

Abstract

In order to handle the increasing amount of collected image and video data, we propose to summarize this data based on human interest. First, we analyze what humans find interesting. Then, we propose summarization algorithms for various applications.

What is human interest?

Literature

Berlyne [1] (1960): Interest is influenced by:

- Novelty
- Uncertainty
- Conflict
- Complexity

Biederman and Vessel [2] (2006): Model based on perceptual pleasure. Interesting when:

- Novel
- Comprehensible
- Natural rather than man-made

Our experiments

Using our data and [3] we found:

- High consistency across individuals ($\rho=0.63$)
- 3 main causes of interest:

- **Unusualness**
- **Aesthetics**
- **General preferences** (Scene types)

Also important are:

- Famousness
- Making happy

Actual memorability and interestingness are negatively correlated.



Figure 2. Example images

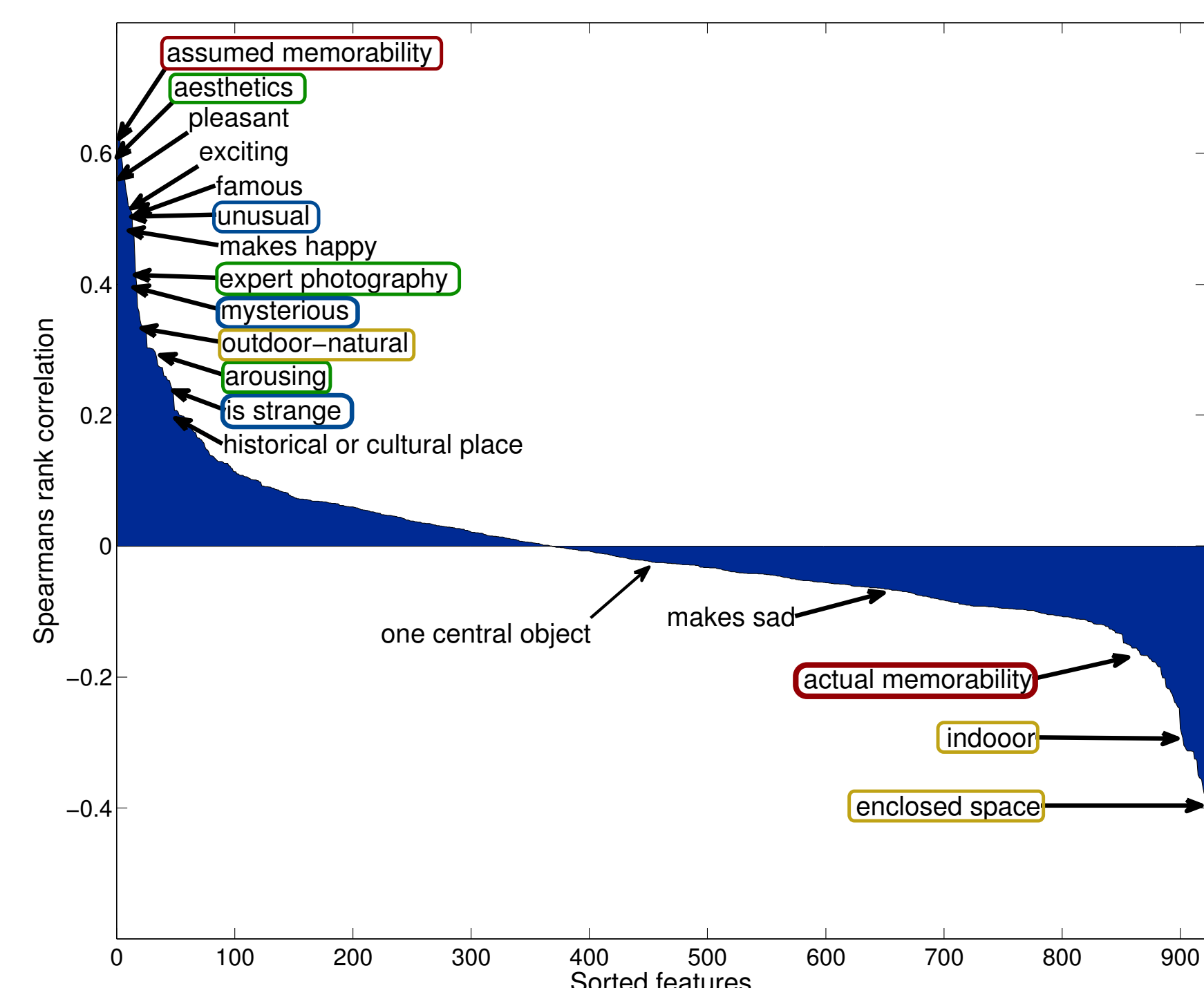


Figure 3. Correlations of interestingness

Application: Image scoring/classification

Method

Features

- 1) **Unusualness**
 - Global outliers
 - Composition of parts
- 2) **Aesthetics**
 - Colorfulness
 - Arousal
 - Complexity
 - Contrast
 - Edge distribution
- 3) **General preferences**
 - SVM on GIST
 - SVM on Spatial pyramid
 - SVM on color histograms

Final interestingness

- Whitening
- Linear model
- Feed-forward feature selection

Results

Strong

Context

Weak

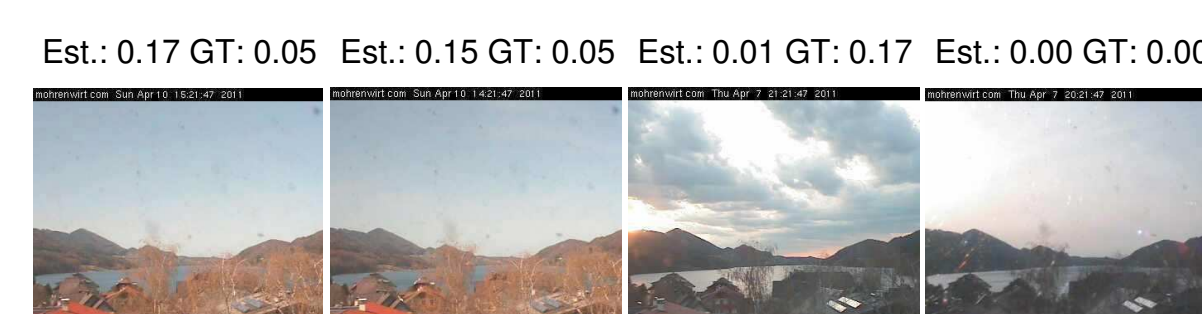
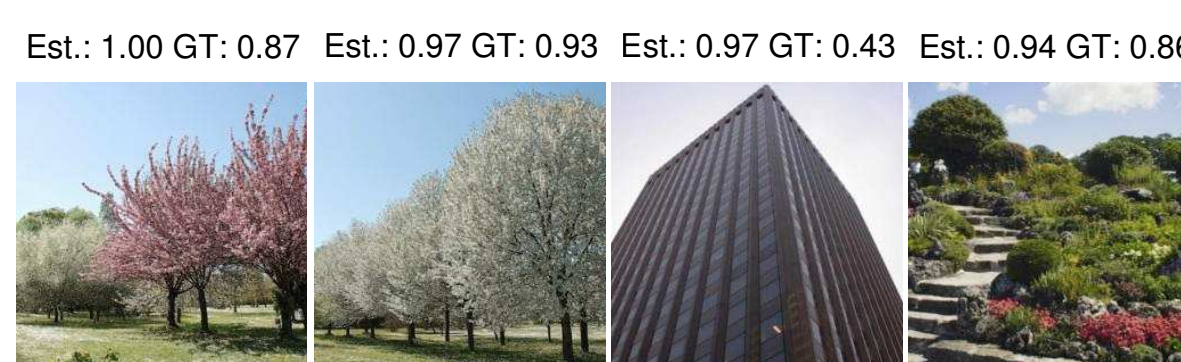
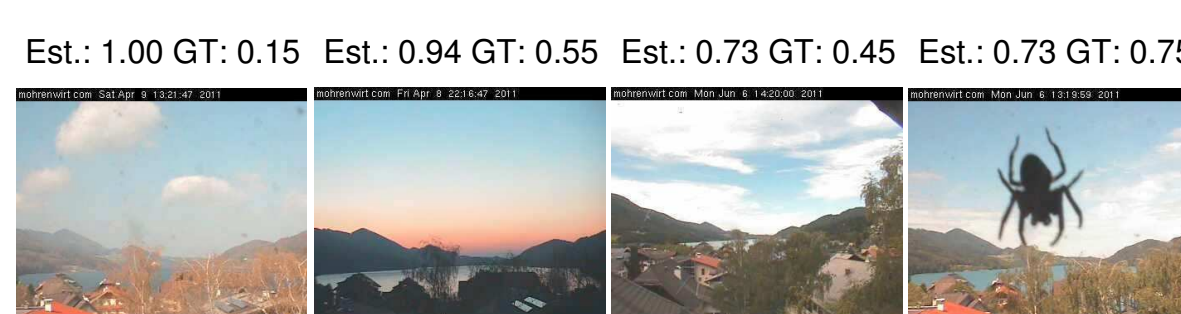
Webcams

8 Scene categories

Arbitrary images

Predicted high interestingness

Predicted low interestingness



Publication: M. Gygli, H. Grabner, H. Riemenschneider, F. Nater, L. Van Gool - The Interestingness of Images - ICCV 2013

Application: Video Summarization

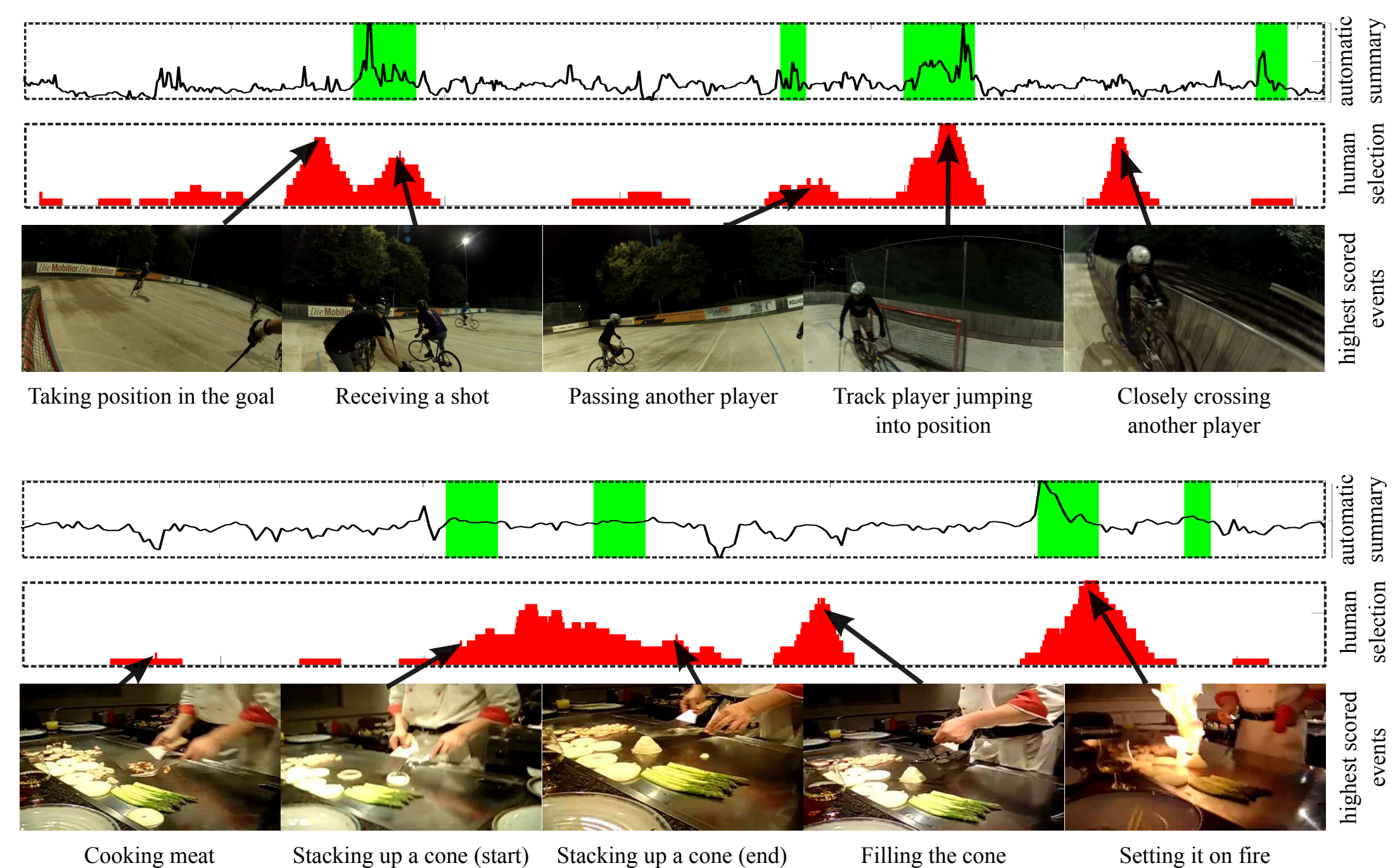
Method for the summarization of user videos

- 1) Novel segmentation tailored for user videos
 - Inspired by editing theory
- 2) Features for summarization
 - Capturing interesting aspects of the video
 - low-, mid-, high-level features
- 3) Knapsack optimization to generate a summary
- 4) New benchmark
 - 25 user videos
 - Annotated with multiple reference summaries
 - Automatic evaluation inspired by text summarization approaches [5]

Results

Mean f-measure:

- Humans: 100%
- Chance: 45%
- Baseline [6]: 54%
- Ours: **75%**



Current work

References

- [1] D. Berlyne. *Conflict, arousal, and curiosity*. McGraw-Hill (1960)
- [2] I. Biederman and E. Vessel. *Perceptual Pleasure and the Brain*. American Scientist (2006)
- [3] P. Isola, J. Xiao, A. Torralba, A. Oliva. *What makes an image memorable?* CVPR (2011)
- [4] E. Vessel, N. Rubin. *Beauty and the beholder: Highly individual taste for abstract, but not real-world images*. J. of Vision (2010)
- [5] Ani Nenkova and Kathleen McKeown. *Automatic Summarization Foundations and Trends in Information Retrieval* (2010)
- [6] N. Ejaz et al. *Efficient visual attention based framework for extracting key frames from videos*. Signal Processing: Image Communication(2013)