Chapter 24
Supporting CSCW and CSCL with Intelligent Social Grouping Services

Jeffrey J.P. Tsai
University of Illinois-Chicago, USA

Jia Zhang
Northern Illinois University, USA

Jeff J.S. Huang
National Central University, Taiwan

Stephen J.H. Yang
National Central University, Taiwan

ABSTRACT

This article presents an intelligent social grouping service for identifying right participants to support CSCW and CSCL. We construct a three-layer hierarchical social network, in which we identify two important relationship ties – a knowledge relationship tie and a social relationship tie. We use these relationship ties as metric to measure the collaboration strength between pairs of participants in a social network. The stronger the knowledge relationship tie, the more knowledgeable the participants; the stronger the social relationship tie, the more likely the participants are willing to share their knowledge. By analyzing and calculating these relationship ties among peers using our computational models, we present a systematic way to discover collaboration peers according to configurable and customizable requirements. Experiences of social grouping services for identifying communities of practice through peer-to-peer search are also reported.

DOI: 10.4018/978-1-4666-0261-8.ch024

INTRODUCTION

Although the Internet technology has made it possible for people to collaborate effectively without staying physically together, they have led to the unintended consequence of increasing isolation among people with respect to their academic peers. In bygone times, the inconvenience of having to share resource sites (for example, computer centers and unscheduled laboratory use) afforded opportunities for developing computer-oriented social groups for virtual collaboration.

Computer Supported Cooperative Work (CSCW) provides a virtual collaboration technology that offers participants a promising option of not being physically present at cooperation. Applied to collaborative learning, CSCW techniques allow students to study in a virtual team without physically staying at a common place (Weinberger, & Fischer, 2006). Computer-Supported Collaborative Learning (CSCL) was thus coined in 1996 (Koschmann, 1996) to refer to adopting CSCW technology to provide a computer and network-supported collaborative learning platform for students to study cooperatively to acquire knowledge (Komis, Avouris, & Fidas, 2002).

While there have been significant efforts developing collaborative learning environments for existing groups, little work has been done to help people find proper partners in Internet communities. In our vision, qualitative principles and strategies from traditional higher education research and practices should be normalized and quantified into computer understandable and interpretable rules, and guide automatic formation of cooperative groups.

This research aims to promote Internet-based informal collaboration over CSCW and CSCL, by exploring the plausibility of providing system-level support and services for the forming of collaborative groups dynamically. Our outcome will lead to a plug-in into the existing Web-based platform providing intelligent social grouping services. Based on our study and surveys, we focus on exploring how to exploit knowledge and social networks on top of historical data to help students establish subgroups of cohorts that may become "communities of practice." By communities of practice, we borrow from social science and refer to a group of participants with common interests in a particular subject. By participants, we refer to the individuals who (1) possess related information, (2) can help to discover and obtain the information, or (3) are willing to exchange and share information with others.

This article presents an intelligent social grouping service empowered by social network-based peer-to-peer (P2P) search to facilitate the identification and establishment of communities of practice on the Internet. Here, peers represent individuals (participants) who are associated with the communities through knowledge and social relationships. Throughout this article, we will use the terms "peer" and "participants" interchangeably. We propose two important relationship ties, a knowledge relationship tie and a social relationship tie, as underlying metric to measure the degrees of a peer's knowledge matching and social relationships regarding a query initiated by another peer. By analyzing and calculating these relationships among peers using our computational models, we present a systematic way to discover peers based on configurable and customizable requirements. We have also conducted experiments to evaluate how our method improves the identification of communities of practice on the Interne.

The remainder of the article is organized as follows. We first review related work in section 2. We present our knowledge and social network-based P2P search framework and the methods for calculating knowledge relationship tie and social relationship tie in section 3. We present our system implementation and discuss our experiments and results in section 4, and finally, we draw conclusions in section 5.