



Game World Generator

Project Proposal

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1. Abstract

The aim of this project is to provide the world of Graphic Designers with a new platform of game world design with automated environment design. Project provides an automated world generation interface using Artificial Intelligence, lessening the hectic long term workload of Environment Designers. It also focuses upon randomized world generation keeping the players engaged in the game. Terrain and NPCs generation becomes convenient as it alleviates both time and cost for the designers. Project is dependent upon user input or more accurately user constraints as input.

2. Introduction

The game industry as of today is booming and high-flying. With the passage of time game design is becoming more complex and detailed as players want their fictitious fantasies turned into reality precisely. Under this matter, it imposes a great challenge to developers themselves to spend their precious time designing on paper and then turning this imagination into 3D meshes using different engines and building each part of the world detail by hand as fast as possible. This may sound easy for low end games as worlds to be built are small but for larger worlds it takes nearly 5-6 years of hard work to create massive environments consisting of terrain and other precise worldly objects. In usually all of the cases gamers require quick release of highly anticipated games therefore most of the time, work hours are not flexible enough to meet deadlines set by players themselves.

Our project intends to provide designers with an interface that will not only produce massive worlds in less time but also produce accurate height maps and other terrain-centric factors with provided user constraints. This generation will not just make any world but an editable world meaning that designers will be able to customize the content created to satisfy their needs furthermore. Such an approach may also lead to cost effectiveness as designers' hours are now minimized.

3. Goals and Objectives

Our project's main objectives are:

- Employing Artificial Intelligence to generate controlled random 3D worlds.
- Minimizing time for Designers by generating terrain according to given constraints.
- Analyze user data and generate reviews for the generated environment.
- Lessening the monetary cost of 3D environment design.
- Random multiplayer maps generation for players to spice up the fun.
- Positioning and placing non-playable characters according to the objects generated.
- Interface for further cleansing the design according to personal needs.
- Provide users with interface for changeable and scalable constraints for different objects.
- Controlling generation such that it guarantees flat surfaces for players to move on.

4. Scope of the Project

The project mainly uses both artificial intelligence and machine learning for calculating correct placement of objects around the environment including both non-playable characters and terrain objects. Project also uses user reviews to generate random map data for multiplayer games. It also uses Unity 3D as the main engine for mesh generation therefore APIs in unity may also be used in future.

5. Initial Study and Work Done so Far

Many algorithms are available for terrain generation. Fractal techniques have been used mostly. Jonathan Dory [1] describes different techniques in different papers. He says one technique uses genetic algorithm for terrain generation and also takes controllability under note. This study was done by Ong [2]. They use database of height maps for this purpose. Most of the studies deal with terrain generation consisting of trees or mountains but our study also deals with buildings and other city related objects. Moreover, there is an approach in automated game level design done by Lim and Harrell [3]. Their approach is to use descriptive language to create game's level. So using this approach, our target is to develop a system that creates a randomized level with items and objects placed in different places, using a descriptive language.

6. References

- [1] Jonathan Doran and Ian Parberry, *Controlled Procedural Terrain Generation Using Software Agents*. Texas, 2010.
- [2] T. Ong, R. Saunders, J. Keyser, and J. Leggett. Terrain generation using genetic algorithms. In *Proceedings of the 2005 conference on Genetic and evolutionary computation*, pages 1463–1470. NY, USA, 2005
- [3] Chong-U Lim and Fox Harrell. *An Approach to General Video Game Evaluation and Automatic Generation using a Description Language*. Germany, 2014