Cellular Automata has been a big cornerstone of the Artificial Life field. Strong Connection to complex systems.

How cells interact with their neighbors to decide what to do next.

See natural selection of self-reproducing organisms

Resurgance within last couple of years.

Key idea of CA: How we want to understand the natural social phenomenon we see in the world. We see living organisms, cat, dog, people, maybe a country and many entities in the real physical world. All are made of tiny particles, i.e atoms, and molecules that aren’t really living, but their interactions create something that is very mysterious. Where are all they coming from? We are all a cluster of molecules that create a massive emergent process that produces very interesting behavior and structures from simple components. Underlying conceptual framework of cellular automata.

1000 year old philosophical questions

How self-reproducing patterns can be written down in mathematical ways. Mathematical formulation of living systems. How a system can create a copy of itself and how a system can evolve over time. More intelligent and complex and adaptive structures over time.

A system that can spontaneously increase its complexity.

Conway’s Game of Life

Exists in a Two-dimensional binary state. 0 or 1 // Empty or active states.

State 0: Means empty.

State 1: Alive, there is an organism in that cell.

Live cells stay alive if there are two or three similarly alive neighbors. Top bottom left right + 4 diagonal neighbors = a total of 8 neighbor cells.

If you have 2 or 3 active cells you remain alive or otherwise you would die.

Another rule: If you are an empty cell if you have precisely 3 living cells nearby you become alive as well.

Last several decades super computers and computers have discovered a wide variety of jaw dropping behavior.

How do you identify any living behavior in this universe? There must be some kind of signature.

With cellular automata it casts a question to something we easily consider trivial.

Some common patterns i.e. organisms move in space i.e gliders move in space.

Nothing is moving it is just cells doing the same thing all the time. Our interpretation: This object moving in space of cellular automata, and they are interacting.

Core part of CA: How do we identify behaviors into some kind objects in this entirely distributed inorganic space you see something more organic happening. Our interpretation at the macroscopic level.

They might produce cool patterns but so what?

Why study CA in the first place?

Artificial life is not modelling anything realistic but it is creating a system that has its own properties on its own. Not modeeling anything realistic bit creating a system with behaviors to understand what is really happening. Deepen our understanding of microscopic roles and the macroscopic behaviors that a collective system can show. The gap between micro and macro remains a huge mystery to many scientific fields. Helps us connect those deep gaps. Between those two scales we find life.

Dive into Cellular Automata, a cornerstone of Artificial Life. Witness complex behaviors emerge from simple rules. From self-reproducing patterns to the evolution of intelligent structures, uncover the mathematical underpinnings of living systems. Discover Conway's Game of Life, where binary states yield astonishing behaviors. Witness gliders and other organic-like movements in a seemingly inorganic space. Explore the bridge between microscopic rules and macroscopic behaviors, shedding light on the mysteries of life's emergence.

Delve into Cellular Automata, a foundation of Artificial Life, where simple rules birth complex phenomena. Incorporating real-world weather data, temperature, and humidity, alongside Perlin noise, witness how these factors influence emergent behaviors. Explore Conway's Game of Life, where binary states unveil astonishing patterns, akin to natural movements. Bridge the gap between microscopic rules and macroscopic behaviors, unveiling the mysteries of life's emergence through dynamic environmental influences.

Embark on a journey through Cellular Automata, the bedrock of Artificial Life, where simplicity begets complexity. From self-reproducing patterns to the evolution of intelligent structures, uncover the mathematical underpinnings of living systems. This project integrates real-world weather data like temperature and humidity, alongside Perlin noise, shaping emergent behaviors. Engage with Conway's Game of Life, where binary states yield mesmerizing patterns, reminiscent of natural movements. Bridge the gap between microscopic rules and macroscopic behaviors. Explore the interplay of environmental factors through a dynamic canvas, allowing users to interact by dragging their mouse, intervening with the mysteries of life's emergence.