Matching methodology for WeCitizens' VAA

Establishing the candidate's profile

We take into account only candidates who have answered all questions of the vote advice application (VAA) applicable to them.

Both, the candidates and the voters have five possible answers: "I fully agree", "rather yes", "I give no opinion", "rather no", "I strongly disagree". This gradation improves the accuracy of the matching and allows candidates to differentiate themselves without infringing party discipline, if applicable[1].

The voter answers the number of questions he/she wishes. Questions which have not been answered, or have been answered with "no opinion", are not taken into consideration for the calculation.

Calculating the "match"

The "match" between the voter's profile and that of the candidate is based on the Euclidean distance (geometric distance within a multidimensional space). In order to situate the answers within this space, they are given a numerical value according to the table below:

	Options given to answer each question		
	to candidates	to voters	Value given
I fully agree	x	x	100
rather yes	x	x	75
I give no opinion	x		50
I give no opinion		x	
rather no	x	x	25
I strongly disagree	x	x	0
no answer		x	

Thus, the Euclidean distance between a candidate and a voter is :

$$D = \sqrt{\sum_{i=1}^{n}(v_i - c_i)^2}$$

where : v_i = the voter's position with regard to question i
c_i = candidate's position with regard to question i
n = number of questions to which the voter has replied.

This distance is then correlated with the maximum distance:

$$D_{max} = \sqrt{\sum_{i=1}^{n}(100)^2} = \sqrt{n \cdot 100^2}$$

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[1] Parties can give more freedom to candidates before the elections. Voters usually like to know the personal views of each candidate.

resulting in the normalized distance : D / D_{max}

A value indicating the level of match is achieved by subtracting the normalized distance of 1. In order to make this easier to read, the result is expressed in percentage points:

$$\text{Match}(\%) = 100 \cdot (1 - D/D_{max})$$

The "match" is a measure of geometric correspondence. It is not the proportion of the questionnaire to which the voter and the candidate provided the same answer.

This means of calculation provides a good balance between simplistic approaches (e.g. one point for each concordant question, …) and more complicated ones (e.g. factorial analysis, etc.).

Ranking

Once the system has calculated Match_w for each of the candidates, it can return to the user the list of-candidates ranked in decreasing order.

>When two or more candidates achieve the same score, they are ranked according to the level of completeness their profile in PoliticiansOnline.

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