Accepted Manuscript

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PII: S1570-8683(16)30060-X
DOI: http://dx.doi.org/10.1016/j.jal.2016.11.006
Reference: JAL 437

To appear in: *Journal of Applied Logic*

Please cite this article in press as: E. Armengol, J. Puyol-Gruart, A reward-based approach for preference modeling: A case study, *J. Appl. Log.* (2016), http://dx.doi.org/10.1016/j.jal.2016.11.006

A reward-based approach for preference modeling: A case study

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Abstract

Most of reasoning for decision making in daily life is based on preferences. As other kinds of reasoning processes, there are many formalisms trying to capture preferences, however none of them is able to capture all the subtleties of the human reasoning. In this paper we analise how to formalize the preferences expressed by humans and how to reason with them to produce rankings. Particularly, we show that qualitative preferences are best represented with a combination of reward logics and conditional logics. We propose a new algorithm based on ideas of similarity between objects commonly used in case-based reasoning. We see that the new approach produces rankings close to the ones expressed by users.

Keywords: Preference Representation, Reasoning with Preferences, Conditional Logics, Reward Logics.

Introduction

Preferences are part of every day life driving to choice and action. According to the Oxford Dictionary of English a preference is *a greater liking for one alternative over another or others*. We humans are constantly expressing complex preferences in natural language and most of our decision making processes are based on them. However, preferences have a great dependence of context and common sense, statements that we prefer in some situations are not adequate for other situations. For instance, concerning colors, if I prefer red to black, probably when I want to buy a T-shirt it will be red. However, if I have to attend to a formal party, probably I do not choose a red cloth but black.

Preferences are the basis of decision making processes. For this reason, preferences have been the topic of interests for different fields [32] such as Economics [18], Psychology [31] and Artificial Intelligence [11] among others. From the point of view of Artificial Intelligence we can find many different approaches to preferences. There is a lot of work focusing on preference representation [4, 5, 11, 16], preference reasoning [8], collaborative filtering [5, 26, 27, 29], recommender systems [6], social choice [1],