

# **The Modular Adaptive Game**

**submitters:** Guy Zvilich 318458882, Ben Lachovitz 206480774

Before we start with the literature review we would like to remind you that our project is divided into two separate projects that eventually will be combined into one big project (AKA The Modular Adaptive Game).

In this literature review and competitors analysis we will refer only to our internal project named Modular World Generation with a touch of explanation where the connection between the two projects is important.

## **Literature Review and Competitors Analysis**

### **1. Introduction**

The objective of this project is to develop a Unity-based tool that generates complete scenes with buildings, roads, NPCs, and more from a premade bank of options. This tool aims to streamline the scene creation process for game developers and designers, enabling more efficient workflows and higher-quality outputs. Additionally, the tool will support dynamic in-game flow generative options, allowing for real-time adaptation of the environment based on player actions.

When considering which game development engine to use, we explored three options: Unity Engine, Godot Engine, and Unreal Engine. After extensive online research, we concluded that Unity is the best choice for several reasons. Firstly, our prior experience with Unity during our game development course will expedite our familiarization with the interface, accelerate the development phase, and enhance our overall understanding of the platform. Moreover, the most significant advantage of Unity is its extensive community and asset store. This vast resource allows us to integrate a wide array of assets into our tool, merge with other tools to enhance our project, and leverage the collective expertise of the community to implement our tool most efficiently and effectively.

## 2. Industry Gaps and Player Engagement

The gaming industry is facing significant challenges, such as rising development costs, project delays, and a crowded marketplace. According to Boston Consulting Group (BCG), budgets for AAA games have grown significantly, leading to unsustainable costs and frequent project delays. These issues result in layoffs and studio closures, highlighting the need for tools that streamline development and reduce costs[1].

Players seek more dynamic and immersive experiences that adapt to their actions. Current tools often lack the ability to create responsive environments, limiting player engagement. For example, traditional tools focus on static settings like vegetation and terrain height but do not dynamically adjust scenes based on player actions [3].

Indie developers struggle with discoverability in a crowded market, with over 14,000 games published on platforms like Steam in 2024. Creating unique, high-quality environments can help games stand out but is often resource-intensive. Developers need tools that simplify scene creation while enhancing game quality and uniqueness [2].

Our tool addresses these industry gaps by streamlining the scene creation process and incorporating an AI-driven decision engine. This tool allows users to create entire scenes with preferences such as the number of NPCs, terrain size, and structures, reducing time and effort. It dynamically adjusts the game environment based on player actions, enhancing interactivity and realism.

By offering customizable and dynamic scenes, our tool supports developers in creating engaging and immersive experiences, improving their chances of success in the competitive gaming market. This combination of streamlined creation and dynamic adaptation not only addresses industry challenges but also enhances the overall player experience.

### 3. Competitors Analysis

**Gaia 2 Pro**[4] is an advanced terrain creation tool set for Unity that streamlines and enhances terrain development processes by providing tools for procedural terrain generation, texturing, and vegetation placement. It offers significant time savings in terrain creation with high-quality, customizable terrain elements. Despite its advantages, Gaia 2 Pro is resource-intensive, requiring substantial computing power, and creating highly detailed scenes often demands additional assets, adding to the overall cost. Furthermore, while it integrates well with Unity, mastering all its features can be challenging for new users.

On the other hand, **MicroVerse**[5] enhances Unity's terrain capabilities through procedural generation and customizable vegetation systems. This tool allows for dynamic and responsive environments by integrating rules-based systems and AI-driven decision engines. Although it simplifies complex environment creation tasks, the rule-based system can be complex for beginners, and large-scale environments can be resource-intensive, impacting performance. Additionally, MicroVerse has less community support compared to more established tools, which may result in slower issue resolution and fewer tutorials.

**World Composer**[6] focuses on creating large-scale terrains using real-world geographical data, allowing developers to import satellite images and height maps for realistic landscapes. This tool produces highly realistic landscapes and enables quick creation of large terrains, enhancing the authenticity of the environments. However, it requires additional assets for texturing and vegetation, increasing the overall cost, and customizing imported data to fit specific needs can be time-consuming and challenging. Moreover, generating and rendering large-scale terrains can be demanding on system resources.

In contrast to these tools, our Unity-based tool offers a streamlined approach to scene creation by allowing users to set preferences for NPC numbers, terrain size, and structures, significantly reducing development time and effort. A unique feature of our tool is the AI-driven decision engine, which dynamically adjusts the game environment based on player actions. For instance, if a player shoots a person in the game, the AI engine increases the number of police officers, creating a more dynamic and realistic response. This capability enhances gameplay interactivity and realism, making our tool stand out from competitors. By offering customizable and dynamic scenes, our tool supports developers in creating engaging and immersive experiences, improving their chances of success in the competitive gaming market.

### 4. Conclusion

The gaming industry faces significant challenges, including high development costs, project delays, and discoverability issues. Our tool addresses these gaps by streamlining scene creation, incorporating an AI-driven decision engine, and enhancing the quality and uniqueness of game environments. By leveraging these features, developers can create more engaging and immersive experiences, improving their chances of success in the competitive gaming market.

## References

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