An Approach to Cooperative Research Paper Writing / Edit system based on the Interactive-Edit Method

Takayuki Fujimoto†, and Tokuro Matsuo††

†Faculty of Engineering, Fukuyama University, Hiroshima, 729-0292 Japan
††School of Biology-Oriented Science and Technology, Kinki University, Wakayama, 649-6492 Japan

Summary

We propose an interactive edit web system, that is, users can edit and revise documents cooperatively and interactively. The Ie-web is constructed based on conceptions of special issue edit and pantographic issue edit. The goal of this study is not only developing cooperative document making system by many users, but research paper making system by mentors and other students. In recent years, computer-based telelearning systems are developed. Thus, we propose a useful cooperative document making support system to develop a system used at university educations.
Key Words
paper making support system, cooperative edit, interactive edit, group ware

1 Introduction

In this paper, we propose an interactive edit web system for making research papers, which is called the Ie-web system (Interactive Edit Web System). There are some useful systems in which multiple users can edit such as the weblog, web-diary, web-board, and the Wiki[1][2][3][5][6]. These systems do not almost provide a function in which users can modify and revise documents, though users can make documents. Thus, we propose a web-based document making support system that has a function for edit cooperatively and interactively.

The purpose of our system is developing a system in which multiple authors write and modify cooperatively. In making documents using computers, we classify behaviors like designers through the "special issue edit" and the "pantographic issue edit". An author is not only editing and making a document, he/she invites the edit space his/her co-researchers, such as, students, mentors, and other specialists about the research issues. Furthermore, these participants can edit the document in which the author prepared.

When the users who are invited to the edit space can modify and revise the document cooperatively and directly.

The users can also ask the author about research issues and give their opinions to the author. Users can reconstruct to the appropriate order of paragraphs from the order of paragraph written by the author based on discussion between the author and participants. Our proposed system is designed on concepts based on bottom-up-type document making system. The system has functions, that is, users edit sentences with each paragraph and reconstruct the order of paragraphs. The system is also implemented as web-based system because the goals of this study are developing for cooperative tele-education system based on making research paper. In many correspondence colleges, students who write graduation theses research and learn based on e-mail or postal correspondence with their supervisors and mentors. Such students never simultaneously write the paper through discussion with their supervisor and colleague. If students can make a research paper with discussion with their supervisor, they can have and understand many profitable comments from their supervisor. On another hand, supervisors can grasp the condition of students' researches and can give some comments for questions if students have some questions and problems. When users use our proposed system, all users have to do is to prepare a web browser.

There are some related work concerned with construction of document and edit support systems. Yamamoto proposed support system to change paragraphs in document based on increments of representational talkback[7]. However, this system never provides services for cooperative edit and web-based edit. Miyake proposed a conception of notebook-based document sharing system ReCoNote (Reflective Collaboration Note), that is, users can share their knowledge cooperatively[4]. However, these existing researches do never consider a system for e-learn and making research paper cooperatively.

The rest of this paper is as follows. We begin the next section with the introduction and background of our study and show some assumptions to support our approach. In Section 3 we show the concept design of our proposed system. Section 4 describes the outline of our proposed system and construction of functions that have the Ie-web.

Then, we provide an actual experiment to clarify the effectiveness of the Ie-web in Section 5. Finally, in Section 6 we provide concluding remarks.

2 Preliminaries

Most of universities and colleges provides the courses and curricula for mastering computer literacy. Students submit reports and papers made by word processor for subjects of lectures. Using word processor, users can share the format and design of documents. Users can also reuse them effectively. Sets of documents are reserved in archives, because the documents made by users is handled electronically. Users can easily re-edit, reuse and share the documents. In the point of such view, education using word processor is becoming an increasingly prosperous modern standard for many types of education. The transition to type-writing method from handwriting method make us give different sorts of conception concerned with authoring activities. In handwriting method, we first consider and decide the construction and chapters of documents. Then, we write iteratively by handwriting. Even though we want to revise the contents after we have completed, we cannot sometimes modify and re-edit them due to the limitation of handwriting in itself. It is difficult for authors to revise described documents. On another hand, type-writing method by word processor enables us to revise and modify even if we have completed making the document. We can also reconstruct the order of contents of documents. The reason why we can do them, the document consists of sets of parts of documents in electronic paper, such as, chapters, sections, subsections, and so on. Merging and Making-up by "copy" and "paste" functions, users can re-compelete the document. Thus, the feature of type-writing method enable us to edit both special issue and pantographic issue. This means that we can make a document cooperatively and interactively with other multiple users if the computers are connected to the Internet.

We give some features and differences between handwriting method and text-typing method as follow. Assumptions based on the features lead designing on our proposed document making support system.

There are the following three features of behavior of edit on PC.

1. Comparing the construction of ducuments between handwriting method and text-typing method, The process of text-typing method is based on constructed paragraphs.

2. Users who edit based on text-typing method make documents based on using "cut and paste."

3. Most of users who make a document by text-typing method write some sentences before they consider the construction as a whole. On another hand, the writers based on hand-writing method consider the construction of the document before they write.

We assume the following two sorts concerned with editing documents.

1. Users who make a document by text-typing method complete the document based on considering with writing and writing with thinking.

2. The text-typing method is appropriate method for writing a document like research papers.

We focus on the feature, that is, most of users make a document and complete through the process both special issue edit and pantographic issue edit and in text-typing method of writing reports and papers. Taking the feature into consideration, we develop an interactive document making support system in tele-education such as correspondence colleges.

3 Concept of the Ie-web

The concept of our proposed system is easy to use and detailed to edit. The concept is also what users can edit and reconstruct documents cooperatively. We give assumptions to support our approach based on "special issue edit" and "pantographic issue edit" as shown in Section 2.

3.1 Submission of documents

The Ie-web system is used easily by authors. When an author submits a new original document, he/she just inputs the document to the text area in the system. When the author has a document as text files, the files are uploaded to the system. All users use easily the Ie-web system with the Internet.

3.2 Cooperative edit by multiple users

Users select a document they want to edit from the list of a set of documents. The document is revised and modified by the users. Users also give comments to the document and paragraphs in the document. There are no limitation of managing and editing documents for all users including an author, mentors and other participants. If the manager of the Ie-web does not set up concerned with the number of participants, there are no limitations of the number of users. Of course, the manager can also set up for users as members of laboratory.

The document written by an author is reserved as an

original paper to the database of the Ie-web. All revised version is also reserved with ID number. The ID number is decided based on the ordinal number, date and user's name.

When a user is revising a paragraph, other users cannot modify it. In that situation, the link for edit of paragraph is not active even though other users push the link. Our system gives an alert for the operation and does not provide a form for text area.

3.3 Special issue edit

Special issue edit is that users can edit in detail and part. In the Ie-web, one document is handled as a set of paragraphs. For example, when the number of line feeds in a document is 10, we assume there are 10 paragraphs in the document. The special issue edit of the Ie-web is what sers can edit and give comments with each paragraph.

3.4 Pantographic issue edit

Pantographic issue edit is that users can reconstruct a document as a whole. The order of paragraph is changed. The reconstruction of the order of paragraph is one of feature where users edit and make a document by using word processors.

3.5 Output data of completed documents

A completed document made by the participants can be output as a text file. Users can set up that comments to the sentences are added on the end of matter. Our system provides functions, that is, users get the document as the Tex file and an Html file that have appropriate command tags. Our system can provide the document which has command tags like "¥ sectiontitle", "¥ subtitle", and so on. For example, when users make a document, the character "titlename" reserved as a valuable "$title" is expressed as "¥ titletitlename". When users give some figures to a document, the system expresses as a command tag like as follows.

Our system provides a function, that is, some types of figure files are converted to the ".eps" file type because it is necessary to get ".eps" type file in using the Tex.

On another hand, when users use a table in making a document, our system provides a command tag of a table described by the Html. Thus, users can get the some types of appropriate files of the documents.

3.6 Usabilities and Interfaces

In our system, users can use the system like weblogs, bbs. Our system is implemented as CGI using Perl, users can browse by using a web-browser. Thus, naive users for our system can use easily. When a server spec., where our system runs is enough, the large number of users can

participate in the edit space in our system. If there is a limitation of the computer power, the manager can set up the number of users who use our system.

4 Ie-web: Interactive Edit Web System

We call our proposed system the Interactive Edit Web System. To abbreviate, the Ie-web. In this section, first, we show the outline of the Ie-web. Second, we show the construction of the system.

4.1 Outline of the Ie-web

Figure 1 shows the flowchart in using the Ie-web. First, an author inputs a document. Users who are invited by the author can also make a document. If a document written in advance is used, the material document is uploaded to the system. Users modify and revise the document through discussion between other users.
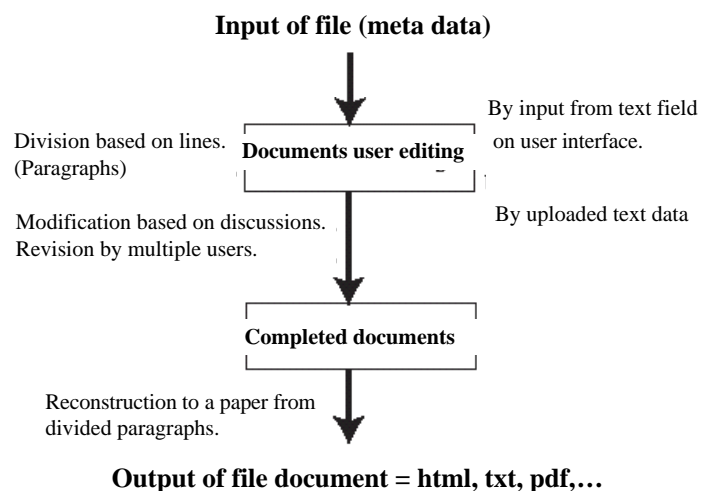
Input of file (meta data)

Division based on lines. (Paragraphs)

Documents user editing

By input from text field on user interface.

Modification based on discussions. Revision by multiple users.

By uploaded text data

Completed documents

Reconstruction to a paper from divided paragraphs.

Output of file document = html, txt, pdf,…

Figure 1. Flowchart

4.2 Construction of proposed system

Figure 2 shows an example of interface where the Ie-web system is used and running. There are four interface windows, subject window, main window, edit window, and chat window. Subject window is the interface that shows a list of sets of document input by the users based on the order of update time. When a document is input by an author, title of the document is listed up in the document list window. Users select a document in which they want to edit and discuss with author who gives the document or other participants. Main window shows a display window in which a user select from a list of document listed up at

the subject window. Users give their comments about the document and a paragraph of the document. Users also edit and revise a paragraph of the document. Edit window is a input window in which users edit and input comments to the paragraph. Chat window is a chat space where users can discuss an issue of each paragraph.
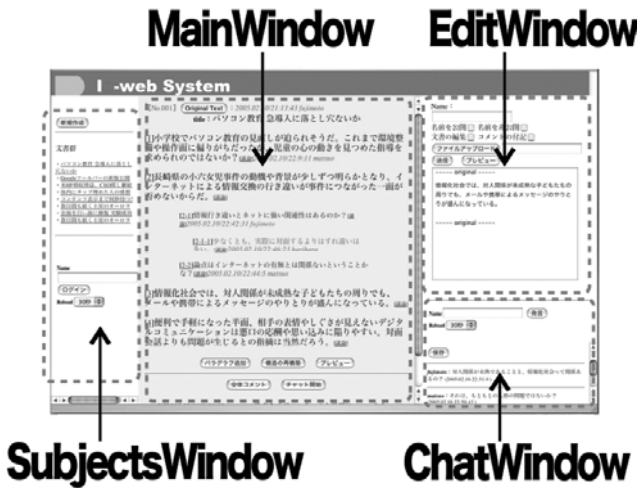

Figure 2. The Ie-web

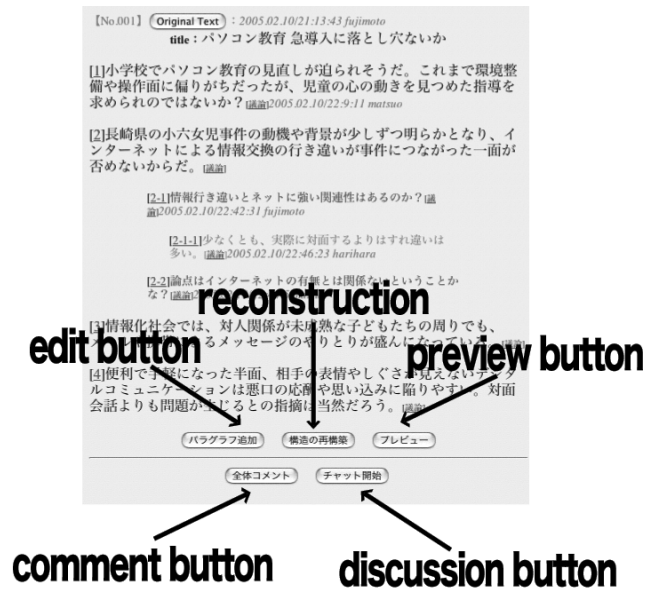document revise. Comment paragraphs are shown at the end of the writing as shown.

Figure 3. Main window

4.2.1 Subject window

A set of documents submitted by users is shown based on the order of submissions on the subject window.When users edit paragraphs and documents, the newest article is shown at the top of the part. In the example as shown in Figure 2, eight documents are input by users.

4.2.2 Main window

Figure 3 shows an interface example of the main window. When a link of the paragraph number at beginning of sentences is clicked, users can edit the sentence in the Edit window. When users click a link [Discussion] at end of sentences, users use a chat window to discuss with an author and other participants. Users add comments to a paragraph. Comments are shown as shown Figure 3. Date and use's name is shown as paragraph [1] in Figure 3 when users have revised the paragraph. When a user gives a comment to the writing, it is shown at below the document such as weblogs and bbs. Users give the comment by pushing [Comments]. Users add a new paragraph pushing the [New paragraph] button. When users change the order of paragrah as shown in Figure 4, users edit it by pushing [Reconstruction] button. If a user wants to discuss the paper but a paragraph, [Chat] button is pushed. [Preview] button is used to confirm by the user who has edited the paragraph. The paragraph edited by a user make the
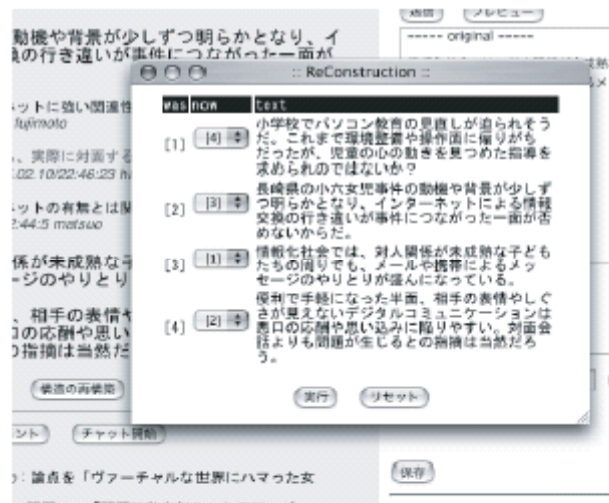

Figure 4. Reconstruction

4.2.3 Edit window

The detail of edit window is shown at Figure 5.

First, a user select whether his/her name is opened or not. User also select where he/she wants to edit and revise in the document. When the user has a comment and an article in which he/she wants to input as text data, the text data

can be uploaded to the system. Edited document is shown as a previewed version to confirm before the main document is updated.
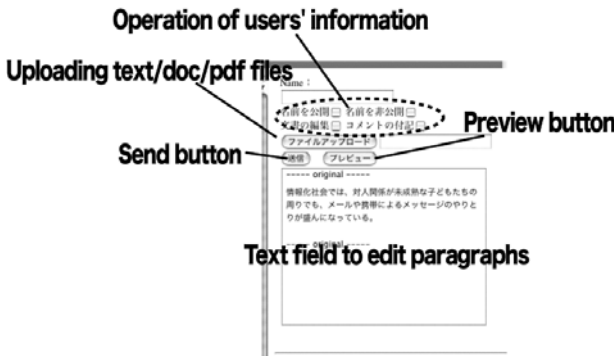

Figure 5. Edit window

4.2.4   Chat window

The detail of chat window is shown in Figure 6. Users can discuss and conserve about paragraphs and a document by using a chat system. Users can view the discussion because users' comments and opinions are reserved to the database in our system.

Figure 6. Chat window

5 Experimental Operation by Users

We show, in this section, an actual operation of the Ie-web by users. First, a user submitted an article to the system. Second, the user and participants edited and revised the document. To simply, we show the first four paragraph that selected from thirteen paragraphs.

5.1 Userbility

Ie-web is a interactive paper edit system which is widely used by multiple users. Users can use the system like weblogs and bbs by using web browsers. If server has enough power concerned with processing, many users utilize simultaneously. The system runs CGI described by Perl. Naive users can use the Ie-web system because users can operate the same way with bbs. Thus, our proposed system has a practical property and easy operation property. In the actual use by users, there is no problem in operations and managements.

In this example, we showed a part of the usability. When users make a research paper, users can make sections, subsections and so on by making paragraphs of hierarchic construction. Thus, the Ie-web is a promising system for making research and graduation paper in cooperative tele-educations.

5.2   Effectiveness of the Ie-web

In this section we discuss the differences between our proposed system and existing systems to clarify the effectiveness of the system. Comparing between the Ie-web and existing systems, our system has the following properties and advantages. First, there is no limitation of edit and revision between author and participants. Second, users can edit with each paragraph. Finally, users can reconstruct and change the order of paragraphs.

The feature and property of our proposed system is that all users edit and modify a document without the difference between users' status. In existing system, the rights between administrators, managers and other operator distinguished in sorts of operations and edit. If unprofitable comments are given in the existing web systems such as weblog and bbs, the manager of the site sometimes deletes the comments. On the other hand, the purpose of the system is educational mentoring and discussion of research issues but purposeless discussion. Furthermore, each user can know the contents and its construction through viewing a process of edits and discussions as a whole.

6   Conclusion

In this paper, we proposed an interactive edit web system, that is, users can edit and revise documents cooperatively and interactively. The Ie-web is constructed based on conceptions of special issue edit and pantographic issue edit. The goal of this study is not only developing cooperative document making system by many users, but research paper making system by mentors and other students. In recent years, computerbased tele-learning systems are developed. Thus, we proposed a useful cooperative document making support system to develop a

system used at university educations. Our future work includes developing as learning support system for dissertation making and improving user interface for the above goals.

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Takayuki Fujimoto: He is a Assistant Professor, Dept. Cultural Development, Sonoda Women's University in JAPAN. He got his Master degree of Knowledge Science from Japan Advenced Institute of Science and Technology (JAIST) and got his Bachelor of Education from Waseda University. His research is including the area of computer Science and Information Design, Cultural Studies. He is a member of IEEE, and several others. He is a conference organizing chair (program chair) of IEEE-IWEA2007.

Tokuro Matsuo: He is a Associate Professor, Dept. of Information Science, Yamagata University. He got his Doctor degree of Information Science from Nagoya Institute of Technology and got his Master degree of Knowledge Science from JAIST and got his Bachelor of Education from Saga University. His current research interests include designs on Agent-mediated Electronic Commerce Support Systems, designs on e-Auction Protocols, Qualitative Reasoning and Simulations, e-Learning Support Systems and University Information Support Systems based on Information Reuse and Integrations. He is a member of AAAI, IEEE, and several others. He is a conference organizing chair (program chair) of IEEE-IWEA2007, IEEE-PRIWEC 2006, RRS 2006, and RRS 2005.