1. MOTIVATION

- Why image composition is important?
  Answer: For better image aesthetics [1,2]
- So far, previous arts focus on custom measures for evaluation of image composition [3,4,6]
- However, spatial distribution of image saliency plays dominant role for image aesthetics [2]!
- Learning spatial distribution of saliency instead of hand-tuned measurements.

2. MODELING PHOTO COMPOSITION

Step1. Saliency extraction and vectorization

Training Image → Image saliency (Harel et al.[7]) → High dimensional vector

Step2. Principal component analysis

The 18 principal components

Step3. EM based Gaussian mixture modeling

3. PHOTO RE-ARRANGEMENT

Find cropping parameter $\tau$ for saliency $S \in \mathbb{R}^2$

$$
\tau_{MAP} = \arg\max_{\tau} P(S_\tau | \mathcal{N}, \mathcal{B})
= P(\mathcal{N} | S_\tau) P(\mathcal{B} | S_\tau) P(S_\tau)
$$

where

$$
P(\mathcal{N} | S_\tau) = \sum_{k=1}^{K} w_k \mathcal{N}(S_\tau | \mu_k, \Sigma_k)
$$

How much $S_\tau$ fits to model

$$
P(\mathcal{B} | S_\tau) = \frac{\sum_{x \in \mathcal{C}(S_\tau)} S(x)}{\sum_{x \in \mathcal{C}(S_\tau)} S(x)}
$$

How much saliency distributes in central region of $S_\tau$ [5]

4.1 PHOTO COMPOSITION

4.2 CONVERT PHOTOGRAPH STYLE

5. CONCLUSION AND FUTURE WORK

- An implicit method for photo composition evaluation
- Application to photo re-arrangement
- Developing a general system that converts an arbitrary image into a specific photographic style.

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7. REFERENCES