UNO Flip Remix - Problem Statement & Goals

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Revision History

Date	Developer(s)	Change
Sept 21	Zain Garada	Initial Problem Statement and Goals
Sept 22	Kevin Ishak	Initial Development Plan
Sept 23	Mingyang Xu	Initial POC Plan and Risks Analysis
Sept 24	Zheng Bang Liang	Refined Problem Statement and Goals
Sept 24	Jianhao Wei	Refined Development Plan
Sept 24	Kevin Ishak	Refined Development Plan with AI and Multiplayer

Problem Statement

Problem

The UNO Flip digital game project seeks to create a highly strategic and technically advanced version of the classic card game, adding complex AI behaviors and real-time multiplayer capabilities. While several online card games exist, they often lack depth in AI strategy and dynamic card interactions. Our game will introduce a novel AI system with learning capabilities, dynamic card interactions, and smooth multiplayer synchronization.

The core problem is the absence of a complex, interactive, and AI-driven card game that provides both a challenging single-player experience and a seamless multiplayer mode. This project will fill that gap by enhancing the traditional UNO Flip rules with added strategic depth and technical complexity.

Inputs and Outputs

Inputs

- Player inputs (card selections, turn decisions)

- Real-time network data (multiplayer mode)

- AI predictions and decisions (single-player mode)

Outputs

- Real-time updates of game states for multiplayer sessions

- AI-driven actions and strategy adaptation based on player behavior

- Visual representation of card interactions and game state in both 2D and 3D

Stakeholders

- Players seeking advanced and challenging card game experiences

- Game developers focusing on AI and multiplayer network synchronization

- Potential investors in gaming AI and online multiplayer innovations

Environment

Software:

- Game developed using JavaScript for front-end, Node.js for the server-side

- TensorFlow or PyTorch for AI strategy development

- Socket.IO for real-time multiplayer synchronization

Hardware:

- The game will run on various hardware platforms (PCs, consoles, mobile devices) with standard graphical capabilities to support 3D animations.

Goals

The project has the following core goals:

- **Multiplayer Synchronization**: Ensure seamless real-time multiplayer gameplay with smooth transitions and minimal network latency.

- **AI Strategy Optimization**: Implement reinforcement learning-based AI that evolves and adapts its gameplay strategy based on player actions.

- **Dynamic Card Interactions**: Develop complex card effects that interact with other cards dynamically, altering game state unpredictably.

- **3D Animations and Visual Feedback**: Integrate visually appealing, real-time 3D animations to enhance player experience.

Stretch Goals

- **Implement cross-platform multiplayer support:** Develop a multiplayer experience across different devices, ensuring compatibility. This will include features like matchmaking and lobbies. Our goal is to expand the player base and enhance community engagement.

- **Introduce new card designs:** The goal is to enhance gameplay by introducing innovative card designs that feature unique mechanics and interactions. Each card will be developed with distinct abilities that promote strategic play and enable creative combinations.

- **Add tutorials and strategy guides for players:** Develop comprehensive tutorials and strategy guides to help new players understand game mechanics and strategies. This will foster a more skilled player base.