

# Milestone 4: Alpha release

## Progress and Implementation Status

The alpha release of our project marks a significant milestone in our development journey, highlighting both the progress we have made and the challenges we have encountered. In this phase, we built upon the foundation laid in Milestone 3 and implemented key systems that enhance the gameplay experience. We are pleased to present a comprehensive overview of our progress, including a detailed discussion of completed components, design revisions, and the implementation challenges we faced.

## Core Progress Achievements

### 1. Karma System Integration

One of the primary enhancements in the alpha release is the integration of the Karma system, which directly ties into the game's interpretation of the chain reaction theme. This system now functions as an underlying mechanic influencing multiple aspects of gameplay. Each npc interaction affects the Karma score, which subsequently determines the behavior of NPCs, prices of items, and negotiation effectiveness within the shop. Moreover, Karma impacts combat mechanics, modifying the strength of attacks and the player's ability to dodge or disarm opponents and the damage of their weapon. This interconnected system enhances strategic depth and creates a dynamic player experience, where actions have meaningful consequences.

### 2. Input Mechanism Enhancements

In Milestone 3, we relied on basic input methods using traditional buttons. For the alpha release, we replaced these with more immersive, gesture-based controls. Players can now use hand gestures, such as forming a fist to activate the microphone and a thumbs-up gesture to confirm actions. Additionally, we implemented 3D interactable buttons and joysticks within the robot control room, providing a more tactile and engaging interface. The gesture recognition system, while effective, will undergo further playtesting to determine if our automated end-of-speech detection sufficiently balances ease of use and frustration levels or if manual confirmation remains necessary.

### 3. Expanded Gameplay Outside Robots

A significant improvement over our previous milestone is the creation of a substantial gameplay section outside the robots. This new wandering scene allows players to explore and interact with NPCs using voice commands. The addition of a shopkeeper NPC offers opportunities to buy items, with prices and negotiation success linked to the Karma system. We also implemented real-time body tracking and animation, translating the player's physical movements into the game world. This feature adds realism and enhances player immersion.

### 4. Diverse and Dynamic NPC Interactions

To enrich the narrative and strategic layers of the game, we developed a range of fight NPCs, each with distinct character traits. This variation ensures that encounters remain fresh and challenging. Additionally, NPCs within the wandering scene now exhibit autonomous

movement, creating a more dynamic and believable environment. These enhancements contribute to a more vibrant game world and promote player engagement through varied interactions.

## **5. Story Elements: Prolog and Epilog Scenes**

To frame the gameplay experience, we added prolog and epilog scenes that provide narrative context. These scenes set the stage for the player's journey and deliver a satisfying conclusion, enhancing the overall storytelling structure.

## **Design Revisions and Rationale**

Throughout implementation, we encountered several unexpected complexities, necessitating design adjustments. Our original plan included hand gestures for combat mechanics, but extensive testing revealed significant issues. The system often misinterpreted inputs when too many gestures were available simultaneously, leading to player frustration and unintended actions during combat. As a result, we replaced gesture-based combat controls with 3D buttons within the cockpit. This revision improved input reliability, reduced cognitive overload, and enhanced the overall sense of immersion by making the cockpit environment more interactive.

Additionally, we opted for teleportation-based movement within the wandering scene. This choice, driven by concerns about motion sickness and ease of navigation, allowed players to traverse greater distances without discomfort. A corresponding hand gesture was added for seamless teleportation, further integrating gesture-based interactions into the gameplay.

## **Implementation Challenges**

### **Gesture Recognition Reliability**

While implementing hand tracking and gesture recognition, we encountered challenges with accuracy and consistency. Detecting a wide range of gestures simultaneously led to frequent misinterpretations, undermining the player experience. Our solution involved limiting the number of gestures and focusing on simpler, more robust inputs. However, balancing simplicity with functionality remains an area for further refinement during playtesting.

### **Voice Recognition and End-of-Speech Detection**

Voice interaction forms a core component of our gameplay, enabling players to converse with NPCs and negotiate prices. Implementing effective end-of-speech detection proved more difficult than anticipated. Automated systems occasionally cut off inputs prematurely or delayed responses, impacting fluidity. We will assess whether manual confirmation is a preferable alternative to reduce potential frustration.

### **Platform-Specific Build Issues**

During testing, we encountered build-specific challenges, particularly with microphone permissions and spatial data access. While these features worked as intended in the play mode, deployment required the creation of a custom manifest file to grant necessary permissions. This issue highlighted the importance of platform-specific optimizations and thorough end-to-end testing.

## **Additional Completed Components**

### **1. Control Room Interface**

The control room now features interactive joysticks and buttons that players manipulate using their virtual hands. This setup enhances immersion and provides a tangible connection between the player's actions and in-game outcomes. A monitor displaying a camera view further immerses players in the control experience.

### **2. Animation and Body Tracking**

We successfully implemented body tracking and animation for humanoid characters, translating real-life movements into the game. This feature enhances realism and player engagement by mirroring physical actions.

### **3. Audio Integration**

We compiled a comprehensive library of sound effects and music, including mechanical noises, combat sounds, and background music. While integration is ongoing, these auditory elements will be strategically placed to heighten immersion.

### **4. Game State Management**

To maintain consistency between the game world and the language model responses, we developed a game state engine. This system tracks player locations, item inventories, and other variables, ensuring synchronization between dynamic in-game events and NPC dialogue. Managing this complexity revealed limitations in the language model's ability to retain detailed state information, necessitating explicit state-passing mechanisms.

### **Reflection and Future Plans**

Overall, we are pleased with the progress achieved in this alpha release. The implementation of core systems, refined input mechanisms, and expanded gameplay environments demonstrates significant advancement toward our project goals. As we move into the playtesting phase, we will gather user feedback to fine-tune interaction methods, address remaining reliability issues, and further enhance player immersion. The results of these tests will inform our next development cycle, ensuring a polished and engaging final release.