A unifying model to measure consensus solutions in a society

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Abstract

A classical group decision making problem arises when a group of voters, experts, ... have to make a decision on a set of alternatives, candidates, ... The experts' opinions about the alternatives are usually characterized by their ideas, principles, knowledge, etc. which is a source for conflict when it comes to making a collective decision. Due to this fact, it may be interesting not only to know the result of aggregating the individuals' opinions but also to measure how much agreement with respect to the individual opinions this final decision has conveyed. This point is important in order to be aware of which decision making methodologies or voting systems could capture the coherence within the group better.

Reaching consensus in group decision making problems and its measurement are prominent and active research area in Social Choice Theory. The literature abounds with references about such subjects under different positions. In most cases the measurement of consensus is approached from an axiomatic point of view, by suggesting specific measure methodologies and studying their properties.

In this work we contribute to the formal analysis of the measurement of consensus in a society by proposing a general method to measure consensus which unifies the previous methodologies. We provide a model for solving such a general problem that can be specialized via two ways: the "voting rule" that is selected, and the measure of agreement between profiles and orderings. We analyse the general properties of our proposal, both from an axiomatic and a computational viewpoint. Finally, we focus our analysis on two relevant and specific subcategories: the Borda and the Copeland rules under a Kemeny-type distance.

Keywords: Consensus, measurement, Kemeny distance, Borda rule, Copeland rule