COST Action IC1205 on Computational Social Choice: STSM Report

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During my two weeks at CMU, I had numerous discussion with my host, Ariel Procaccia, and Dominik Peters from Oxford University, who was visiting Ariel on an STSM, as well. We settled on a topic that could be entitled "Aggregation of distance measures". The goal is to aggregate a given tuple of metrics on a set of alternatives to obtain one joint metric. This models situations where voters have possibly conflicting believes about how far pairs of alternatives are apart and one would like to obtain a joint believe by aggregating the individual opinions. Metrics can for example be viewed as a measure of similarity of alternatives. Our goal was to find an aggregation mechanism that satisfies desirable properties such as fairness, efficiency, and strategyproofness. The main problem is that the aggregated distances have to satisfy the defining properties of a metric, in particular the triangle inequality. We were able to show that the unique mechanism satisfying anonymity, Pareto efficiency, and strategyproofness is the *maximum rule*, which, for every pair of alternatives, chooses the maximal distance for this pair stated by any voter. The proof of this result makes use of Moulin's (1980) characterization of anonymous, Pareto efficient, and strategyproof voting rules for single-peaked preferences. We also considered other mechanisms such as a Kemeny-like approach (choosing the metric that is closest to the individual metrics) and a median-based approach (choosing the metric that is closest to the median distances). The appeal of these mechanisms is that they are less sensitive to extreme views of single voters. Studying these rules in more detail will be subject of further research.

I am very grateful to COST Action IC1205 and my host, Ariel Procaccia, for giving me the opportunity to visit CMU.