Cost Action IC1205 on Computational Social Choice: STSM Report

Applicant: Ronald de Haan
Home institution: Technische Universität Wien
Home country: Austria
Host: Britta Dorn
Host institution: Eberhard Karls Universität Tübingen
Host country: Germany
Dates: 23/11/2016 to 29/11/2016
Reference: ECOST-STSM-IC1205-211116-081278

In this short-term scientific mission, I developed a scientific collaboration with Dr. Britta Dorn and her colleagues Janosch Döcker and Sebastian Schneckenburger. We discussed various topics in the field of computational social choice.

One part of our collaboration concerns the computational complexity analysis of problems arising for several restricted variants of mixed multi-unit combinatorial auctions. In particular, we discussed various cases where the bids only involve transformations with a strict relation between the input goods and the output goods. For these restricted settings, we identified various cases where the problem of finding an optimal strategy for the auctioneer is solvable efficiently. In addition, we identified (parameterized) complexity results that indicate the boundaries of these efficiently solvable cases.

Additionally we investigated the computational complexity of determining the outcome of a commonly considered judgment aggregation procedure, for restricted judgment aggregation scenarios where the logical relation between the different issues can be represented using a logical formula of one of several restricted forms. In particular, we studied the Kemeny judgment aggregation procedure—in two different formal frameworks used to model judgment aggregation—where the logical formulas used to express the relation between issues are either Horn formulas or 2CNF formulas. We identified both negative and positive complexity results.

The collaboration on both of these topics allowed us to establish several results that can be published in conference proceedings. Moreover, I foresee that the collaboration started with this scientific mission will continue in the future on these, as well as other, topics.

During my stay in Tübingen, I also gave a talk to the full Theoretical Computer Science Section at the department, where I provided an overview of research in the area of judgment aggregation aimed at computational complexity issues.