

Is the Voter Model a Model for Voters?

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Election data provide a framework for contrasting opinion models, a task that has remained elusive. We identify three tasks: determining generic features of election data that should be described by a basic opinion model, identify an appropriate interaction mechanism and a plausible interaction network. We analyze election data of US presidential elections from year 1980 to 2012 and find that the vote-share distribution follows approximately a Gaussian distribution with a constant standard deviation from election to election, although the average value changes. Another feature is the logarithmic decay in vote-share spatial correlations. We develop a social influence opinion model based on random imperfect imitation, i.e., a voter model like interaction with the addition of random noise. As a proxy for the interaction network we use census data on commuting that counts how many individuals live in one county and work in another one. This gives input data fixing the value of the parameters of the model. The agents interact a proportion of their times at their home location with other agents they can meet and otherwise they interact at their working location. The model accounts for the two generic features of election data mentioned above. Furthermore it recovers the behavior of these properties when the geographical space is coarse grained at different scales—from the county level through congressional districts, and up to states. Finally, we analyze the role of the mobility range and the randomness in decision making, which are consistent with the empirical observations.

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