Team VG-AI

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Project Overview

- Combine our passions for gaming and artificial intelligence to create an interesting and entertaining experience
- Use unreal engine to develop a new game from scratch
- Incorporate AI into the game
- **AI Components:** enemies, balancing, and level generation
- **Goal:**
  - Determine feasibility of self artificially intelligent systems in gaming
  - Learn about the development process required for video games
  - Research and development of an artificial intelligent program
  - Implement cloud computing, parallel training architecture, the unreal engine, and video game version control into a single project

The Team

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Project Abstract

The goal of our project is to create a video game where gameplay can be altered based on the decisions from artificial intelligence to create entertaining gameplay. Our current plan is to create a small scale single player game, where the in game enemies learn to defeat the player.

The game will record data tables for each encounter with an enemy. Upon defeating an enemy, the game will add the fight data to a training set. Between fights, the game creates new enemy patterns based on multidimensional classification for historic player vs. enemy situations from the training set. Upon creating a new enemy pattern, the game will test it against a generated test set of predicted player actions. When the time comes to spawn the next enemy, the game will use the best it has come up with so far.

We feel this concept can create fun and modular gameplay, where the engagement is generated from the game's systems and not it's content.

User Stories

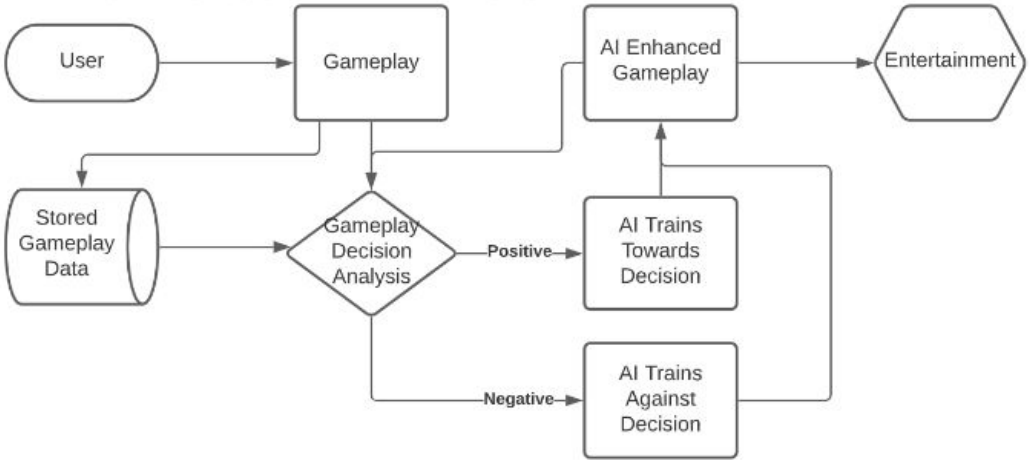
As a team full of video game players, we want to make sure our game remains fun with the new A.I. elements. These are the acceptance criteria for our project to achieve that goal:

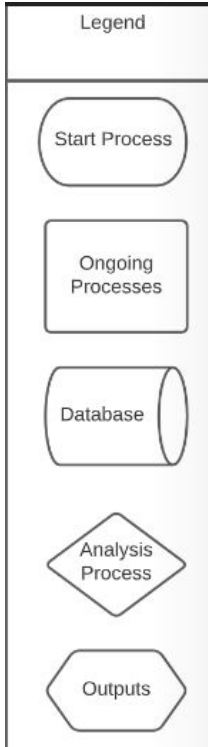
- As a Player, I want the game to reflect upon my decisions so that my gameplay experience is enhanced.
- As a Player, I want the AI to make fair alterations such that the gameplay remains fun.
- As a Player, I want the AI training to be as unobtrusive as possible such that the gameplay is unaffected.

Design Diagrams

D1:

D2:





Major Projects Constraints

- **Time**
  - No worry of a game working with AI elements
    - Rather how impressive we can make the game given a time frame
  - **Goal:** Finish, expand, and improve a working product in a limited time frame
- **Scope**
  - We were sure to divide the project into goals agreeable by the team members
  - An AI game on the unreal engine has a large portion of this projects scope that we will need to research
- **Professional/ Technical Experience**
  - **Required Skills:** game development, artificial intelligence, model creation, software development.
  - Our lack of knowledge within the unreal platform may lead to issues along the way

Project Progress

- Methods of implementing Artificial Intelligence have begun to take shape
  - Exploring decision trees using Unreal’s own architecture
  - Looking at using classification to determine gameplay movement for the computer
- Base project has been created and assets are being added to the game
  - The arena exists and users can go in and play around

Expected Accomplishments for this Term

- Understanding of the Unreal Engine and dev environment
  - User Experience
  - Performance optimization/quality options (both for players and devs)
  - Game assets - usually large binary files
  - Collaboration tools
- Research AI techniques
  - Find the best methods to classify data in large dimensions

Division of Work

- We will all be active in research and development of the AI systems
- Game development will be split as follows
  - Spencer Kruse - Set up cloud / internet services for game
  - Jack Osterman - Create any necessary game models
  - Craig Gorney - Using library to implement external AI code into unreal
  - Nathan Jonas - Creating game map and texturing

Expected Demo

- The game will be playable without interruption or error
- The game will be fully textured and modeled with no placeholders
- The game will have at least one implementation of artificial intelligence that can learn player patterns
- Provide a demo download