Annihilation and Creation of Agents in the Axelrod Model

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1 Axelrod Model

In 1997 the American Political Scientist Robert Axelrod developed on his paper "The Dissemination of Culture: A Model with Local Convergence and Global Polarization" a model that tries to describe how the cultural decision are disseminated in a discrete space.

The original model correspond to a 2D lattice with an agent per site, being able to interact with his neighbors, the interaction is based in two principal rules: [1]

1. **Homophily**: Is most probable that two agent interact if they are culturally alike.
2. **Relationship Tendency**: After the interaction of two agents they are more similar.

Every agent will be represented by a "cultural vector" $\sigma_i \; \forall i \in \{1, ..., F\}$, where F is the number of cultural features i.e. favorite color or favorite football team. Every σ_i can take a value between 0 and q, that represent a cultural preference.[2][3]

Thus the model try to simulate the cultural dissipation and predict different configuration of the system over the time.

2 The Real World Case...

The Axelrod Model has multiples application in the real world, like understanding the social differentiation, the preference for certain kind of fads or the geographic isolation. This is because all this phenomenon are product of the interaction of people or communities, and this interaction produce a change on the state of the agents.

The predictions made from the Axelrod Model always end in a equilibrium state were is no variation in the system [2], this is because it supposes agent that never disappear. Nevertheless the social systems have agents that are created and annihilated all the time (like people).

It is therefore that the real world working here is the "Annihilation and Creation of Agents in the Axelrod Model", were the "time of life" depend with some probability in the decision of the agents (in this case, people).

3 Relating the Model to the Real System

To relate the model to the real system we have to do 2 things. In the first place we have to include in the model presented by Axelrod the annihilation and creation of vectors σ_i and in the liberated site crate a new one with some characteristics that allow interaction with the neighbors.

In second place we have to simplify the real world system with the limitation of the number of cultural features of which depend the "time of life" of the agent.

Applying this new rules to the model we'll have a more representative system dynamic.

4 Problems Foresee

We thing that the inclusion of this new rules will make a dynamic system that will not reach a equilibrium state unlike the original model that not include this agents characteristic. Thus some problems foresee are the analysis method for the results of the simulation, that will include looking for data regularity and calculate some state variables like entropy, temperature or correlation. Maybe find some phase transition or correlations. However in a dynamic system with no equilibrium state, this will be very difficult to do [4][5].

References

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