Preference Reasoning in Computational Social Choice and in Decision Support Systems

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Timetable: 12 hrs. First Lecture on September 16, 2014, 11:00 (dates already fixed, see the calendar), Torre Archimede, Room 2BC/30.

Course requirements: None

Examination and grading: The students' performance will be assessed for each course via an academic paper where the student will relate his research area with some of the topics presented in the course. Failure to submit papers within a required deadline, without prior endorsement by the lecturer, will be considered as an insufficient result.

SSD: ING-INF/05

Aim: I want to show the crucial role of preference reasoning in Computational Social Choice and in Decision Support Systems. Computational Social Choice is an interdisciplinary field of study at the interface of social choice theory and computer science, promoting an exchange of ideas in both directions. On the one hand, it is concerned with the application of techniques developed in computer science, such as complexity analysis or algorithm design, to the study of social choice mechanisms, such as voting procedures. On the other hand, computational social choice is concerned with importing concepts from social choice theory into computing, such as fairness and non-manipulability. In this course, I will show how preference reasoning is crucial in voting rules and in multiagent preference aggregation with uncertainty, where some agents reveal incomplete preferences. Also, I will also show two compact preference formalisms (soft constraints and CP-nets) to express preferences over combinatorial domains. Moreover, I will show how preference reasoning is central in stable matching problems, that have many practical applications in two-sided markets, like those that assign doctors to hospitals and students to schools. Finally, I will show how preference reasoning is central in two specific decision support systems: recommender systems (e.g., Amazon) and reputation systems (e.g., Tripadvisor).

Course contents: Computational social choice, preferences, voting rules, preference aggregation with uncertainty, compact preference formalisms, stable matching problems, recommender systems, and reputation systems.