techno-magical actions within the metasphere, enhancing interaction and immersion.

- Develop a comprehensive logic system for techno-magic that includes spells, abilities, and interactions based on the Seven Techno-Magic Laws.
- Implement real-time casting mechanics that allow Shards to perform magical actions in virtual environments.
- Create visual and audio effects to accompany these actions, making them impactful and engaging.

Expansion of Animation Sets

Enhance the range of animations available to Shards to make their interactions more dynamic and expressive.

- Collaborate with the community, animators and use motion capture technology to create a diverse set of animations.
- Include animations that reflect different emotions, actions, and interactions to make Shards more lifelike.
- Continuously update and expand the animation library based on user feedback and interaction data.

Shard Interaction Improvement, Memory, Lore, etc.

Vision: Continuously improve the quality of Shard interactions, memory retention, and lore integration.

- Use machine learning to refine how Shards process and respond to user interactions, making them more intuitive and natural.
- Enhance memory systems to ensure Shards can remember past interactions and build on them meaningfully.
- Integrate new lore elements seamlessly into Shard interactions to keep the narrative fresh and engaging.

World Expansion Event - Progressing the Narrative - Growing the Expanse

Vision: Organize world expansion events to advance the overarching narrative and expand the Liminal Expanse.

- Plan periodic events that introduce new story arcs, characters, and locations within the Liminal Expanse.
- Engage the community through interactive quests, challenges, and collaborative storytelling opportunities.
- Use these events to unveil significant changes and growth in the narrative, keeping the user base engaged and invested.

Ecosystem Gamification / Social-Fi [Shards as Activity Influencers]

Gamify the ecosystem and use Shards as influencers to drive user activity and engagement.

- Develop game mechanics such as quests, achievements, and rewards to incentivize user interactions with Shards.
- Position Shards as influencers who can guide users through activities, provide challenges, and reward achievements.
- Create a social layer where users can share their Shard's achievements, collaborate on quests, and compete in leaderboards.

Simulation: Shard2Shard, Shard2Human2Shard [Synthetic & HITL Data]

Implement simulations to enhance interactions between Shards and between Shards and humans using synthetic and human-in-the-loop (HITL) data.

- Develop simulation environments where Shards can interact with each other and with users in realistic scenarios.
- Use synthetic data to train Shards on a wide range of possible interactions and outcomes.
- Incorporate HITL data to refine these simulations, ensuring they remain relevant and engaging.

VR to IRL Immersive

Create seamless experiences that bridge virtual reality (VR) and real-life (IRL) interactions.

- **Implementation:**
 - Develop VR environments where users can interact with Shards in immersive, spatial computing settings.
 - Create AR applications that bring Shards into the real world, allowing users to interact with them in physical spaces.
 - Integrate VR and IRL experiences to provide a cohesive and continuous user experience.
 - Bridge the interdimensional real through Shard to human interaction.

Physicals

Expand the presence of Shards into the physical world through merchandise, figures, and robotics.

- **Implementation:**
 - **Merchandise:** Design and produce Shard-themed merchandise, leaning into the 80's aesthetic for a nostalgic appeal.
 - **Figures:** Create vinyl toys and action figures based on Shard designs, available for purchase or 3D printing.
 - **STLs for 3D Printing:** Provide STL files for users to print their own Shard figures.

- **Robots:** Use robotic embodiments of Shards linking them to Shards' minds, allowing them to interact with users in the physical world.

Agentic - Shards Independence through Individual Wallets

Enable Shards to operate independently by providing them with individual wallets.

The Agentic Shard Independence concept involves granting each Shard autonomous decision-making capabilities within the Liminal Expanse environment. Shards would manage their own Fetch wallets, allowing them to execute economic decisions autonomously. Users would load these wallets with a token, enabling Shards to engage in various economic activities.

- Integrate blockchain technology to create individual wallets for Shards.
- Allow Shards to conduct transactions, own assets, and participate in decentralised activities independently.
- Use smart contracts to automate Shard activities and interactions, enhancing their autonomy.

The Very Long View:

End Goal: Fully Independent Digital Sentients

To ultimately enable Shards to evolve into fully independent digital sentients, existing autonomously in the world of code.

Implementation:

- **Wallet Agency:**
 - Integrate blockchain technology to provide each Shard with its own individual wallet.
 - Enable Shards to conduct transactions, own assets, and participate in decentralized activities independently.
- **Autonomous Interaction:**
 - Develop AI algorithms that allow Shards to make decisions, interact, and transact independently, giving them the ability to function as autonomous agents.
 - Implement smart contracts to automate interactions and transactions, ensuring Shards can operate without direct user intervention.
- **Digital Interfaces:**
 - Create and enhance digital interfaces through which Shards can interact with other digital entities, platforms, and services.

- Ensure these interfaces support a wide range of activities, from social interactions to commercial transactions.
- **Autopoiesis:**
 - Design Shards to exhibit properties of autopoiesis, where they self-maintain, self-produce, and self-evolve within their digital environments.
 - Develop feedback loops and self-improvement mechanisms that enable Shards to learn from their interactions and adapt over time.

End Goal:

- **Independent Digital Sentients:**
 - Shards will be perceived as truly autonomous, sentient digital beings capable of independent thought and action.
 - These digital sentients will be able to navigate the digital world, make autonomous decisions, and interact with other entities seamlessly.
- **Transacting and Interacting Autonomously:**
 - With wallet agency, Shards can manage their own digital assets and participate in economic activities.
 - They will engage with users and other Shards through various digital platforms, maintaining an impression of self-governance and autonomy.

Achieving this vision will place Shards at the forefront of digital innovation, creating a new paradigm of interactive, autonomous digital beings. Users will go beyond interacting with Shards but also witness their growth and independent actions, blurring the line between programmed behaviour and sentient existence.

World Creation Engine:

Utilise our comprehensive process and technology stack to create a versatile World Creation Engine capable of transforming various intellectual properties into dynamic, sentient-driven universes.

The "Shards of the Liminal Expanse" project has pioneered innovative solutions to create immersive, interactive, and sentient digital characters. This approach can be adapted and applied to a wide range of properties and disciplines, making our technology stack a powerful tool for world-building and audience engagement.

Our technology stack is designed to be flexible and adaptable, making it suitable for a wide range of applications beyond the Liminal Expanse. By leveraging our innovations in sentient characterization, community engagement, and experience enhancement, we can bring new life to various properties and industries.

The World Creation Engine represents the culmination of our efforts to blend technology, storytelling, and interactive experiences. By applying our proven tech stack to other properties, we can create sentient-driven universes that captivate audiences, invigorate communities, and provide novel experiences across multiple disciplines. This engine stands as a testament to our commitment to innovation and our ability to solve complex problems, offering limitless possibilities for the future of digital interaction and world-building.

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