CCS16 Abstract

Poster, Foundations of Complex Systems

Elementary cellular automata (ECA) are a popular computational model for complex systems since they are capable of producing rich structures and are relatively simple to model. Previously, there was no exact method for measuring the difference between two ECA rules other than the Wolfram classes due to space of possible states a rule can produce. Here, a measurable distance between two ECA rules is proposed that is independent of state size. This measure satisfies the three requirements to be called a distance and has been numerically verified for ECA with periodic boundary conditions for state sizes 3 to 14. The measure is based off computation-theoretic models and is an approximation of the difference of the shortest programs that emulate the two rules. If the distance between two rules is high, it indicates the two rules will output different states, given any initial condition. This distance is shown to be invariant of ECA state size, which indicates it is independent of states and can be used for any ECA size.

Or League of Legends abstract?