Simulating human civilisation and the evolution of society based on factors such as culture, religion, and technology

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1. Introduction

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1. Literature Review

The uniquity of this project comes in the form of its ability to put existing concepts such as world generation and time simulation together – software already exists to complete some of the objectives of this artefact, but little has been done to collate these ideas into one package. In order to perfect the individual components of the project, analysis into similar projects was completed.

* 1. Dwarf Fortress

The first similar system identified was the 2006 game Dwarf Fortress (Tarn Adams, 2006). This game, which began development in 2002, is set in a world populated by fantasy creatures such as elves, dwarves, and goblins. The objective of the player is to build a new colony for their chosen dwarven civilisation, trade with nearby populations and accumulate wealth. The game is notorious for its difficulty and attention to detail, particularly in its simulation of the world.

The game world is generated by the player at the beginning of the game and uses an entirely random map fit with its own history and civilisations, as well as records such as that of key peoples and artefacts. This, much like the artefact under development for this project, is done from the beginning of history, starting with an empty map that slowly becomes populated as time progresses. The impact of this approach to simulation allows the world to be truly defined by what occurred in its past: wars fought between nations in the past may affect the players ability to trade with others, artefacts of ancient history may be found by the player and can be stolen by enemies, the titular dwarves can even be seen engraving depictions of historical events or peoples in some cases.

This historical simulation system also has a direct impact on gameplay, a testament to the depth of the implementation. Some interesting examples of how the timeline of the world can affect gameplay are as follows:

* When starting a game, the player may choose their civilisation and what resources they will bring to their new colony. The resources available are defined by what the chosen civilisation is capable of – such as what metals they have available or what animals the nation has successfully domesticated.
* It is possible for a player to find themselves in a world that is missing a race, including as the playable dwarves, as a result of past events such as wars.
* The world is able to undergo changes in “age”, as defined by what peoples and monsters exist in the world at any given time. It is even possible for the world to enter a state in which all fantasy elements, such as dragons or monsters, have become extinct, which is referred to by the game as “The Age of Civilisation” (Dwarf Fortress Wiki, n.d.)

While this project includes many features applicable to this project, it is important to note the simulation serves as a backdrop to the main gameplay. Many liberties are taken to ensure the world is playable – a world without dwarves will still allow a player to start a colony and will simply spawn new people for the player to use. As such, while the game serves as an inspiration for this project, it has very little that can be used as material to work from. The following concepts highlighted are aspects which this project can gain insight from.

* + 1. World Generation

As described by the creator (Adams, 2009), the world generation method centres around elevation, with a location on the map being given a height and the sea level being defined as a result of the elevation of the world. This generated topographical map is then provided factors including temperature and rainfall – by which other factors such as river locations or biomes are built from. This approach to world generation is of particular interest, the concept of building a world by building layers of random content – elevation, temperature, rainfall – could be an appropriate method to be used by this project due to the relevance of these factors and their derivatives to the objective of the artefact.

The elevation generation seen in dwarf fortress makes use of a variant to the diamond-square algorithm (Adams, 2013) (Alain Fournier, 1982), the result of this being results that appear to be more continent-like than other algorithms in this field. Additionally, the developer of the game noted that the game did not use the more common Perlin noise method for world generation, citing it as looking “fluffy and rounded” (Adams, 2010). This assertion has implications for the direction of this project, as the diamond-square algorithm may serve as a better fit for the project than the original intended algorithm – Perlin noise.

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