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THE COLOR SCIENCE ASSOCIATION OF JAPAN

日本色彩学会第43回全国大会要旨集

会期：2012年5月25日-27日
会場：京都大学吉田南キャンパス

照明新時代シンポジウム：5件

口頭発表：51件

ポスター発表：35件

International Symposium：6件

International Conference：23件

会場案内
プログラム

色

7/8
Sunday

協会認定 **パーソナルカラーアドバイザー**

2012年 7月 8日 (日)

第19回 モジュール1 (初級・中級) マークシート

第15回 モジュール2 (上級) マークシート

2012年 11月18日 (日)

第19回 モジュール1 (初級・中級) マークシート

第15回 モジュール2 (上級) マークシート

11/18
Sunday

第4回 モジュール3 (技能認定試験・一部筆記) ~ モジュール3 は年1回
モジュール2 合格者に向けて実施... 2012年4月1日 (日)

● 最上級資格所得者に対し協会より

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特定非営利活動法人(NPO)

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日本色彩学会 第43回全国大会 **京都**'12

2012年5月25日(金) - 27日(日)

京都大学吉田南キャンパス (主会場)

<そのほか 京都大学百周年時計台記念館>

25日 冷泉邸見学会

シンポジウム：照明新時代～色彩のサイエンスとデザイン

研究発表：口頭・ポスター カラーデザイン発表：口頭・ポスター
国際コンファレンス：ポスター・ショートプレゼン 企業プレゼン
総会

26日

特別講演：日本人の色彩－冷泉流歌道と年中行事をめぐって
冷泉為人氏 (財団法人冷泉家時雨亭文庫 理事長)
懇親会 <関西日仏学館>

27日

国際シンポジウム：Color Science for Our Better Life
国際コンファレンス：口頭・ポスター
研究発表：口頭・ポスター
式典

◆ 企業展示・カラーデザイン作品展示・研究会特別展示：26-27日
研究発表：109件 (国際コンファレンスを含む)

THE COLOR SCIENCE ASSOCIATION OF JAPAN THE 43rd ANNUAL MEETING

May 25 (Fri) - 27 (Sun), 2012

Kyoto University (Yoshida South Campus)

● International Symposium < May 27 (Sun) >
"Color Science for Our Better Life"

Guest Speakers : Prof. Haisong Xu of Hangzhou University, China, Prof. Miho Saito of Waseda University, Japan, Prof. Lee Tien-Rein of Chinese Culture University, Taiwan, Prof. Young In Kim of Yonsei University, Korea, Prof. Pontawee Punggrassamee of Chulalongkorn University, Thailand, and Prof. Ken Sagawa of Japan Women's University, Japan.

● International Conference: 23 presentations

主催：日本色彩学会

運営：日本色彩学会第43回全国大会実行委員会 (担当：日本色彩学会関西支部)

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日本色彩学会
THE COLOR SCIENCE ASSOCIATION OF JAPAN

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The Effect of Illumination on Visual Acuity of Thai Characters for Billboard Advertising Design

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Keywords: Visual Acuity, Thai Characters, Billboard Advertising Design

1. Introduction

The usage of billboards is one of effective strategies in advertisements. According to a new market research report published by MarketsandMarkets, the global market of billboard advertising is expected to reach 12.5 billion dollar in 2016 at estimated CAGR of 5.7% from 2011 to 2016. Considering the fact that advertisements on billboards are largely visible, they are very effective in promoting goods or services. Several factors are said to be responsible for visual acuity: character types and size, achromatic and chromatic contrast, visual duration, visual distance and so on.¹⁻³⁾ So far various studies have been carried out to investigate the factors that influence visual acuity of Thai characters on billboards when they are observed under a difference of illumination levels. This study, hence, aims to explore the effects of illumination on visual acuity of Thai text stimuli for billboard advertising design.

2. Experiments

Three female of 22 years old took part in this experiment. All the subjects had normal or corrected to normal visual acuity. Each subject was screened for color deficiency using the Ishihara plate test.

Task I was to measure the minimal character size for visual acuity when observing under different

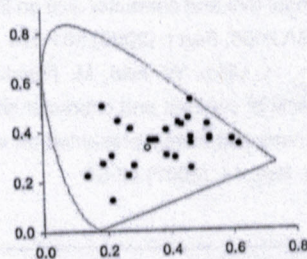


Figure 1. xy chromaticity coordinate of test stimuli (solid dot) and a substrate (opened dot) used in Task II.

illumination levels. A set of adjustable daylight type fluorescent lamp with relative color temperature at 6500K was used for setting up a room illumination. The illumination level set to 20, 80, 200, 800, and 1500 lx to cover the range of whole day illumination. Achromatic Thai characters used as test stimuli varied in different sizes of character height (4.2, 4.0, 3.8, 3.5, 3.0, 2.8, 2.6, 2.5, 2.3, 2.1, 1.9, 1.8, and 1.6 mm). Within each stimulus, 10 random characters of same size in the same line were presented in 5 illumination levels for subjects to read out and report. Each subject repeated 5 times of all experiment sessions.

Task II was devoted for investigating the effect of illumination on visual acuity in colored text. The colored texts included nine hues and one achromatic varied in three different lightness levels as shown in figure 1. Within each stimulus, 10 random characters of 4 mm in size were also presented in 5 illumination levels, as same as the illumination used in task I, for subjects to read out and report. Each subject repeated 5 times of all experiment sessions.

All stimuli in both tasks were printed on white vinyl substrate by screen printing process and subjects were asked for observation at 155 cm. of a viewing distance at subject's eye level.

3. Results and Discussions

The number of characters correctly read by subjects is accumulated as percentage of readable characters. Figure 2(a) shows the mean results with increasing character height. The results show that a higher font size results in a higher percentage of readable character. Our results agree with previous studies for PDA²⁾ and visual display terminal.³⁾

To investigate a possible variation of correct response score among different illumination levels, the 75% seeing curves of each subject were acquired and the threshold character size curve was analyzed. Figure 2(b) shows a result of the three

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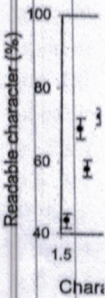


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shold character size in different illumination levels expressed on a logarithmic scale. As shown by the results, visual acuity was improved with increased illumination level. The lower size of character required a high illumination level for perfect visual acuity.

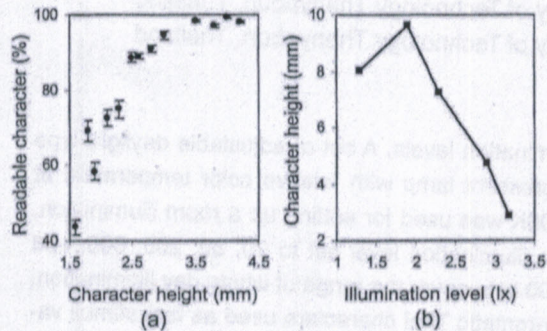


Figure 2. (a) mean of readable character in different sizes, (b) the 75% threshold character size curve of illumination in different sizes of character

Next, an effect of illumination on visual acuity in different colored character was explored. Figure 3 shows the mean of readable character plotted against the hue angles of colored character. The results revealed that the percentage of readable character was dropped on hue angle nearly 90°. This tendency occurred in all illumination levels. This implied that yellow character might be ineffective for white background.

Figure 4 shows that the higher the contrast ratio, the higher the percentage of readable character. This result indicates that contrast affects the visual acuity.

4. Conclusion

This study was undertaken to obtain the visual acuity in the different illumination levels in simulated billboard. It was found that visual acuity is improved with illumination. The effective character size for billboard design that is observed with 9 m. of viewing distance should be higher than 45 mm for dim illumination condition and 17 mm for bright illumination condition. In addition, the low lightness contrast between character and background might be kept away from design. The future study will include more subjects and more illumination conditions to investigate the effect of actual lighting up using in

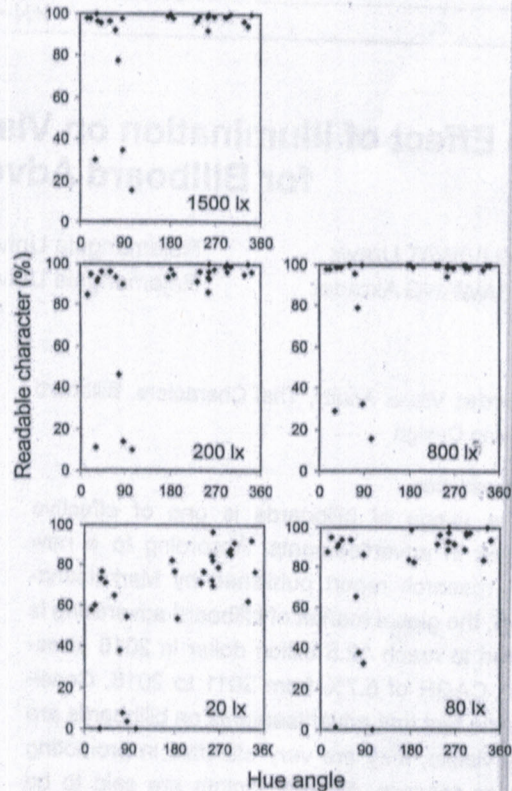


Figure 3. The results of visual acuity of colored character.

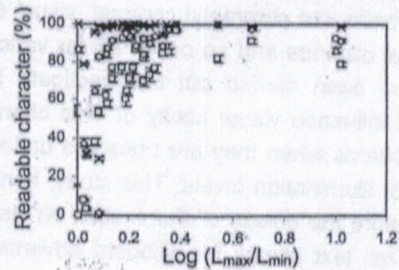


Figure 4. Mean of readable character plotted against the log of the contrast of the stimulus.

billboard advertising on visual acuity.

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