

## **COST Action IC1205 on Computational Social Choice: STSM Report**

**Applicant:** Marija Slavkovic, University of Bergen, Norway

**Host:** Wojciech Jamroga, Polish Academy of Sciences, Gdansk, Poland

**Dates:** 17/05/2015 to 23/05/2015

### **Purpose of the STSM**

The purpose of this STSM visit was to work with Dr Wojciech Jamroga on the problem of developing a iterative information aggregation procedure. We were looking primarily, but not exclusively at judgment aggregation. A new procedure seeks to ameliorate the main shortcomings of classical information aggregation approaches, such as high computational complexity, irresoluteness and non-scalability to open agent systems.

### **Description of the work**

During my visit I worked closely with Dr. Jamroga in Gdansk. Additionally an opportunity arose for a one day visit to the Polish Academy of Sciences in Warsaw, where I met more members of the Institute of Computer Science.

At this visit we began working on the new research topic outlined in the proposal. We had several brain-storming sessions in which we explored various approaches to iterative aggregation, most of which did not manage to give better results than the median voter approach for judgment aggregation (according to which the domain of the aggregation function is reduced to the aggregated profile). We managed to design a consensus reaching algorithm for judgment aggregation which converges depending on the properties of the aggregation problem and the selection of a concession parameter. A concession parameter defines the maximal amount of divergence from ones original position that each agent is willing to accept in order for a consensus to be reached. In each step of the algorithm each agent, if possible, makes a concession, iteratively reducing the differences in positions among the agents in the profile.

We study the consensus reaching process as an extensive game with perfect information. We outlined properties of the game and sketched proofs. We identified the important questions, which we will continue to work on. Although the problems of aggregating logically related information are inherently computationally hard, the concession parameter can be designed in such a way as to reduce the complexity of reaching a consensus compared to the complexity of finding collective judgment sets using a judgment aggregation function.