

Using a natural monotonicity constraint as the basis of a ranking procedure

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Consider what it means for a ranking to correspond to a group opinion, or for a ranking procedure to be appropriate. Much like in some other disciplines, there is no ground truth (automatic image annotation is another example in which the ground truth is not clearly defined). Rather, there are certain axioms that are considered as natural and desirable. On the basis of those, a methodology can be constructed. The methodology we will present is built on the idea of monotonicity: When I prefer a to b and prefer b to c , the extent to which I prefer a to c cannot be smaller than the extent to which I prefer a to b or b to c .

We consider a ranking problem where each voter has expressed a linear order relation over the candidates. We consider a ranking procedure that chooses as a winning ranking one which adheres best to the constraint of monotonicity: For a ranking $a \succ b \succ c$, monotonicity implies that the strength with which $a \succ c$ is supported by the group of voters should not be less than the strength with which either one of $a \succ b$ or $b \succ c$ is supported. The notion of strength of support within our context is taken to be the number of voters who expressed the corresponding pairwise preference. The underlying intuition is that the more clearly one candidate is better than another, the easier it is for voters to indicate the ‘correct’ preference. We will also investigate how the proposed ranking procedure fares with regard to some properties by which such procedures are commonly judged. We have previously published on this topic in [1,2,3], at times approaching the problem as an optimization problem.

References

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