

Capturing Designers' Knowledge Demands in Collaborative Team

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Abstract. Collaborative team members usually come from diverse disciplines; their demands for knowledge are also different from each other. This paper is mainly concerned with how to capturing designers' knowledge demands in collaborative team. With the view from workflow, designers' knowledge demand is modeled from three aspects, members, roles, and tasks' requirements for knowledge. Based on the model of knowledge demand, some intelligent mining methods are proposed so that designers' knowledge demand could be derived automatically. With the knowledge demand model, a knowledge supply system could be developed to realize: knowledge within an appropriate domain could be delivered to the proper user among the collaborative team.

Keywords: Knowledge Management, Knowledge demand, Collaborative design, Workflow.

1 Introduction

Team members among a collaborative design team usually come from diverse disciplines, each with particular expertise and contribution from their relevant areas. So, their demands for knowledge are also different from each other. Collaborative team requires a mechanism to efficiently distribute knowledge such as news, seminar announcements, patents, technique documents, software services, etc. The knowledge has to be delivered in the right context to the right person, in the right time for the right purpose^[1], which is called knowledge supply, knowledge logistics, or knowledge distribution. As to above target, the fundamental issue lies in how to accurately capture the characteristics of user profiles and find each user's demand for knowledge. Based on those knowledge demand descriptions, a proper volume of knowledge within a proper domain could be delivered to the proper user among the collaborative team.

"Demand" is the premise for "supply", all of those demands for knowledge buildup the basis for the knowledge supply. Our goal is to develop a new approach for mining the knowledge demands of each designer among collaborative team from their backgrounds, roles' description, tasks' requirement, query\browser history, email records, and work schedules.

The crucial technologies related to capturing users' demands for knowledge include representation and modification of user profile, the representation of resource, the recommendation technology, and the architecture of personalization. Some famous

personalized systems have been developed among both academia and industry: e.g. IBM's WebSphere, BroadVision, ILOG, ant etc. CiteSeer^[2], Webpersonalizer^[3] and etc. filter web information according to the similarities between the web resources and users' interests. In addition, GroupLens^[4], SiteSeer^[5] and etc. are collaborative method which filtering web information according to users' similarities among them. However, those systems mainly concern personalized recommendations of web information. They have not considered specific applications of knowledge recommendation in among a collaborative team about some specific business or research processes.

Our approach is workflow-centric because we view knowledge distribution as an organizational process and investigate process-oriented solution for it. It helps us design efficient and utilizable solution for routing process among enterprises or institutes, rather than pure algorithm research about information filtering, or just web pages recommendation among internet.

2 The Model of Knowledge Demand

Members are the core factor in knowledge management in enterprises; all the knowledge is produced and also used by members during their design tasks. Each member in a collaborative team may have one or more roles in a collaborative team, e.g. product manager, system engineer, mechanical engineer, electrical engineer, and etc. Moreover, there are up-low relationships between those various roles, all of which constitute a role hierarchy, named role tree. The role tree reflects the organization architecture of an enterprise or a team.

The above reference model RM is defined as: $RM = \langle T, R, M \rangle$;

Here, T is the total set of tasks, $T = \{t_i | i = 1, \dots, t_{num}\}$, t_{num} is the number of tasks;

R is the total set of roles, $R = \{r_i | i = 1, \dots, r_{num}\}$, r_{num} is the number of roles;

M is the total set of members, $M = \{m_i | i = 1, \dots, m_{num}\}$, m_{num} is the number of members;

- ✧ **Member list:** each unit in member list is corresponding to a real member in a collaborative team. Their member ID and interests are stored in it. Those interests reflect the member's knowledge background, specialty, research interests, strong points and etc.
- ✧ **Role tree:** different from member list, role is a virtual concept; and each role reflects a position and rank in collaborative team. Different positions are corresponding to different qualification of capabilities and skills, which are also described by some keywords.
- ✧ **Task model:** task in a workflow reflects an activity among some project. Each task (or activity) needs distinct requirement for fulfilling it. Similarly, those task requirements are described by some keywords about the task's domain, technical requirements and etc.

The above three parts concern three demand sources for knowledge: demands for knowledge according to (1) one member's interests, (2) qualification of capabilities about roles that are correlative with some members, (3) requirements of workflow's tasks that are also correlative with some members.