Optimizing Collaborative Learning Processes by Using Recommendation Systems

Sebastian Harrach
Department of Philosophy
Darmstadt University of Technology
Darmstadt, Germany
harrach@phil.tu-darmstadt.de

Mojisola Anjorin
Multimedia Communications Lab
Darmstadt University of Technology
Darmstadt, Germany
mojisola.anjorin@kom.tu-darmstadt.de

ABSTRACT

In this paper, we present the work of the research group e-learning at the Darmstadt University of Technology by describing a paradigmatic research cooperation between the departments of philosophy and computer science. Here, the perspective of Parallelkommunikation from the philosophy of technology is used to increase the transparency of recommendation systems used in certain learning scenarios. This is achieved by providing explanations to allow a better understanding of the reasons behind recommendations. With this enhanced understanding, users can give more relevant feedback, thereby actively influencing the ranking of resources.

Categories and Subject Descriptors

K.3.1 [**Computers and Education**]: Computer Uses in Education – *Collaborative learning*

General Terms

Human Factors

Keywords

1. INTRODUCTION

We apply the perspective of Parallelkommunikation [1] to a general learning scenario (where a group of learners are working collaboratively within a semantic network) and thereby exemplify the interconnectivity and interdisciplinary character of the projects of the research group e-learning.

We then focus on one paradigmatic subproject: the task of improving recommendation systems [2] based on ranking algorithms.

2. RECOMMENDATION FEEDBACK

The perspective of Parallelkommunikation [1] calls for three additional communication levels in any user/system interaction:

1. User/Developer communication regarding the developer's perceptions on user stereotypes

2. Community based meta-communication regarding the general requirement about system communication

3. On demand transparency within the user/system communication while the system is active

These three communication levels have been investigated by the research group e-learning:

(1) Currently, a research group member of the department of pedagogy is in the initial stages of investigating dynamic modification of user stereotypes by analysing formative assessments.

(2) A meta-discussion of collaborative learning practices in online communities from the point of view of educational theory was part of a completed dissertation of a research group member of the department of pedagogy [3].

(3) Concerning this third level of communication, we present here a more detailed description of the work in progress currently being conducted on a paradigmatic project within the research group. This will give an impression of the daily work within the group and what research questions arise as a result:

Providing explanations and thereby supporting the transparency of recommendations is an important field in computer science and particularly in recommendation systems [2]. Explanations provide additional details so the user can better understand the reasoning of the system and why specific recommendations are generated. This transparency helps the user to better influence the ranking algorithms which calculate the relevance of resources in the network. Examples of ranking algorithms are FolkRank, TrustRank or Interestingness Ranking [4]. Some ranking algorithms use machine learning algorithms to generate recommendations based on the textual content of the resource, the structure of the network, the user's activities or a combination of these.

The user can actively take part in improving the ranking of resources by explicitly giving relevance feedback [4]. This can be implemented when the learner accepts or ignores (implicitly rejects) the recommendations made by the system. The relevance feedback can then be used to improve the selection of resources to be recommended once again. However, learners should be able to switch off these complex ranking algorithms [4] to avoid over-specifying the individual rankings and recommendations.

3. REFERENCES

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