論 文 の 内 容 の 要 旨

論文題目 Search and Communication Based on Affective Understanding of Fonts and Images
(画像とフォントの印象理解に基づく検索・コミュニケーション支援)

氏　　名 崔　セミ

Graphic elements, such as images and fonts, are good visual communication media. These media convey a variety of information, and they affect one's emotional state. A photo of sunset creates a feeling of warmth, and a text with the font Times New Roman would look professional. With the growth of World Wide Web, significant amount of images and fonts have been shared via on-line communities. Many studies have proposed applications that support users to search images and fonts in the large database, but few studies considered affect.

Motivated by these observations, we aim at modeling systems that understand affective signals in image and font and proposing applications where the analyzed affective signals can be used. In this thesis, we explore the answers to the following research questions: (1) How to model a system that predicts affects in images and fonts without a large dataset to learn (2) How to improve user engagement in searching with ambiguous and noisy dataset? This thesis explores answers to these questions as follow:

1) Image impression retrieval: Conventional image retrieval systems ask users to input query by text. However, it is not always easy for users to convert their intention into verbal representations. In Chapter 3, we propose an interactive retrieval system based on yes-no questions for image impression retrieval. We modeled a system that interprets images with impression words such as fresh and modern. Then, we introduce a yes-no question based querying method and a feedback interface to support users querying.

2) Font emotion understanding: Different fonts create different experience. Many researchers in marketing field studied the effect of fonts in advertisement, but few researchers studied emotional effects of font. In Chapter 4, we demonstrate the effect of fonts on viewers' emotional state by two experimental studies --- explicit study and implicit study. In explicit study, we measure the

response to fonts using a questionnaire method. In implicit study, we measure unconscious responses to fonts by analyzing spontaneous speeches that elicited by different fonts.

3) Font communication on mobile messenger: Instant messaging is a popular form of text-based communication. However, text-based messaging lacks the ability to communicate nonverbal signals such as facial expressions and tones of the voice. In Chapter 5, we propose Emotype, a mobile messenger application prototype that enables users to change the font of their message to communicate emotions. In user test, we demonstrate the feasibility of fonts for communicating emotions, and understand user experience with the application.

4) Font search by image: One of the important aspects in graphic design is choosing the font of the caption that matches aesthetically the associated image. In Chapter 6, we present two font search systems that enable users to use images as queries - (1) query by image impressions based on color study and (2) query by image contents based on concept analysis. Instead of matching font and image directly, we mapped both image and font to color-based semantic space or concept-based semantic space. Our evaluation results show that the recommended fonts scored better than other comparisons and provides competing results with the ones chosen by experienced graphic designers.

5) Creativity support in graphic design: Inspiration plays an important role in the creative process. By getting inspired, we can reach unexpected but useful ideas. Inspiration, generally, comes to us when we interact with external interventions. In Chapter 7, we present a framework that assist users' interactions in font search with unexpected but useful concepts generated by multimodal learning. By examining the results of the model that change with various inputs, we observed that the model produces promising results that appeared to be useful for inspiring users.

In this thesis, we aim at modeling systems that understand affective signals in image and font and proposing applications where the analyzed information can be used. Especially, we see machines as a medium for affective interaction between users, and focus on studying the interactional influence of the system to users to make users be pleased in the affects-aware systems.