

Agent-based ordinal classification for group decision making

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1 Introduction

Group decision making is a process in which multiple stakeholders, with individual preferences, act collectively to make a common decision. This decision could be a choice of an alternative among a set of possible alternatives or a classification of an object in a particular performance class. An ordinal classification problem [6, 8] consists in partitioning a set of objects into predefined ordered classes, called categories. The classification of hotels into one star, two stars, etc. is a common example.

Particularly, in internet applications, groups of people need to agree on a joint decision in a variety of situations, such as setting up meetings, planning vacations, watching movies together, classifying applications for a given job, to name but a few.

Group decision making systems could be based on Group Recommender System (GRS) methods [2, 3], on aggregation procedures [1, 4] or on negotiation techniques [5, 7, 9, 10]. These last consist in interactions between several decision makers having personal local preferences, in order to reach an agreement.

In this paper, we propose a multiagent group decision making process based on a multi-lateral negotiation to reach common ordinal classifications from individual preferences. Each user involved in the classification process is represented by a user agent acting on behalf of her preferences, constraints and goals. We assume that all agents are cooperative and share the common goal of reaching an agreement. However, local preferences could be different or even contradictory and common classifications become hard to get to. In order to avoid such conflicting situations, a mediator agent is given the task of initiating and conducting the negotiation process. A key role of the mediator agent is to make an objective decision when the negotiation doesn't lead to an agreement.

Each user agent behaves dynamically all along the process ; she makes her decisions based on an aggregation of several criteria representing her profile such as flexibility over time. The communication protocol is characterized by a high degree of privacy, hence, agents decide whether to reveal entirely or partially their preferences.

After presenting our classification process, we concluded with an experimental approach showing that our process, when compared to centralized approaches, makes more satisfied the least satisfied agent (compared to plurality), distributes the global dissatisfaction in a fairer way and better protects the privacy of the decision makers.

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