‘Saudade’
Exploring Immersive Boundaries through Horror Environments and Heuristic-Based AI in VR

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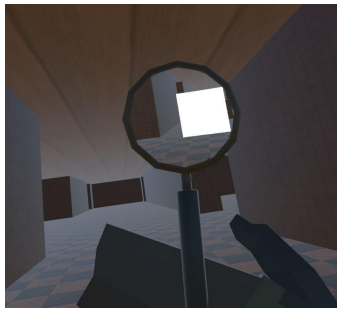
INTRODUCTION

What is *immersion*?
> The degree to which a player feels absorbed in the game world, the ‘other reality,’ losing awareness of the real world around them. The game world contains a compelling sense of presence and meaningful interactions.

I identified 4 primary dimensions of immersion that are key to grasp for effective player engagement:

- **Sensory** Immersion
- **Cognitive** Immersion
- **Emotional** Immersion
- **Spatial** Immersion

SENSORY



COGNITIVE

Figure 1: Example of handheld mirror mechanic

OBJECTIVE

The goal is to explore various methods of maximizing and sustaining user immersion and engagement. A highly immersive game can lead to deeper engagement as players become more invested in the game world and its challenges.

In the context of a horror video game experience, this can be achieved through the implementation of:

- A dynamic and responsive environment
- Elements of unpredictability
- Mechanical and narrative depth
- Psychological tension
- Action-reaction feedback
- Oppressive sound design

PROJECT OVERVIEW

‘Saudade’ is a **virtual reality** (VR) psychological horror game set in the mysteriously abandoned Saudade Memory Rehabilitation Center. The in-game experience seeks to elevate player immersion by integrating adaptive **artificial intelligence** (AI) and meticulously crafted atmospheric design. This project investigates the boundaries of immersion via the horror genre by exploring the psychological tension between the player and an adaptive antagonist called ***The Fragment***. It dynamically responds and adapts to the player’s actions, learning from the player’s behavior while seeking to hinder their escape.

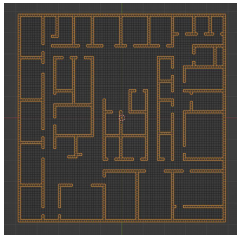


Figure 2: Map of playable environment

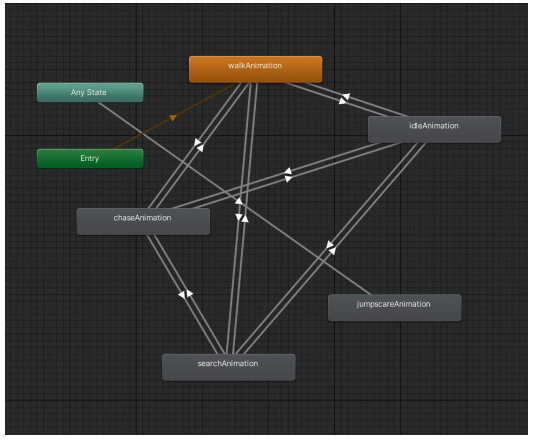


Figure 3: AI Finite State Machine (FSM)

The Fragment’s pathfinding ability relies on the UnityEngine.AI NavMesh scripting class.

METHODOLOGY

Core Gameplay Loop:
> To complete the game, the player must avoid The Fragment and escape the Saudade Memory Rehabilitation Center. Before escaping the facility, the player must collect and watch 6 VHS tapes.
> With each progression, the behavior and appearance of The Fragment change, along with the layout of the map. The difficulty of the gameplay experience generally increases with each tape collected: 0/6 is the easiest state, and 6/6 is the hardest state.

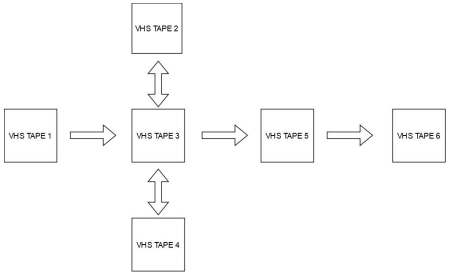


Figure 4: VHS Tape Collection Diagram

Player-AI Interactions:
> The player can only see The Fragment via a *grabbable mirror* (see Figure 1). Otherwise, The Fragment has a distinct auditory signature. However, it is sensitive to noises generated by the player.
> The Fragment’s in-game AI has multiple states:
1. **The walking state**: The Fragment moves throughout the map, from destination to destination, until it detects the player or a player action. This is the default state.
2. **The idle state**: when The Fragment reaches a destination or spawns into the environment, it briefly stands still.
3. **The chase state**: if The Fragment’s distance from the player is less than or equal to searchDistance, it will begin sprinting after the player until it either captures the player, loses the player, or a set duration of time elapsed.
4. **The searching state**: if the player is within a set distance of The Fragment’s field of vision, The Fragment will begin searching. After some number of seconds, the Fragment will switch to the walking state if the player goes fully undetected.