

3D Cellular Automata Visualization

Project Three Proposal

Computer Simulation

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Dear Professor Peskin,

I am writing this letter to demonstrate my project plan in your course Computer Simulation. The project will simulate the 3D version cellular automata and visualize it using MATLAB.

The update rule can be designed in a similar manner as the one used in the 1D case. The state of a cell should only be determined by nearby cells. All cells must update synchronously in one time stamp.

The visualization will use colors to distinguish the relative spatial locations of activated cells.

A major problem of this project would be runtime efficiency. A grid with length of 100 would need to update one million cells for every tick. I will try to vectorize the calculation to make sure it can be simulated in real-time. Special data structures can be helpful to reduce the amount of calculation.

This project is inspired by a wonderful presentation I saw in class. The presenter tries to interpret the 1D cellular automata as sound. It would be interesting to hear the sound of 3D cells. I have not figured out how to map the 3D coordinates to frequencies, but it is worth trying.

Yours sincerely,

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