Improvement of Emergency Response Manual by Use of Electronic Document

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Abstract

Because of the volume increase of disaster response manual after Hanshin-Awaji Earthquake Disaster, the current manual is not so good for practical use. But, by the cooperation between deferent types of electronic document, it is possible to do planning and operation with high-effectiveness and low-cost. Automatic hyper-text generation program supports this system. This program generates hyper-text automatically, so it reduces the costs of instruction and renewal.

1. Introduction

We accumulated a large amount of experiences from Hanshin-Awaji Earthquake Disaster, and the completion of disaster reduction plan is going on. But as a side effect of this, the increase of volume arises. So that it is difficult to use this manual in a real disaster. This problem means that it is necessary to develop a method by which we can grasp places to read, in a huge amount of contents, quickly.

There are few researches on the electronic documentation of disaster response manual. Oka and Hayashi (1998) said that there are several problems in regional disaster reduction plan, such as increase of volume, lack of reference, ambiguity of explanation. But on the other hand, they said that it is not solution to translate the entire document to hyper-text.

In this research, we provide a new way of electronic documentation that enables planning and operation with high-effectiveness and low-cost. This is because of the cooperation between deferent types of electronic document, and automatic hyper-text generation program supports this system.

2. Method

There is no research that analyzes the characteristics of electronic document. So, at first, we compared the merits and demerits of web document, relational database and paper document. With this result, we considered a system image under the cooperation of deferent types of document. Then, we tried to automate the process of translation, and on the other hand, we made a concrete electronic documentation of shelter operation manual. Lastly, we tested this system by considering constraints for practical use.

3. Results

3.1. Analysis of merits and demerits depend on the type of document

Table 1 represents the result of comparison of the types of document.

	Random accessibility Page movement	Dynamic change Use of colors	Data processing Reference
Paper document	○	×	×
Web document	×	○	×
Relational database	×	×	○

Table 1: Merits and demerits depend on the types of document

From this result, we can say that it is important to make use of their merits, and to make up the demerits. So we considered a system image.

3.2. Cooperation of web document, relational database and paper document

Figure 1 represents the image of the system with electronic documents.

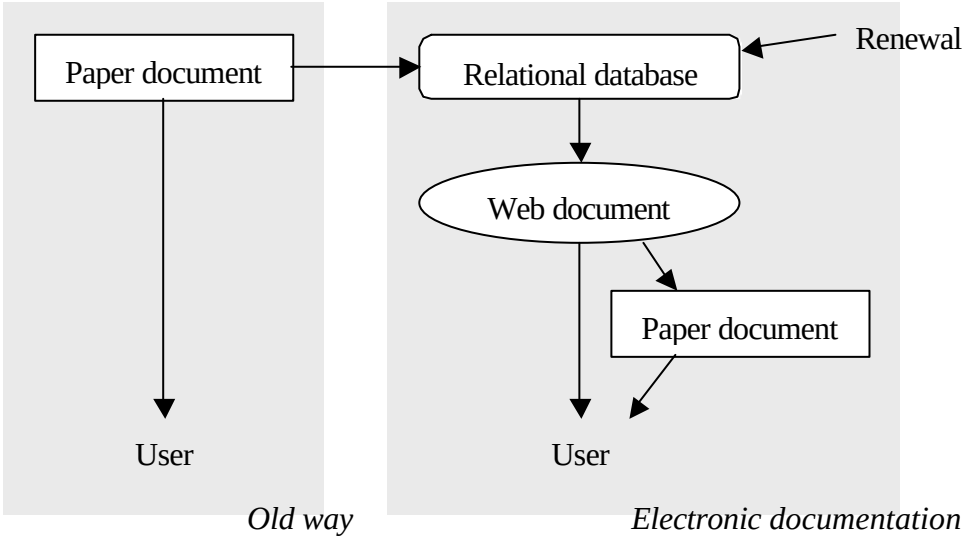

Figure 1: Cooperation between 3 types of document

In this system, relational database is back and web document is front of system. This is because relational database is good at data processing and reference, and web document is good at dynamic change and use of colors. To read long writings, we would better read paper document that is printed out.

3.3. Automatic hyper-text generation

There are problems of conversion to web document. The conversion means processing the disaster prevention plan, from old paper document to electronic document, from text file to HTML file. This is simple procedure to find especial keywords and to mark up them, but it takes a long time. This results the high labor cost. Automatic hyper-text generation program automate this procedure and reduces the cost.

The concept of automatic hyper-text generation program is very simple: 1)computer reads the text-file, and 2)when computer finds an especial keyword, the program marks up the word automatically. In this case(Aichi-prefecture shelter manual), we created about 200 files in a few seconds. It can reduce not only the instruction cost, but also the renewal cost.

3.4. Electronic documentation of shelter operation manual

Figure 2 is the screen of concrete electronic shelter operation manual.

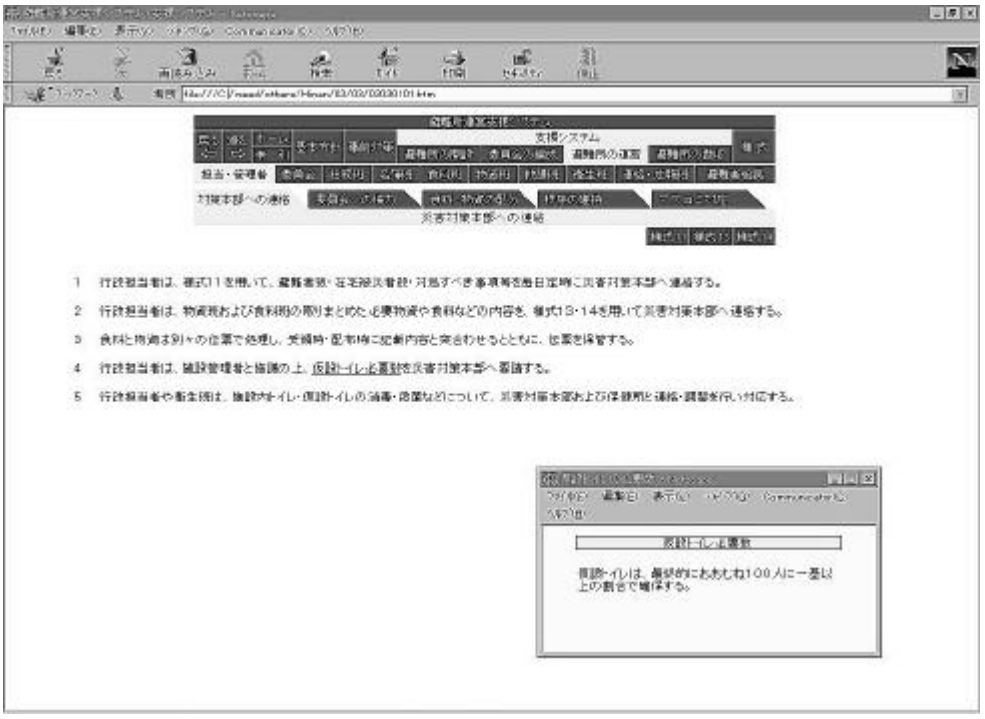

Figure 2: Electronic shelter operation manual

The upper part of the screen is the whole image of this manual, and the middle part

shows the commands. The additional information is provided in other window.

3.5. Consideration of constraints for practical use

To test this system, we considered constraints for practical use, from problems that was pointed out. As a result, we found 14 constraints that are categorized into three groups; Organization structure (partial responsibility of writings, limited budget, reshuffle every a few years), Disaster circumstances (necessity of cooperation among many organizations, necessity of unusual knowledge and know-how, destruction of daily information network, flexibility, necessity of decision making support system, only daily things can be used in disaster), and Human cognition (difficult to read unstructured writings, bad prospect makes reader tired, difficult to read writings without colors or decorations, difficult to remember more than 7 items, memory has a list-structure). Our system overcomes 7 constraints, 2 constraints depend on manual writer, 1 constraints is the hardware problem, and 4 constraints are our future's task.

4. Consideration

Now we have a large amount of knowledge and know-how, but the document type of manual make it difficult to use for real disaster. This is the bottleneck of feedback loop of information from the past disaster for the next disaster. The reason is that we didn't consider about external constraints of system, enough. Our research is a trial to widen the bottleneck and overcome the constraints by use of electronic document.

The automatic hyper-text generation program that we made is not sufficient, yet. But this does not means that the program is difficult to make, because we have not imported the stored knowledge of information processing, and the time for programming was not so long. We think that the professional of text processing can make a better program with enough functions.

5. Conclusion

It is possible to make system with high-effectiveness and low-cost. This is because of the cooperation between three types of documents, by making use of their merits and making up the demerits, and of the automation of translation.

References

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