

Title	Eye-makeup Guidance System Based on Eye-shape Analysis
Author(s)	王, 寒歌
Citation	
Issue Date	2021-12
Type	Thesis or Dissertation
Text version	author
URL	<a href="http://hdl.handle.net/10119/17604">http://hdl.handle.net/10119/17604</a>
Rights	
Description	Supervisor: 宮田 一乘, 先端科学技術研究科, 修士(知識科学)

## Abstract

Eye makeup plays an important role in facial makeup. However, it is a difficult task for common users with few experiences in makeup to accomplish perfectly. Therefore, the user often seeks makeup tutorials from video sites or other social medias, but these tutorials are often difficult to match to personal facial features. It is known that there is a significant relationship between eye shape and eye makeup, which means a good eye makeup should fit the shape of the eyes well. In this thesis, we proposed an interactive system based on the analysis of user's eye shape which can help less-experienced users in makeup draw eye makeup that suits their own eye shape features.

We reviewed the research about makeup guidance in recent years. Among them, it is a common approach that provides corresponding makeup suggestions based on the user's facial features. In addition, there are lots of related approaches that show the virtual makeup effect on the user's face in real-time as a reference. We compared these approaches and found that for inexperienced users in makeup, it is more intuitive and effective to provide eye-makeup recommendations and guidance based on facial features.

We conducted eye shape classification, and extracted the features of the eye contour and compared it with several typical eye shapes, which is an effective way to classify eye shapes in contrast previous studies. In this study, we summarized shape features of different typical eye shapes: almond eyes, round eyes, downturned eyes, close-set eyes, etc. Based on these features, we designed a classification model to obtain the label of the user's eye shape features by inputting three feature values of the user's eyes: eye aspect ratio, toward of eye's outer corner, and eye distance.

In addition, we investigated and studied several typical eye makeup styles and their features. Based on the eye feature points obtained from the system, we reproduced the eye makeup styles and displayed them on the user's eyes in real-time as guidance to support the user completing the eye makeup.

We designed and conducted an evaluation experiment to verify the feasibility of the proposed system, then discussed users' evaluations of various aspects of the system. We compared and analyzed the effects of eye makeup drawn by users in two conditions: without using the system and using the system. We found that the proposed system can effectively help people with less makeup experience to draw a better eye-makeup that suits their eye shape. Besides, from the collected participants' feedbacks, we noticed that the system can also help users understand their eye features and improve their eye-makeup skills.

To improve the user experience of our system and help users draw makeup, we discussed and summarized the limitations of our system and the possible feature works. In this study, the recognition model could not effectively identify the eyelids when the system recognized the user's eye contour, thus may decrease the classification accuracy of the user's actual eye shape. To solve this issue, we plan to build a novel dataset containing images of eyes with labeled eyelid shapes and train a machine learning model to optimize the effect of eye shape recognition. Furthermore, some participants indicated that our system provided few eye makeup styles, which may not be suitable for some rare eye shapes, so we need to design more eye makeup styles as guidance in the future to meet the more needs.