STMS Scientific Report

COST ACTION IC1205

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STSM type: Reciprocal (from Italy to Australia)

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STSM Topic: Reciprocal STSM

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Background

The use of techniques and concepts from computational social choice area is growing. These are used mainly to resolve decision and planning problems. Indeed, it is growing the number of as artificial agents communities that take decisions based on the preferences expressed by individuals, as democratic human communities do. For this and other reasons, it is important to study this area also for Artificial Intelligence researchers.

Purpose of the visit

The main purpose of the visit it to continue a research collaboration with Prof. Francesca Rossi, Dr Brent Venable and Prof Toby Walsh on convergence of iterative voting and computational complexity of multi-mode control action. In addition, I will give a research seminar on my past research work. Finally, the visit will provide me with an opportunity to meet other members of the Algorithmic Decision Theory group and to initiate research collaborations with them.

Description of the work carried out during the visit

During the visit, we carried out the following works:
- Studying a new form of multi-mode control action based on the notion of equal-budget. In particular, we classified these new control actions based on their computational complexity against the most known and used voting rules, such as scoring procedure
- Studying different iterative voting rules
- Studying different restrictions to apply to iterative voting systems
- Running experiment on iterative voting system
- Studying statistical method to produce data to be used in computational social choice experiments
- Introduction to game theory

Description of the main results obtained

Most of the activities carried out during the visit give important results, such as:

- modelling a new control action and named it Replace Control. This new form of control allow to replace a subset of candidates or voters of an election system
- proving the computational complexity of replace control action in Plurality, Veto and Borda systems, against constructive and destructive form of control for weighted and unweighted voters
- using impartial culture, impartial anonymous culture and Polya Eggenberger urn model to produce data for computational social choice and running tests using this data
- using data from real events in iterative voting experiment to produce empirical analysis of iterative voting rules

Future collaboration with host institution

Both institutes are interested in future collaboration concerning of methods and experiences to expand the knowledge of the iterative voting systems and multi-mode control actions.

Projected publications/articles resulting or to result from the STSM

Most results will be presented at (major AI) conferences in forms of papers.

Other comments

I would like to greatly thank the Cost Office and NICTA for giving me this opportunity.