Accepted Manuscript

A social choice approach to ordinal group activity selection

Andreas Darmann

PII: S0165-4896(18)30005-2
DOI: https://doi.org/10.1016/j.mathsocsci.2018.01.005
Reference: MATSOC 1995

To appear in: *Mathematical Social Sciences*

Received date : 8 February 2017
Revised date : 4 October 2017
Accepted date : 26 January 2018

Please cite this article as: Darmann A., A social choice approach to ordinal group activity selection. *Mathematical Social Sciences* (2018), https://doi.org/10.1016/j.mathsocsci.2018.01.005

A Social Choice Approach to Ordinal Group Activity Selection

Andreas Darmann
University of Graz, Austria

Abstract

We consider the situation in which group activities need to be organized for a set of agents when each agent can take part in at most one activity. The agents' preferences depend both on the activity and the number of participants in that activity. In particular, the preferences are given by means of strict orders over pairs "(activity, group size)", including the possibility "do nothing". Our goal will be to assign agents to activities on basis of their preferences, the minimum requirement being that no agent prefers doing nothing, i.e., not taking part in any activity at all. Taking a social choice perspective, we aim at establishing such an assignment by two approaches. On the one hand, we use k-approval and Borda scores, and we apply the Condorcet criterion on the other hand. We analyze the computational complexity involved in finding a desired assignment, with focus on two natural special cases of agents' preferences which allow for some positive complexity results.

1 Introduction

In many situations activities need to be organized for a set of agents taking into account the agents' preferences. Often, each agent can be assigned to at most one activity. E.g., consider a company which would like to provide free sports classes in order to achieve a high employee satisfaction (Skowron et al. [31]), or the organizer of a social or business event (such as a workshop), who wants to arrange social activities for the free afternoon (Darmann et al. [17]). In the former case, for cost reasons the company might allow each employee to take part in at most one activity; in the latter case, since the activities take place at the same time, each agent can take part in at most one activity. Now, in many cases the agents have preferences not only over the available activities themselves but also over the number of attendees in the activity. For example, one would be willing to take a sauna with up to 6 attendees, but does not wish to take part if the sauna is more crowded. On the other hand, for activities connected with costs that need to be shared by the attendees (such as renting a bus for a trip to a given sightseeing destination), an agent might prefer a higher number of attendees to a lower number, and also have a conception over the minimum number of joining participants among which the costs are to be split. Typically, the respective preferences differ from agent to agent.