PhD proposal:
Elicitation and explanation for voting rules

A competition for a full time three-year long Ph.D. position in computer science at LAMSADE, Université Paris-Dauphine is open.

Keywords: artificial intelligence, computational social choice, decision theory, axiomatic analysis, preference elicitation, preference modeling, formal argumentation theory

Context

The theme of this call is around the development of procedures to help a committee (or a society) choose a suitable voting rule. This will involve 1) axiomatic analysis of voting rules; 2) explanation of those axioms in terms a non-expert can understand; 3) preference elicitation methods. As such, the dissertation will be situated at the interface between computer science and economics.

Voting rules are formal means to aggregate preferences of a group of voters into a collective decision. Social choice theory has produced and analyzed several voting rules, many of which being apparently reasonable: no rule can be considered “the best voting rule”, independent of the context. However, some rules are, upon reflexion, better than others. As a result, the choice of the voting rule to be used turns out to be an interesting question. For example, in a (social or commercial) enterprise a body may have to decide how conflicts will be sorted out, or a parliament may decide about a possible revision of the electoral law of the country.

More details about the related research context are available in the long version [https://github.com/oliviercailloux/deliberated/raw/phd/Voting-PhD-long.pdf] of this call.

Expected results and impact

The PhD will strive to develop explainable models and justifiable recommendations. It may thus contribute to make scientific-driven recommendations more acceptable to the general public. The results are expected to be published in top-ranked conferences and journals in the AI and social choice fields.

Besides theoretical work, it might aim at producing practical methods that could be integrated into the Whale [http://whale.imag.fr] platform. As an example, automatic deduction might be used to automatically illustrate various (paradoxical or intuitive) results when applying known voting rules to concrete situations.

Expected assets

The subject involves social choice theory, decision theory, formal argumentation theory. The candidate must have strong competencies in some of these fields, and be interested in the other ones. Regarding language requirements, a good command of English and willingness to learn French in necessary.

Environment and contacts

Applicants must send their CV, coordinates of a referent person, a letter of motivation and a listing of the courses they took in masters, together with their marks, to Remzi Sanver [mailto:remzi.sanver@dauphine.fr] until 1 April 2018. The position is to start on 1 October 2018.

The successful student will be hosted at LAMSADE [http://www.lamsade.dauphine.fr/], Université Paris-Dauphine (which is a part of Université Paris Sciences et Lettres) and will be supervised by Remzi Sanver [https://sanver.bilgi.edu.tr/] and Olivier Cailloux [http://www.lamsade.dauphine.fr/~ocailloux].