Predicting Viewer Affective Comments Based on Image Content in Social Media

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Viewer Affect Concepts in Social Multimedia

This paper focuses on predicting what viewer affect concepts will be evoked after affect content in image is perceived. For example, given an image tagged with the concept "yummy food" by the publisher (PAC), the viewers are likely to comment "delicious" and "hungry," referred to as viewer affect concepts (VAC). To the best of our knowledge, this is the first work explicitly distinguishing intended publisher affect concepts and induced viewer affect concepts associated with social visual content, and aiming at understanding their correlations.

Applications

- **A**: "cute" → Image recommendation
- **B**: "wonderful," "nice," "cute," "adorable," ... → Viewer affect concept prediction
- **C**: "Wonderful shot! Love the cute one." → Comment robot

Probabilistic PAC-VAC Correlation Model

- Measuring PAC-VAC Co-occurrences:
  \[
P(p_i | v_j ; \theta) = \frac{\sum_{d_l} B_k P(v_j | d_l)}{\sum_{d_l} P(v_j | d_l)}, \quad B_k: \text{presence of } p_i \text{ in the metadata of } d_l
  \]

- Recommending images by Multivariate Bernoulli formulation:
  \[
P(d_i | v_j ; \theta) = \prod_{l=1}^{L} \left( P(p_i | d_l) P(v_j | d_l) + (1 - P(p_i | d_l))(1 - P(v_j | d_l)) \right)
  \]
  Visual-based detection score of \(p_i\) in \(d_l\)

- Predicting VACs for the given image by Bayes probabilistic model:
  \[
P(v_j | d_i ; \theta) = \frac{P(v_j | d_i ; \theta) P(d_i | v_j ; \theta)}{P(d_i | \theta)}
  \]

Viewer Affective Comment Prediction

- PAC and the evoked VAC are correlated

Experiments

- Image Recommendation for Targeted VACs
- Viewer Affect Concept and Comment Prediction

Conclusion and Future Work

- Propose to model the probabilistic correlations between affect content in an image and the evoked viewer affect concepts.
- Propose three novel applications including image recommendation for targeted viewer affect concepts, viewer affect concept detection and automatic commenting.
- Potentially benefit advertising, user profiling, propaganda and human-machine interaction.