Aesthetic Application of the Ising Model

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The presentation will introduce a series of time-based animations and still images that were realized by exploring the potential of the Ising mathematical model to generate behavior transitions within a 2D matrix where each cell evaluating their neighbor states, flip between two polarized states (positive, negative) based on external factors such as temperature.

The Ising model for the animation series (Blink PolypTelic, GeoNerve. PolypPiston, Polyptic) was transformed from a polarized system (positive/negative) to a continuous model by turning each cell into a continuous signal consisting of multiple frames. The 2D Discrete Ising model is the underlying method which is updated using a monte carlo technique in which random cells are flipped on or off. This is regulated using the "ising speed" control which corresponds to the number of flip iterations. The overall behavior of the Discrete Ising model is controlled by temperature which is adjusted on a much longer duration called the oscillation speed (top of diagram), causing the artwork to change appearance over several minutes.

The model is made continuous by a secondary layer in which the cells are turned into continuous signals. Each cell signal is triggered from the discrete binary model in which the cell is not flipped instantaneously but instead transitions to the opposite state over a period of time, To achieve this transition that simulates animation, we have set the transition between positive to negative to from 68 to 200 frames, similar to the way that film, consisting of multiple still images, transition through the sequence to simulation movement.