

# State-of-the-art: Strategic Voting in Democratic Elections

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## **What is the problem addressed?**

The problem described in the paper by Pacuit and Holiday (2019) is that in voting situations, voters are sometimes incentivized to misrepresent their beliefs. In this so-called strategic voting, the voter can achieve a preferable outcome by misrepresenting their true preferences about the available candidates. To get an election result which actually represents how people think about the candidates, every voter should be voting for their favorite candidate. The paper goes on to explain that this problem is hard to avoid, as every reasonable voting method is susceptible to strategic voting and that strategic voting cannot be avoided. De Ita et al. (2019) describe the problem of accurately modeling a democratic election.

## **What is the state of the art concerning this problem?**

In the paper by Pacuit and Holiday (2019) the preferences of the other voters are known, but the rules of the electoral process are not, these are randomly chosen from a set of different methods. In other words: the voters are uncertain about the used voting method. The paper compares this uncertainty in voting method to a probabilistic approach, which tries to reduce strategic voting by using randomisation to select a winner. The difference as described in the paper is that both approaches have a loss of transparency at the time of voting, but there is a difference in explainability between the two approaches. Whereas the probabilistic approach could be explained as a lottery, the uncertainty in the voting method could be explained by revealing what voting method was used to obtain the results. Within this paper, they worked with voter profiles that map candidates to certain rankings for each voting strategy.

De Ita et al. (2019) model a democratic election by mapping voters to certain sectors which all have strategies associated with them that candidates can cater to in order to gather votes of these voters. They have the candidates start in a certain state with a certain strategy, and then have them iteratively change their strategy to gather more voters until the candidates reach a Nash equilibrium.

## **What is the new idea for addressing the problem?**

The new idea of Pacuit and Holiday (2019) was the aforementioned uncertainty in the voting method. They mention that in a lot of the previous literature, voters have extensive information about other voters and the voting strategy, and that an election designer might profit off of including uncertainty in elections to prevent strategic voting from taking place.

De Ita et al. (2011) deal with the modeling of elections by having their agents iteratively build towards a final strategy. In this way, they are competing with the other agents like candidates would be in real life and they work towards the common goal of gathering as many votes as possible.

### **What are the results (expected or established)?**

The results of Pacuit and Holiday (2019) show that uncertainty about the voting method can reduce the amount of manipulation that occurs. They show this across three types of manipulation.

De Ita et al. (2011) proposes a way to model democratic elections, they do not show any results or hypothesise about what might happen in a certain situation. The only assumption made is that this model can be used to model an election given sector sizes and strategies that are to be used.

### **What is the relevance of this work?**

Pacuit and Holiday (2019) work is relevant to us in that it extensively discusses different concepts related to strategic voting. We will go on to research how this type of manipulation can influence a democratic election in different situations. Moreover, comparable to the paper by Pacuit and Holiday (2019), we will give each voter a profile which will contain their preferred true ranking of the parties. Whereas they try to minimize strategic voting, we will simply be looking at how it changes in influence when we alter parameters in our election. De Ita et al. (2011) has a more straightforward connection to our research in that it provides us with a starting point to model a democratic election. We will go on to try and improve their idea of voter sectors by mapping voter profiles and party profiles into a vector space based on the party's views on core topics. We will then use the euclidean distances between voters and parties to base their voter profiles on.

## **References:**

Pacuit, E. & Holiday, W. (2019). Strategic Voting Under Uncertainty About the Voting Method.  
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De Ita, G., González, M. & Quechol, I. (May 2011). A Multiagent System for Modeling Democratic Elections. In Proceedings of the Twenty-Fourth International Florida Artificial Intelligence Research Society Conference (pp 91-92).