

An Automatic Document Coloring and Interactive Browsing System

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1 Introduction

In recent years, the number of online documents, for example WWW, have increased. Nevertheless its expression is still traditional black-and-white. Color devices such as color CRT are available, and document expressions which make full use of this chromatic faculty is in great demand. We will study effective coloring of documents to increase their legibility and understandability, and develop the automatic document coloring and interactive browsing system CERAS. From an estimation experiment, CERAS improved the speed and accuracy of reading.

2 Color Effect

There are various psychological effects of using colors[1]. First of all, color can express up to millions of attributes human can distinguish. Especially a phenomenon called pop-out that can discover the stimulus of a purpose in a glance from within a plural stimulus is very effective. Next, color can bring the sense of warmth, size, distance and weight. Besides that, color brings feelings such as beauty and joy, as it is now acknowledged in the advertisement field. If the effects of these colors are used effectively, it will be expected that a reader can get the outline of a document faster and understand the content of a document further and enjoy reading more.

3 Automatic Coloring System 'CERAS'

This system gives color to an input plain text and displays it on a CRT. Users can customize the coloring rules and tune the expression interactively by a GUI.

Morpheme analysis is carried out to sentences in the text, and coloring points; type of character, part of speech and keywords, are extracted. CERAS gives color expressions to extracted points considering the reader's customize information and feedback information from the GUI.

CERAS acts in either General coloration mode or Specific coloration mode. In General coloration mode, documents are colored by general features, such as type of character and part of speech. Specific coloration mode is used when a user has a specific point to read, and the user can enter this mode anytime, to specify a keyword by clicking the right button of a mouse on it. In this

mode, words related to the keyword are also colored by using a thesaurus. The related words are expressed by the color whose strength is associated with the strength of the relation.

4 Estimation of CERAS

Keyword coloration function of CERAS was evaluated by a news article classification experiment. A testee searches one or two designated descriptions inside a displayed document in speed-reading and classified the document into two kinds.

The required time for classification is reduced to 24.2% by coloration. And answer rate is raised by coloration in 3 out of 4 cases. In total, it rises 5% by coloration.

According to the results, in a news article speed-reading case, it is presumed that related word coloration is effective for speed when the number of coloration marks are less than 3 per line on an average.

5 Conclusion

The number of online documents and those who read documents on color devices is increasing very much. We estimated the effect of coloring a document by experiment, and developed CERAS which generates color expression automatically and responds quickly to the user's customize and tuning request through a GUI.

In Specific coloration mode, CERAS has many advantages in fast-reading. From an estimation experiment, CERAS is effective for fast-reading of news articles, both in time and in accuracy in Specific coloration mode. And there is enough margin till a defect appears.

Still, there is room of precise estimation and examination, but this system has important significance as the tool that estimates the possibility of color expression of a document.

References

[William Winn, 1991] William Winn. *Color in Document Design*. IEEE Trans. Professional Commun., vol.34, no.3, pp.180-185, 1991.