Multiplayer Game with Artificial Intelligence (Gunslinger)

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Introduction

Our project, **GUNSLINGER** presents a digital adaptation of the classic board game **BANG!** utilizing advanced game development technologies. This 3D multiplayer game, developed in Unity and powered by the **Fish-Net** networking solution, offers an engaging experience where players can compete in real-time. To ensure seamless gameplay even when players disconnect, we integrated sophisticated **AI components** that take over, maintaining the game's integrity and continuity.

Artificial Intelligence

To ensure that the game remains enjoyable even when players drop out, we developed an AI system capable of taking over seamlessly. Our AI is designed using traditional methods to emulate human player behavior and make decisions based on the current game state. Here's how we achieved it:

AI Design:

- **State Machine:** The AI operates using a state machine that manages different phases of the game, such as drawing cards, playing cards, and making decisions based on its role and objectives.
- **Rule-Based System:** We implemented a rule-based system where the AI follows predefined rules and conditions to make decisions. This system evaluates the game state and selects actions that align with its objectives, such as attacking specific targets or using defensive cards when necessary.

Decision-Making Process:

- **Card Selection:** The AI uses a set of heuristics to determine the best card to play each turn. It considers factors such as the current health, available cards, and the roles of other players to choose optimal actions.
- **Adaptive Strategies:** While the AI follows a rule-based approach, it also includes conditional logic that allows it to adapt its strategies based on the evolving game state. For example, if the AI's health is low, it prioritizes defensive actions and healing.

Behavioral Emulation:

- **Human-like Behavior:** To make the AI's actions resemble those of human players, we incorporated variability in decision-making and response times. This ensures that the AI does not appear too predictable or mechanical.
- **Static Strategy Adjustments:** Although the AI does not learn from previous games, we fine-tuned its decision-making rules through extensive testing and adjustments to ensure that it provides a challenging and engaging experience for players.

Game Mechanics

Our game is a digital adaptation of the board game **"Bang!"**, which is a popular wild west-themed card game where players assume secret roles with distinct objectives: **Sheriff** and **Deputies** aim to eliminate Outlaws and Renegade, **Outlaws** seek to kill Sheriff, and **Renegade** strives to be the last player standing after eliminating Sheriff. Each player uses a combination of strategy and luck, drawing and playing cards that represent weapons, defenses, and special actions to attack opponents, defend themselves, or alter the game state. The game emphasizes social interaction, bluffing, and deduction, as players must navigate alliances and deception to achieve their hidden goals.

Multiplayer

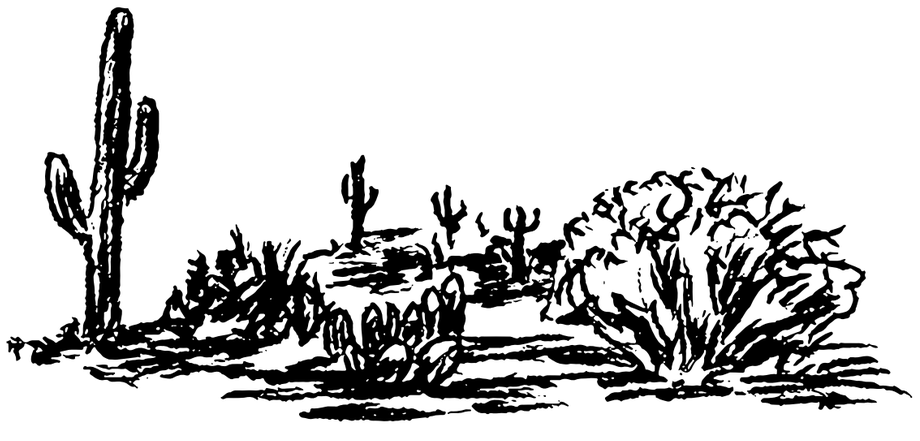
Achieving robust multiplayer functionality was a critical aspect of our project. We utilized Fish-Net, a powerful networking solution for Unity, to manage real-time multiplayer interactions. Here's how we accomplished it:

Networking Framework:

- **Fish-Net Integration:** Fish-Net was integrated into our Unity project to handle all networking aspects. It provides a comprehensive set of tools for creating, managing, and synchronizing multiplayer game sessions.
- **Server-Client Architecture:** The game operates on a server-client architecture where one instance acts as the server hosting the game, and other instances connect as clients. This ensures consistent game state synchronization across all players.

Player Management:

- **Lobby System:** We implemented a lobby system where players can join or create game sessions. This system manages player connections, ensuring that everyone is ready before the game starts.
- **Synchronization:** All game actions, such as card plays, health updates, and player turns, are synchronized in real-time using Fish-Net's reliable communication protocols. This ensures that all players experience the game consistently, regardless of their location.



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