

Work in Progress - Towards a Tool to Analyze Qualitative Aspects of the Relations among Members of Social Networks

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Abstract - This paper discusses a tool to study the relations among group members of a social network that evolve using a virtual environment. Understanding how these relations are built and maintained is essential to foster favorable conditions that can facilitate collective and individual learning. The focus of interest is how inner relations affect both the collective and individual learning of its members. We consider a group as being a set of relations among people and artifacts. As an example, we might determine which relations among members of a Project Team (predominantly goal-oriented) are different from the ones found in Communities of Practice (predominantly learning-oriented), and how they affect the learning of their members. We propose to characterize the relations among members by analyzing text content of social exchanges (e.g. email messages, blog posts, chat sessions, etc). The approach originality relies on taking into account the distinct points of view of its actors. Due to the distributed character of the problem (a virtual group), we intend to develop this tool by using a Multi-Agent System, whose architecture we present in this paper.

Index Terms - Communities of Practice, Project Teams, Social Networks.

INTRODUCTION

In project-based learning, real project situations are simulated in a controlled environment. The execution of realistic projects incites students to create knowledge and learn through a communication process that relies on the relations among members and artifacts. The relations cement a dynamic social network. Understanding the way those relations develop and how the communication stream is affected, as well as the role of the different communication channels, may lead to the development of tools that can help both the comprehension and the improvement of group relations as well as assisting group managers on their duties.

We consider "tool" the integration of both: a method to determine social human interaction axes that are significant for individuals that work on project groups and a set of computer programs that analyze messages exchanged by

these individuals and represent their distinct points of view about the academic and professional interactions they have.

Our main hypothesis is that representation of social networks by a set of relations based on the frequency of messages (like number of emails exchanged or messages posted in a forum) blurs a significant point of a social learning process, the existence of different points of view and the consequent negotiation of meaning. Especially for project group managers the perception of these time-dependent points of vision could help leading the group to more productive levels.

Considering what one can observe on SNA tools, project manager could identify clusters and their evolution [1]. Nevertheless, these tools give little information about why individuals do not exchange information, cooperate or help each other. In a certain way, they can point possible reasons for past failures but cannot highlight potential social relations problems. In this research project we study the possibility of identification of individuals' different points of view about their social relations.

THE EXPERIMENT

We decide to conduct a three phases experiment. In phase 1 we will focus on academic project groups that work on a virtual environment. The objective is to set up methods and computer programs. In phase 2 we will apply the results of the first phase in both a professional project team and a community of practice. In phase 3 we will analyze the results of phase 2. Phases 1 and 2 will have three steps:

Step 1 – Representing the social micro networks of a group and defining social interaction axes. We will use exploratory qualitative analysis (interviews and text analysis). The objective is to produce social micro networks and make emerge a set of significant social interaction axes that represents the sum of individuals views of the social network.

Step 2 – The social interaction axes defined on step 1 will be used to guide algorithms for automatic text knowledge extraction. The objective is to build automatically social micro networks and compare with the ones obtained on step 1. According to the results, we will promote adjustments on the defined axes.

Step 3 – If step 2 is successful on an ongoing project, the same group will be monitored and the results assessed in order to estimate the usefulness of the tool.

RELATED WORK

One of the challenges of this research is to extract information from unstructured documents like email messages and use such information to identify clusters automatically.

Mitsatko and MacLaren [2] identify clusters of students from graphs that represent students’ interactions. Cakir et al. [3] also use graphs. They analyzed manually the interactions among students solving mathematical exercises. The students’ statements, obtained from chat sessions, were classed in various categories and the interactions were represented as graphs. They used a computational model to identify some features in the students’ interactions.

Cakir et al. [3] seek to identify and classify automatically some features of the participants of groups. Similarly, we seek to identify and classify the relations among participants. In this context, we envisage the use of techniques for discourse parsing and automatic text summarization [4] and patterns recognition [5] to identify relevant features and to classify documents semi-automatically.

EXPECTED RESULTS

A project team could be considered as a set of micro social networks, each actor anchoring a micro social network. Figure 1 illustrates the kind of visualization for micro social networks we seek. At the left we see the anchor and in the other side his colleagues. With the photos we have a short profile and in the next right column we have a profile of the relationship between the anchor and each colleague. In the central part of the graph, we see the social relations axes (personal empathy, technical empathy and sharing of information). The grades on the axes represent how the system estimates the actors interact based on the messages analysis. With this kind of visualization, we are willing to understand how the relations among members affect their learning as individuals and as a group.

THE PROPOSED ARCHITECTURE

The number of possible communications channels in a virtual environment (forums, chats, etc), the complexity inherent of each one and, the distributed character of the problem suggest the use of Multi-Agent System (MAS) technology. As the research project goes on each user will have a Personal Assistant (PA) to interface him/her to the system. The PAs will use the services provided by the Service Agents (SA). A first SA will analyze and present information extracted from email messages, eventually other SAs may be developed and reach the system (focusing the others communication channels). As every channel has its discourse gender specificities, each one could have a SA with specific knowledge base.

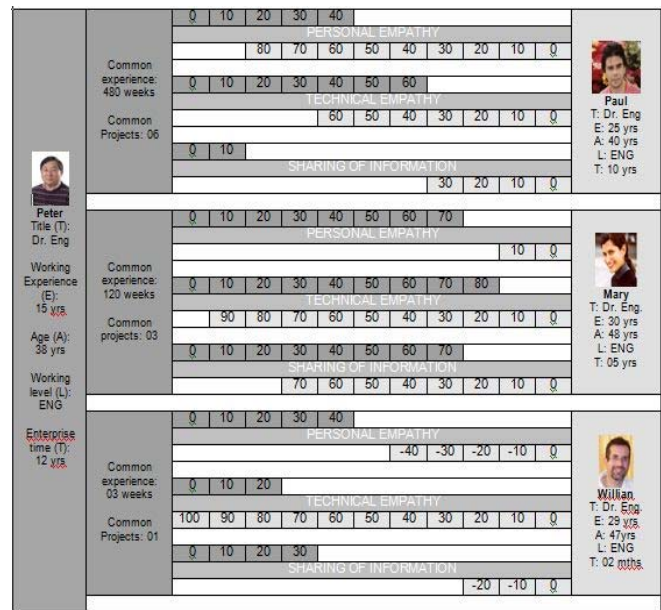


FIGURE 1
VISUALIZATION OF A SOCIAL MICRO NETWORK.

CONCLUSION

We discussed a tool to analyze how the relations among members of a social network affect their learning. We introduced the notion of social micro network which we consider as a first step towards understanding such relations. We also presented the experiment we are going to conduct to develop this tool.

We understand that we will face some difficulties conducting such experiments. We already have contacted project teams that agreed to participate in our experiment, but we have not identified a community yet. Furthermore, we are aware that some technical limitations can reduce the usefulness and efficiency of our tool, but we are willing to evaluate the importance of such limitations.

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