Defining an Evaluation Criteria for Cooperative Writing Applications

By

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Thesis submitted to the faculty of UMT in partial fulfillment of requirements for the Degree of M.S. Computer Science

School of Science and Technology, University of Management and Technology Lahore

SESSION: 2007-2009


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Dedication

*Dedicated To my **Parents***

whom love and real affection

will always remain with me.

Acknowledgement

I am especially grateful to Allah Almighty, Who gave me the health, brain, and conducive environment to become one of those who are blessed.

I am grateful to Dr. Muhammad Asalam, Dr Sajjad Shami and Dr. Khalid Qamar whose advices, courage building and moral guidance helped greatly towards my work.

Nabeela Kausar

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Abstract

Groupware are software which provides an environment to group of users to work in shared environment on a common task to achieve common goal. Cooperative writing application is also a type of groupware. Cooperative writing applications enable people working in a group to perform common task by providing shared environment. To provide the required consistency and integrity of shared data the key focus is on structured information about the actions performed by the group members, shared objects, communication techniques and effective coordination mechanism. Cooperative writing applications require the features like efficient communication service, effective coordination mechanism and awareness about all user activities and their participation for the production of consistent shared documents. The research focuses on comparative study, citation of related work, and questionnaire from users/groupware designers and intends to define the criteria for the evaluation of cooperative writing applications.

1 Introduction

Today with the globalization of the world most of the tasks are performed in real time and in shared manners. The new communication methods provide the ways to work collaboratively. World Wide Web has made it possible to share information resources which enabled the users to work in cooperative/collaborative environment in a distributed way, around the globe, independent of geological locations. A new domain called Computer Supported Collaborative Work (CSCW) came into being which focuses on providing requirement such as shared resources, coordination mechanism and communication services for performing the shared tasks. CSCW is "a generic term which combines the understanding of the way people work in groups with the enabling technologies of computer networking and associated hardware, software, services and techniques" [1]. When we talk about Collaborative environment, we should consider many aspects like how data would be stored (centralized/distributed), how it would be communicated (Synchronous/ Asynchronous)? Hence it is crystal clear that we should focus on individual working as well as working in groups. What information related to different users would be made public and what would be made private? How users will be intimated about a specific action and how that intimation will be represented in the form of different icons?

Groupware is software that supports and augments collaborative work. It is technically-oriented label meant to differentiate “group-oriented” products, explicitly designed to assist groups of people working together, from “single-user” products that help people pursue only their isolated tasks. The more familiar groupware examples include electronic mail, bulletin boards, and asynchronous conferencing.

Many applications are available for computer supported collaborative work. We are going to discuss here cooperative writing applications which are a kind of groupware. Cooperative writing application provides the facility to produce the shared work. The focus of our study is to analyze the theoretical concept of the awareness and its elements, different communication services and coordination mechanism in cooperative writing applications. We shall study what kind of information should be provided to members and how it should be provided and we shall review the awareness systems integrated into cooperative writing applications.

We shall study different communication services provided by the variety of cooperative writing applications whether that is email, instant messaging, message posting, video conferencing or voice chat. And we will deduct which services are effective for a standard cooperative writing application.

We shall also study the different coordination mechanisms in different cooperative writing applications and see how roles are assigned to members. And then define criterion for evaluation of cooperative writing application on the basis of comparative study.

1.1 Problem statement

Variety of cooperative writing applications exist some of them include good communication services but lake the good coordination mechanism and some applications include good coordination mechanism but has lake of awareness and communication services. The application which has no awareness functionality may result in inconsistent collaborative production.

Awareness plays a very important role in Cooperative Writing Applications and there are many problems which need to be addressed. In awareness related problems in cooperative writing applications, we need to know how different objects which interact with the system, what is happening around the user interface of cooperative writing applications. The activities of one object/actor with respect to others should be identified and described in this regard.

The application which lakes the coordination mechanism may result in time waste because in this case same work may be produced by more than one member in a group. And there exist no standard criteria to evaluate any cooperative writing application.

1.2 Proposed solution

A computer infrastructure to support a group of people to carry out the shared tasks and to achieve the common goal is named as groupware: “a software that supports and augments group work” [2]. Most of the software in day to day life are intended for tasks performed by single user while groupware applications are developed in a way that people may communicate in a group in shared memory space while maintaining the integrity of shared data. Groupware consider how people in a group can work together , how people can share the resources storage media, memory and hardware,

how they will communicate with each other and what communication services they will use, how they will know the activities of other members in a group and how the members of the group will coordinate with each other. Examples of groupware are instant messengers[3], email services, ftp, cooperative writing/designing applications [4], ODesk team system, group schedulers, group decision support systems, collaborative writing tools, screen-sharing software, computer equivalents to whiteboards, video and workstation conferencing etc.

The groupware applications must have three characteristics named communication services, group awareness system and coordination mechanism. Communication is important part of cooperative writing application because the users present at different geological locations need to communicate with each other to share their ideas.

Awareness is another important necessity for the cooperative writing applications. Awareness of individual and group activities is critical to successful collaboration [5].

In groupware context awareness means one should be aware by the activity of other member in the group. A classic definition of awareness is “an understanding of the activity of others, which provides a context for your own activity.” [5] Information from the workspace comprises the awareness elements introduced in [6]. Awareness elements are related to the present and past activities of the coauthors. These elements are all general that deal with the interaction between a person and environment [6]. Type of awareness includes workspace awareness, presence awareness and past awareness. Workspace awareness is awareness to the activity of any member in the workspace and awareness about each other who are working in the same group.

Presence awareness shows who is present or on-line. All elements of the awareness whether they are present or past they are divided into situation awareness, presence awareness and workspace awareness. To resolve the issues related to awareness two important seminal ethnographic studies, the study of the London Underground control room by Heath and Luff (1992; 1996) and the study of air traffic control work by the Lancaster group (Hughes et al., 1988; Harper et al., 1989b; Harper and Hughes, 1993) have been conducted. As a result of these studies members/actors were defined as the “monitor” of different activities performed by their colleagues by observing or listening or interacting so that progress, state or

direction may be ascertained related to these activities. Actors normally do know these thing inconspicuously that is monitoring the work of others does not require a response from colleagues.

The activities performed by members are normally made publicly or partially visible of those activities that may be related to specific member of the group. The specific member while in a shared environment doing individual contribution to the joint effort, members/actors typically design or modulate their activities in such a manner that their colleagues are provided with clues and other information relevant to their monitoring the activities. Members conduct their activities in a way that other colleagues can speculate that the activities have started or done, through which path they have been done, how the constraints are being met in terms of time and quality. All these factors will affect or not the work of their colleagues so that they can adjust their parrot of effort accordingly?

There should be some mechanism of displaying the information and monitoring the events generated by different objects. The monitoring the activities of other person/object is facilitated by displaying aspects that are relevant for me and my displaying aspects of my work to others presupposes that I am monitoring their activities and thereby I am aware of their concern, expectations and motives. The individual activities are however, sometimes may be 'systematically, yet unobtrusively, coordinated with the actions of colleagues' (Heath et al., 1995, p. 156), and this is not always the scenario.

The actors normalize the monitoring mechanism delicately so that they may adjust the degree of fussiness to their requirements of situation, and hence they display the work done in a form and at a level of fineness which may be adjusted to the situation faced by their colleagues.

When the activities of others are being monitored and in displaying aspects of their own work, actors demonstrate great care and expertise in choosing a model that have some sort of fuzziness or un-fuzziness to a degree and appropriate to a specific situation. All these problems/factors need to be addressed while developing standard criteria for cooperative writing applications.

Coordination is third needed property in cooperative writing applications. Coordination is handling of tasks such as changes in roles, priorities of tasks and user interests. Management of these all constraints is called coordination [4]. The

coordination mechanism handles conflict among group member activities for sharing resources and performs effectively collaborative/shared work.

Coordination is management of dependencies among user activities. In the context of CSCW, the coordination is defined as "the support for the activity of managing dependencies and possible conflicts between collaborative entities (users and their roles) involved in common and inter-related tasks of a collaborative activity (actions performed in the shared workspace)" [7]. Several kinds of dependencies are shared resources, task assignment and producer consumer relationship [8].

The modes of communication for groupware applications may be synchronous mode (real time systems) or asynchronous mode (email systems). While communicating data groupware applications should provide information about user actions. The status of user and activities performed by the user is provided by means of awareness functionality, namely group-awareness systems.

Proposed solution include comparative study variety of cooperative writing applications, citation of related work and questionnaire from users of cooperative writing application on the basis of awareness system, communication service and coordination mechanism and develop a criterion to measure the performance evaluation of cooperative writing application. This criterion will help a user or a group in making a decision the kind of application they choose for collaborative work and consequently an effective and consistent completion of collaborative task.

1.3 Goal

Principle objective of this research is to define criterion for evaluation of cooperative writing applications. This will help a group of people to choose suitable application for their shared/collaborative production. The group will choose the application with the communication service, coordination mechanism and awareness functionality according to their needs to complete their shared task.

1.4 Related Work

A review, of how groupware systems have been evaluated in the past, can help to frame the discussion of what methods and techniques should be considered for future evaluation and to establish the standards for future applications. In [9] a review was performed on all papers from the ACM Computer Supported Collaborative Work (CSCW) conference (1990-1998) that introduced or evaluated a groupware system.

Forty-five papers were included in the review. In review each article was analyzed in five areas: type of evaluation, characteristics of the evaluation, data collection techniques, placement of the evaluation in the software development cycle, and type of conclusions drawn from the evaluation.

The main findings are that almost one-third of the groupware systems were not evaluated in any formal way, that only about one-quarter of the articles included evaluations in a real-world setting, and that a wide variety of evaluation techniques are in use. The main conclusion from the review was that more attention must be paid to evaluating groupware systems and that there was room for additional evaluation techniques that must be simple and low in cost. In particular, it was suggested that evaluation techniques should be developed to help eliminate problems with the application before it progresses into situated workplace-centered evaluations.

The conducted survey related to CSCW systems [10] sort out different kinds of systems which support cooperating environment. It was concluded that the basis for classification are the two characteristics named form of interaction (synchronous or asynchronous) and processing location (remote or co-located) are common to all the cooperative systems. Hence, the types of cooperative system may be, message systems, video conferencing, remote meeting rooms, co-authoring and argumentation. Regarding empirical study on collaborating writing through a questionnaire filled by 41 persons was conducted using W3. The questionnaire was about, “how people work when they are collaborating to write a document? What kind of tools do they use and, in particular, do they resort to groupware for this task?” etc. It was found out that people normally use word processors to write their documents instead of using collaborative tools. They exchange their documents using email face-to-face meetings and telephone. Some people also gave valuable importance of collaborative writing tools but they only use collaborative writing tool only if they are sure that other party also use them.

The era from 1998 to 2004, seen 169 papers published in the ACM CSCW conferences. We may classify these papers according to groupware evaluation, work situations, hypothesis testing, bibliographic research, and no empirical research. It was observed that there is constant decrease in the number of papers that does not report an empirical result, a constant proportion of papers that propose a new groupware system and evaluate it (in some form), and an increasing number of papers that describe a work/collaboration situation and papers that test hypothesis by using

experiments. For evaluations, the most common type of evaluations are, in decreasing frequency, lab experiments, field experiment, and field/case study. Evaluations are mostly only qualitative, followed by only quantitative, followed by both.

The not-empirical class may be divided into groupware with no evaluation, frameworks to develop groupware, algorithms (synchronous editing) and taxonomy/model. One of the limitations of ACM CSCW conferences is that it cannot be considered as a standard for publications in the CSCW area. Hence, it is realized that groupware evaluation is only one of the types of empirical research possible.

1.5 Thesis Plan

Sr. No.	Chapters	Description
1	Introduction	Chapter 1 describes core purpose of co-operative writing applications and what are the required features. It also targets the problem confronting co-operative writing application's users and proposes a solution.
2	Related Work	It covers all the citation from different international journals. It covers reviews of the papers published in journals.
3	Proposed Methodology	Based on the research work from literature and questionnaire filled by 35 technical persons from groupware designers, groupware users and from industry, it proposes standard evaluation criteria for co-operative writing applications.
4	Comparative Study	In this chapter comparative study of different cooperative writing applications have been performed in perspective of awareness functionality, communication service and coordination mechanism.
5	Results and Discussion	This chapter covers how research will help group of people collaborating for different tasks to choose suitable application.

2 Related Work

In this chapter related work citation is performed. In [11] an empirical study on collaborative writing is performed to know what the co-authors do and like when they collaborate. How do people work when they are collaborating to write a document? What kind of tools do they use and, in particular, do they resort to groupware for this task? Forty-one people filled out a questionnaire placed on the World Wide Web. In spite of the existence of specialized collaborative writing tools, most respondents reported using individual word processors and email as their main tools for writing joint documents. Respondents noted the importance of functions such as change tracking, version control, and synchronous work for collaborative writing tools. This study also confirmed the great variability that exists between collaborative writing projects, whether it is group membership, management, writing strategy, or scheduling issues. Thus, it seems that people like to use the know word processors to write documents instead of using specialized collaborative writing tools. They use to communicate mostly by email, face-to-face meetings and telephone. People highlighted importance functions of collaborative writing tools such as change, tracking, version control and synchronous work; new communication technologies such chat as instant messaging are hardly to be used. The hypothesis of this paper is that people use collaborative writing tool only if they are sure that their partners also use them.

In [12] an empirical study of awareness functionalities integrated into cooperative writing applications, a kind of groupware that supports people working in groups to achieve common task by providing shared environment, is performed. Producing in groups requires structured information about activities of all participants, shared objects, an efficient communication service, and an effective coordination mechanism. Otherwise, collaborators activities would not be organized resulting into an inconsistent shared production. The study is performed on the basis of present and past awareness elements introduce in [11], the kind of integrated communication services, and coordination mechanisms. The principal objective of this study is to investigate what does exist concerning awareness for cooperative work and what issues are yet to be addressed.

In [13] a survey on CSCW was performed. It was shown that over the last decade, Computer Supported Cooperative Work (CSCW) has emerged as an identifiable research area which focuses on the role of the computer in group work. CSCW is a generic term which combines the understanding of the nature of group working with the enabling technologies of computer networking, systems support and applications. This paper examines the classes of system which have emerged to support cooperative working. A framework for characterizing and describing CSCW systems is presented and four major classes of cooperative system identified. Each of these classes of cooperative system is examined highlighting their general characteristics and applicability to CSCW.

In [14] research presents an interview study in which 11 academics as interviewees participated for the purpose of revealing common collaborative writing practices, with particular focus on reviewing documents. First, the research presents the findings obtained concerning the issues of co-operating strategies underlying the reviewing process, how people revise their documents and comment on them, what they use the previous revision history for, and to what extent current technology is used in the reviewing process. Second, it also discusses aspects of the design of collaborative writing tools.

In [15] a survey on number groupware system has been performed some of them vary in terms of their functional, architectural, focal, temporal, user involvement and platform dependencies. While a wide variety of options have been found for each system, there are also strong commonalities. All of them work with closed communities or groups. There is no public file sharing. All users are aware of all other collaborators in the community and all systems focus on collaboration; not sharing. The comparison includes a new system Nomad, a framework for distributed resource management, with special emphasis placed on the accessibility of information stored on detached devices, such as personal computers, laptops, PDAs, and flash-disks. In the comparison, Nomad has advantages of flexibility and temporal independence over the other systems, together with low requirements on the user, and a high level of mobility and platform independence. The contributions of this paper are twofold: it identifies and defines a specific type of CSCW, groupware, together with a set of criteria for evaluating such systems; and it performs a survey and classifies some of the main systems according to the criteria, as well as introducing a custom-designed system, Nomad. From these results, a collaborative group of workers can more easily

select a specific groupware that suits its needs. Moreover, designers of new systems will find the commonality factors useful, so they can more easily position their own products.

The research describes the categories of CSCW applications, and the differences between CSCW and Groupware. It compares a number of academic and commercial systems against a number of criteria. It concludes by comparing each of these systems against all criteria. We notice the similarities and differences between each of these systems and our Groupware system, Nomad.

In [16] it is studied that what new kinds of coordination structures will emerge? Are these new structures desirable? What is necessary for them to work well? It conducts studies that chart how the prototype is used, as work-teams make progress through realistic document coauthoring and commenting tasks. This should help us come up with better descriptive theories that go beyond the normative theory that currently prevails.

In [17] paper presents a comparative study of workspace and conversational awareness support in collaborative writing systems. For this purpose R. Vertegaal's (1997) framework is adopted to analyze the group awareness functions for collaborative writing. The framework considers the workspace and conversational awareness elements. On the basis of these elements, Quilt, GROVE, PREP, SASSE, Calliope and Alliance collaborative writing systems are analyzed and compared. The goal of study was to know in which degree the collaborative writing systems provided the identified elements of group awareness. The evaluation procedure used for the comparative study contained the following steps. First all awareness functionalities in the collaborative writing applications were studied then it was studied how group awareness system worked to find the clear answer of all question in the vertegaal's framework. Then comparison was performed on synchronous and asynchronous collaborative systems in relation to workspace and conversational awareness elements.

Finally, their strengths and weaknesses are identified. And here we are also performing comparative study to know what awareness functionalities, communication services, and coordination mechanism should be in an effective collaborative system when group of users is working in space and time dimensions.

In [18] the study of three shared editors, Quilt, Groove, and PREP is performed with an emphasis on the mechanisms they use for providing the awareness information