The Rubik's Cube Reshapes Our Notion of Networks

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Knowledge of small-scale interactions within a group tells us something about the group big-scale interactions. Commonly, one uses graphs to mathematically model and analyze such relationships to predict and find adequate solutions whether in science, economy, or social science. This project will focus on one model of social networks that encodes whether the relationships are positive or negative. In other words, if the network is structurally balanced. The central question is to find another model that visually represents in real time an evolving graph for better predictions and simulations of its outcomes. My solution is to optimally solve the Rubik's cube! I found a bijection between this dynamic three-dimensional puzzle and the structurally unbalanced graph. Albeit the Hamiltonian property of the cube's cycles, I can turn them into any type of graphs: directed, unweighted, complete, asymmetric, and easily track their changes by solving the Rubik's cube. For more than 45 years, mathematicians have not yet been able to find an optimal method to solve it. However, I found a solution using group theory and 3D transformations: I used commutators to find the periodicity n of the algorithm. Since this algorithm is a set of successive rotations, I can pair and decompose them into four axes of symmetries so that the second and third axes will form an identity. I then turn the remaining ones into rotations. This process is repeated until we reach God's algorithm. With my method, I plan to predict the impact of the Coronavirus crisis through graphs.

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