

Platformata

Game Design with Automata Theory

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Introduction

- There are many ways of incorporating automata in game design that have been considered.
- Many design decisions take place during the development of a game.
- Decisions can vary based on the genre of the game.
- Automata can help with these streamline the process.

Literature Review

[1] In a paper from 2022 A procedural-level generation has been demonstrated using cellular automata.

- A genetic algorithm is used to evolve the cellular automata rules applied to generate game levels.
- A Procedural content generator designed using this method is meant to be used during the game development process rather than at runtime.

[2] In a paper from 2016 students designed an infinite runner game using mealy machines.

- The game consisted of several states such as: running, jumping, and flying.
- Games designed using automata are less prone to bugs and the development process is simplified.

[3] Conway's Game of Life

- Developed by John Conway.
- A "zero-player" game utilizing cellular automata.
- Essentially a square grid containing cells that evolve based on three rules: birth, death, and survival.

Game Design

Input Alphabet

$\sum_{\text{Move}} = \{ U, D, L, R \} \sum_{\text{Action}} = \{ P, J, O \} \sum_{\text{Game}} = \{ T_{\{n\}}, TA_{\{n\}}, A_{\{n\}}, B_{\{n\}}, NB_{\{n\}}, D_{\{n\}}, ND_{\{n\}} \}$

