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Applying An Eye-Tracker To Study Effects Of Using Human Presenter In Product Image

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ABSTRACT

This study applies an eye-tracker to investigate effects of using human presenter in product images. Fixation duration of five different product images on e-commerce webpages were collected using Mirametrix S2 Eye Tracker. The five different product images are [2] using no human presenter in product image, [1] using male presenter with positive emotion (smiling face) in product image, [3] using male presenter with neutral emotion in product image, [4] using female presenter with positive emotion (smiling face) in product image, and [6] using female presenter with neutral emotion in product image. This study was conducted in a laboratory. The data was collected from 100 undergraduate students from Chulalongkorn Business School, Thailand. The result indicates that product image with positive emotion female presenter gets the highest fixation duration, however, not significantly higher than fixation duration of other types of product images.

Keywords: Human Presenter, Product Image, E-commerce, Eye-tracking, Fixation duration.

INTRODUCTION

Nowadays, technology has played an important role in medical, education, communication, and especially in marketing. If organizations use technology effectively, they will be able to create advantages over their competitors. Researchers use many tools for collecting data such as questionnaires and interviews. However, questionnaires and interviews may not be the most suitable tools for collecting eye-gaze data. On the other hand, eye-tracking devices such as Mirametrix S2 Eye-tracker have been used to collect such eye-gaze data.

S2 Eye-tracker is an eye-tracking technology by Mirametrix (http://www.mirametrix.com) which can collect eye-gaze data, provide important analysis tools, and record video of eye movements. Eye-tracking tools have been applied to studies in many different fields. However, because of the increased importance of e-commerce, in this study, S2 Eye-tracker by Mirametrix is applied to study effects of using human presenter in product image used in e-commerce webpages.

RESEARCH OBJECTIVES

This paper has three objectives which are:

1. To study how eye-tracking technology such as Mirametrix S2 Eye-tracker can collect eye-gaze data from visitors of e-commerce webpages.

2. To use the collected eye-gaze data from Mirametrix S2 Eye-tracker to calculate "fixation duration" or how long visitor spends looking at some specific areas of a webpage (area of interest, or AOI).

3. To compare fixation duration of five different product images on e-commerce webpages which are:

- Using no human presenter in product image.
- Using male presenter with positive emotion (smiling face) in product image.
- Using male presenter with neutral emotion in product image.
- Using female presenter with positive emotion (smiling face) in product image.
- Using female presenter with neutral emotion in product image.

RESEARCH METHODOLOGY

Research Tools

There are three research tools in this study.

1. S2 Eye-tracker and Viewer by Mirametrix (http://www.mirametrix.com), as shown in Figure 1. S2 Eye-tracker is a portable hardware device that is put below the computer screen. It calibrates almost instantly and holds calibration well. Viewer is software for recording an eye tracking session. It works in the background to create a video of the screen, with red dots for tracking the eye, showing where the user is looking at that moment in time. Viewer can also save the eye-gaze data as an XML or CSV document for later processing. In this study, eye-gaze data is collected in CSV document.

Figure 1 – S2 Eye-tracker by Mirametrix
(http://www.mirametrix.com/wp-content/uploads/2013/03/Desktop-Eye-Tracker-copy.png)

2. Five e-commerce webpages, with five different product images as mentioned earlier, but same design and content in each pages, as shown in Figure 2, 3, 4, 5, and 6.

Figure 2 – Webpage using no human presenter in product image.

Figure 3 – Webpage using male presenter with positive emotion (smiling face) in product image.

Figure 4 – Webpage using male presenter with neutral emotion in product image.

Figure 5 – Webpage using female presenter with positive emotion (smiling face) in product image.

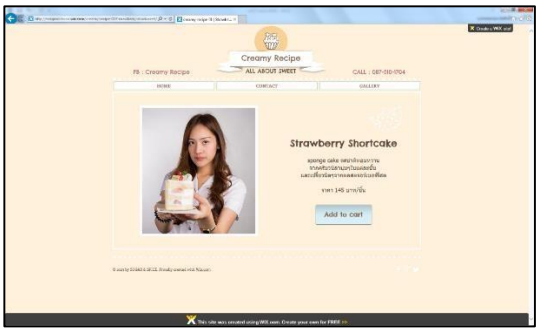

Figure 6 – Webpage using female presenter with neutral emotion in product image.

3. Questionnaire for collecting participants' data. This questionnaire is divided into four parts. The first part is used to collect demographic data such as gender, age, and experiences with Internet shopping. The second part collects participants' vision condition, usual or unusual (such as Myopia, Hyperopia, or Astigmatism). The third part is to double check if each participant really looks at the webpage or not (by asking something specific about the product on webpages). And the final part is to ask participants about product (cake) purchase behavior such as how often he/she buys the product, reasons why he/she buys the product, his/her opinions about using human presenter in product image, and so on.

Procedure

Nielson (2006) suggested using about 20 subjects when collecting usability data. Since we have five different product images to compare in this study, we collect data from 100 participants (20 subjects x 5 different product images). We conducted this study in these following steps:

1. The information about this research was announced to students. Each volunteer participant made appointment with his/her convenient date and time. For the data collection process, data can be collected from one person at a time.

2. Each participant came to his/her appointment.

3. Participant listened to an explanation about the study and steps of data collection before starting the data collection process. Then, if the participant agreed, he/she signed the consent form allowing us to use his/her data in the study.

4. Participant adjusted his/her seat in front of the computer with S2 Eye-tracker. Then, we set Eye-tracker in accordance with participant's seat for reducing error in data collection.

5. We started the program called "Tracker", as shown in Figure 7, to calibrate participant's eye gaze accurately and precisely before starting data collection. Participant looked at each of the 9 points appearing on the computer screen. After that, program displayed participant's eye-gaze result. As shown in Figure 8, average error value (Ave err.) should be less than 80, the acceptable score. If not, we have to redo the calibration process until average error value becomes less than 80.

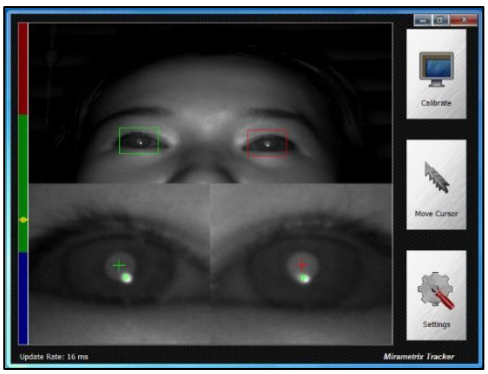

Figure 7 – Tracker

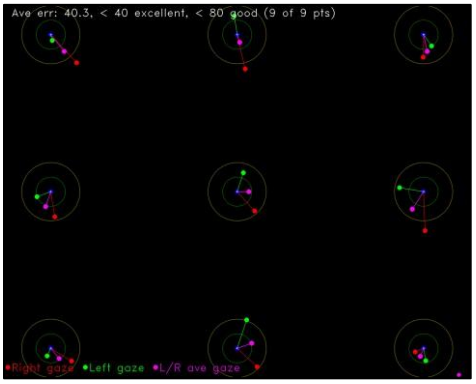

Figure 8 – Calibration Result

6. After calibration was finished, we ran another program called "Viewer" to record participant's eye-gaze data in CSV document and participant's fixation trace video. Then, we asked each participant to view an e-commerce webpage. When the participant finished working with the webpage, we stopped recording eye-gaze-data and participant's fixation trace video.

7. Lastly, participant was asked to fill in the questionnaire to collect participant's demographic data, as well as other data and opinions for the study.

Measurements

In this study, participants were asked to view e-commerce webpages. We were interested in participants' fixation duration when they looked at product images on our experiment webpages. Hence, we defined product image on webpages as our area of interest (AOI). After data collection from Eye-tracker was finished, we filtered participants' fixation data in CSV document to calculate fixation duration of each participant for product image or our area of interest (AOI).

Participants

One hundred volunteer participants who were undergraduate students from Chulalongkorn Business School participated in this study. A summary of demographic information of 100 participants is shown in Table 1. The participants were 75.0% female, average age of 20.4 years old, and 71.0% of them had Internet shopping experience.

Table 1 – Respondents' demographic information.

Demographics	Distribution
Gender	25.0% male, 75.0% female
Age	Average age of 20.4 years old
Internet shopping experience	29.0% No shopping experience 71.0% With shopping experience

RESULTS

As mentioned earlier, there are five e-commerce webpages, with five different product images in this study, one product image on one webpage. The 100 volunteer participants were divided into 5 groups, one group for one product image (or one webpage). So, 20 participants (5 males, 15 females) were assigned to one product image. In group 1, participants viewed the e-commerce webpage using no human presenter in product image. In group 2, participants viewed the e-commerce webpage using male presenter with positive emotion (smiling face) in product image. In group 3, participants viewed the e-commerce webpage using male presenter with neutral emotion in product image. In group 4, participants viewed the e-commerce webpage using female

presenter with positive emotion (smiling face) in product image. And group 5, participants viewed the e-commerce webpage using female presenter with neutral emotion in product image.

Table 2 – Average Fixation Duration for Five Groups

Product Image	Average Fixation Duration (Second)	Standard Deviation
No human presenter	3.988	2.260
Male presenter with *positive* emotion.	3.820	2.466
Male presenter with *neutral* emotion.	4.378	2.188
Female presenter with *positive* emotion.	5.107	3.534
Female presenter with *neutral* emotion.	5.031	2.463

As shown in Table 2, the result indicates that product image with female presenter showing positive emotion (smiling face) gets the highest average fixation duration. However, product image with male presenter showing positive emotion (smiling face) gets the lowest average fixation duration. Then, we used Analysis of Variance (ANOVA) to compare the average of fixation duration between five different product images at the 0.05 significance level. The result of ANOVA indicates that fixation duration of product image with female presenter showing positive emotion is not significantly higher than fixation duration of other four types of product images.

In Table 3, we re-grouped participants into three groups using gender of presenters. The three groups include [2] no human presenter, [1] male presenter, and [3] female presenter. The result shows that product image with female presenter gets the highest average fixation duration and product image with no human presenter gets the lowest average fixation duration. Then, we used Analysis of Variance (ANOVA) to compare the average of fixation duration between three different groups at the 0.05 significance level. The result of ANOVA indicates that fixation duration of product image with female presenter is not significantly higher than fixation duration of other two groups of product images.

Table 3 – Average Fixation Duration: Grouped by Gender of Presenter

Product Image	Average Fixation Duration (Second)	Standard Deviation
No human presenter	3.988	2.260
Male presenter	4.099	2.319
Female presenter	5.069	3.007

Table 4 – Average Fixation Duration: Grouped by Emotion Expression of Presenter

Product Image	Average Fixation Duration (Second)	Standard Deviation
No human presenter.	3.988	2.260
Human presenter with *positive* emotion.	4.464	3.078
Human presenter with *neutral* emotion.	4.704	2.323

In Table 4, we re-grouped participants into three groups using emotion expression of presenter. The three groups are [2] no human presenter, [1] presenter with positive emotion (smiling face), and [3] presenter with neutral emotion. The result shows that product image with human presenter expressing neutral emotion gets the highest average fixation duration and product image with no presenter gets the lowest fixation duration. Then, we used Analysis of Variance (ANOVA) to compare the average of fixation duration between three different groups at the 0.05 significance level. The result of ANOVA indicates that fixation duration of product images with human presenter expressing neutral emotion is not significantly higher than fixation duration of other two groups of product images.

Table 5 – Average Fixation Duration: Grouped by Human Presenter Usage

Product Image	Average Fixation Duration (Second)	Standard Deviation
No human presenter	3.988	2.260
Human presenter	4.584	2.712

As shown in Table 5, product image with human presenter gets higher average fixation duration than product image with no human presenter. Then, we used t-test to compare the average of fixation duration between product image with no human presenter and product image with human presenter at the 0.05 significance level. The result indicates that fixation duration of product image with human presenter is not significantly higher than fixation duration of product image with no human presenter.

DISCUSSION OF RESULTS

In this experimental study, the results from Mirametrix S2 Eye-tracker shows that product image with female presenter expressing positive emotion (smiling face) gets the highest fixation duration, but not significantly higher than fixation duration of other types of product images. When grouping by gender of the presenter, the result suggests that product image with female presenter gets the highest fixation duration. When grouping by emotion expression of presenter, the result indicates that product image with human presenter expressing neutral emotion gets higher average fixation duration then other groups. As shown in Table 2, product image with female presenter expressing positive emotion gets the highest fixation duration, product image with male presenter expressing positive emotion gets the lowest fixation duration. So, the average fixation duration of product images with human presenters expressing positive emotion is less than the average fixation duration of product images with human presenters expressing neutral emotion. And finally, when grouping by human presenter usage, the result suggests that product image with human presenter gets higher fixation duration than product image without human presenter. Results from ANOVA and t-test all indicate that there is no significant differences between different groups of product images. This can be because the product image position on the experiment webpage is in the center of the page and the size of product images are quite large. Hence, participants in the study would look at the product images no matter what types of product images they are. However, most participants suggest in the questionnaire that they prefer product image with female presenter expressing positive emotion (smiling face).

CONCLUSION AND LIMITATIONS

From this study, we can conclude that S2 Eye-tracker and Viewer by Mirametrix can be used for eye-gaze data collection and data collected from the study in CSV document can be analyzed for further statistical conclusion. However, there are some limitations using S2 Eye-tracker for collecting eye-gaze data as follow:

1. We found problems when participants wore eyeglasses. S2 Eye-tracker detected some reflective points of eyeglasses, instead of participants' eyes.

2. We found that sometimes S2 Eye-tracker crashed during collecting eye-gaze data. We suspected that it happened after using S2 Eye-tracker continuously for some period of time. So, we had to find more than 100 participants in order to get usable 100 sets of eye-gaze data.

FUTURE RESEARCH

The results show that five product images are not different significantly. This may be because product image or our area of interest (AOI)'s size is quite large and has its position in the center of the webpage. Most people would look at this product image area no matter what type of product images they are. So, future research can try to change area of interest to other positions of webpage.

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