



Relative Features for Photo Quality Assessment

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Aesthetic Quality Assessment of Consumer Photos

Given a gallery of photos and the associated human ratings, design a grader that evaluates the aesthetic visual quality of an image.

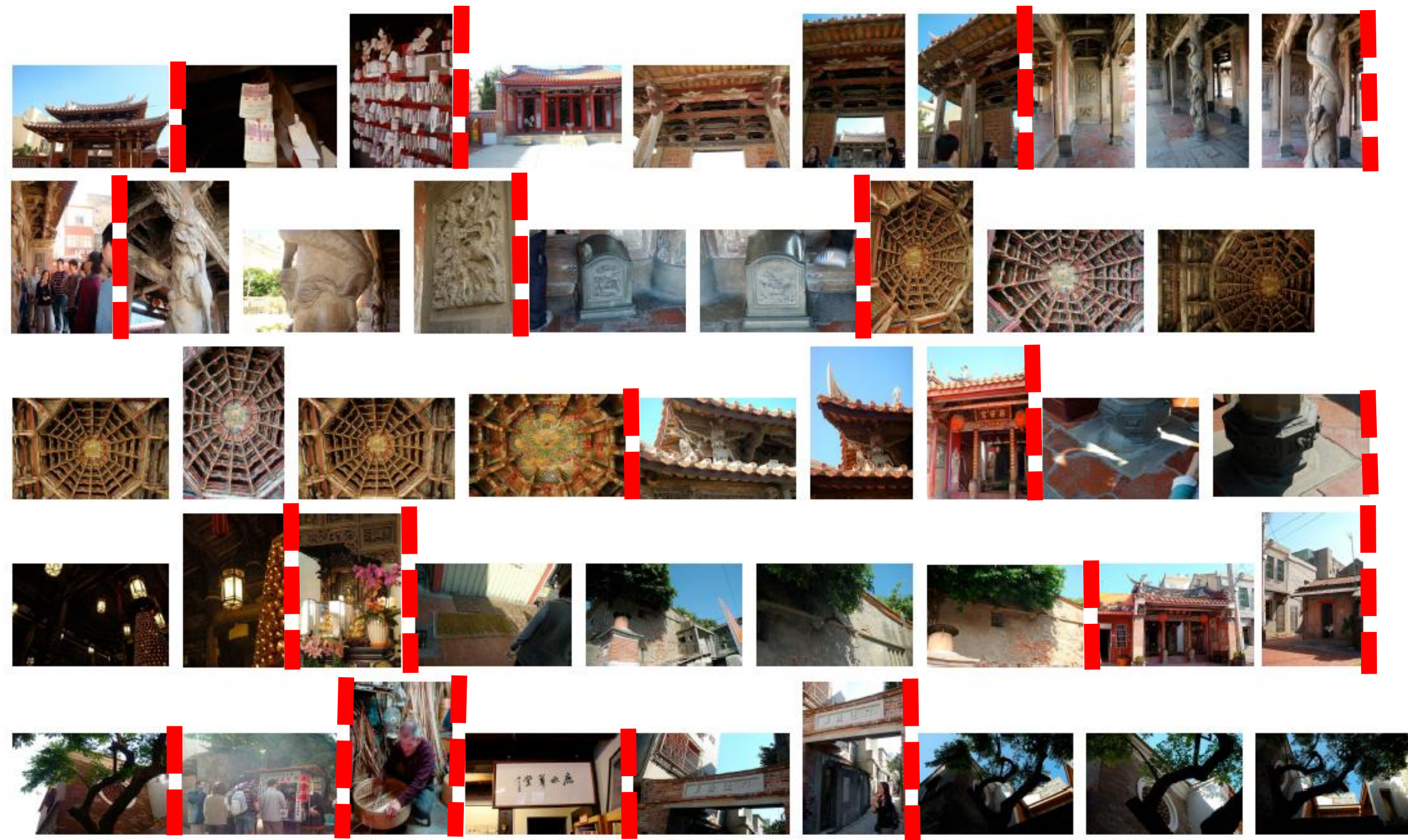
CONTRIBUTIONS

- Exploring the use of multiple images as basic atoms for rating photos
- Introducing the relative features: simple, computational efficient
- Demonstrating the benefits of group evaluation through experiments



RELATIVE FEATURES

1. Preprocessing: form a photo group of a same scene
2. Feature computation



The computation of relative features is performed *on a group basis!*

Input: m photos, type- k features $\{f_1, f_2, \dots, f_m\}$
Output: type- k relative features $\{r_1, r_2, \dots, r_m\}$

$$r_i = \begin{cases} \frac{\sum_{j \neq i} f_j - f_i}{m-1}, & \text{if } m > 1 \\ f_i, & \text{otherwise} \end{cases}$$

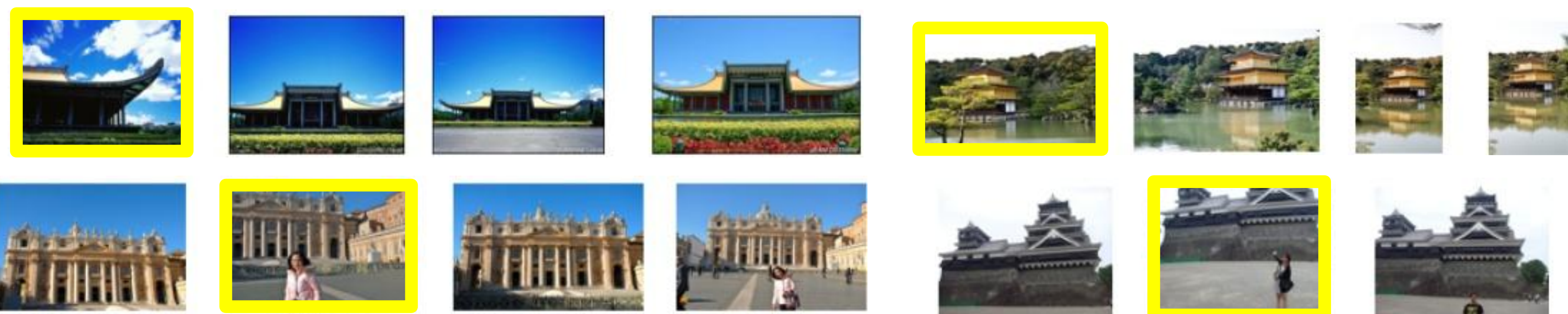
EXPERIMENTS

1. Incompleteness Detection

Dataset: 85 travel photos, organized in 22 groups

Feature: The number of *common keypoints* an image contains (A common keypoint is identified if it has sufficient matched SIFTs among images in a group.)

Result: **84.7%** detection rate



2. Aesthetic Quality Assessment of Photos

Dataset: 309 personal photos, organized in 50 groups

Ground truth: 25 participants score the photos in the dataset

Feature: Rule of thirds, golden ratio, clarity, intensity balance, saturation, hue, and MPEG-7 texture descriptor

We used support vector regression (ϵ -SVR) to map feature statistics to a photographic quality score.

| Features | Kendall's Tau-b |
|---|-----------------|
| Rule of Thirds (f_1) | -0.0377 |
| Golden Ratio (f_2) | -0.0256 |
| Clarity (f_3) | -0.0377 |
| Intensity Balance-LR (f_4) | 0.0398 |
| Intensity Balance-UD (f_5) | 0.0412 |
| Saturation (f_6) | 0.0667 |
| Hue (f_7) | 0.0488 |
| Combined $\{f_1, \dots, f_7\}$ | 0.2061 |
| Relative $\{f_1, \dots, f_7, r_1, \dots, r_7\}$ | 0.2535 |
| {Texture} | 0.2196 |
| {Texture, f_3 } | 0.2378 |
| {Texture, f_3, r_3 } | 0.2812 |
| Acquino, ACM MIR 2010 | -0.0364 |
| Yeh et al., ACM MM 2010 | 0.0376 |

Results were obtained using 5-folds cross validation.

1. **Using multiple similar photos is effective for rating photo aesthetics.**
2. **Relative features: simple, require no training phase, and fast to compute.**

CONTACT

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