Evaluation of Townscape Colours in Kyoto Using Kansei and Colour Harmony Models

Yuichiro KINOSHITA*, Eric W. COOPER*, Yukinobu HOSHINO*, Katsuari KAMEI*

*Department of Human and Computer Intelligence, Ritsumeikan University

1. INTRODUCTION
We have proposed a colour planning support system to improve townscapes. The system offers colour combination proposals based on the evaluation of three elements: colour harmony, impression of the townscape, and cost for changing the colours. In this paper, we demonstrate the evaluation of townscape colours in Kyoto using Kansei and colour harmony models [1], which are the main components of the proposed colour support system.

2. COLOUR HARMONY MODEL
This model evaluates townscape colours from the approach of colour harmony. Moon and Spencer proposed equations to calculate an aesthetic measure $M$ for colour harmony [2]. In their measure, colour combinations having $M>0.5$ are considered desirable. We applied their colour harmony equations to townscapes. At this time, we only considered building colours in a townscape and excluded other elements such as plants or the sky. The equations are intended for the use of general designs. We conducted model evaluations to make sure that the colour harmony equations are applicable to street colours as well. The correlation coefficient for subject response and model output was $r=0.55$ for 20 responses. This result indicates that the colour harmony equations are applicable to townscapes.

3. KANSEI EVALUATION MODEL
A Kansei evaluation model was constructed with the Kansei engineering approach. The input to the model is townscape colours and the output is impressions of the townscape. First, we conducted evaluation experiments for 20 subjects to investigate the relationship between impression and townscape colours. We used 100 colour picture samples and twelve adjectives, such as warm or elegant, to express impressions of the townscapes. We constructed the model using a neural network for every adjective. 62 sets of experiment results were selected for the training data of the neural networks. After the construction, we tested the model performance. The results gave proof that our Kansei model has adequate ability to evaluate the town impression.

4. EVALUATION OF TOWNSCAPE COLOURS IN KYOTO
We evaluate townscapes in Kyoto using our models. Kyoto is Japan’s old capital city and has many historical districts. Townscape colours in those districts are controlled by landscape conservation regulations. Here we chose townscapes of Shinbashi St. and Hanami-koji St. in Gion district for evaluation targets. We took pictures of the streets and extracted wall colours, roof colours and window frame colours of each building. We use these colours as the input to the models. Figure 1 shows the front view of the target townscapes.

The colour harmony model output very high score for both of the townscapes. It means those townscape colours are adequately aesthetic. The Kansei model evaluated both townscapes as calm, comfortable, quite and conservative, but the evaluation showed that Shinbashi St. is much more conservative and calmer. Those impressions express the features of Kyoto city. Hanami-koji St. was evaluated as slightly unrefined while Shinbashi St. had a refined impression. The colours of the centre building in Figure 1(b), different slightly from the others, are perhaps giving the impression of unrefined in this case.

Figure 1: Townscapes in Gion district, Kyoto.

References