

Predicting Viewer Affective Comments Based on Image Content in Social Media

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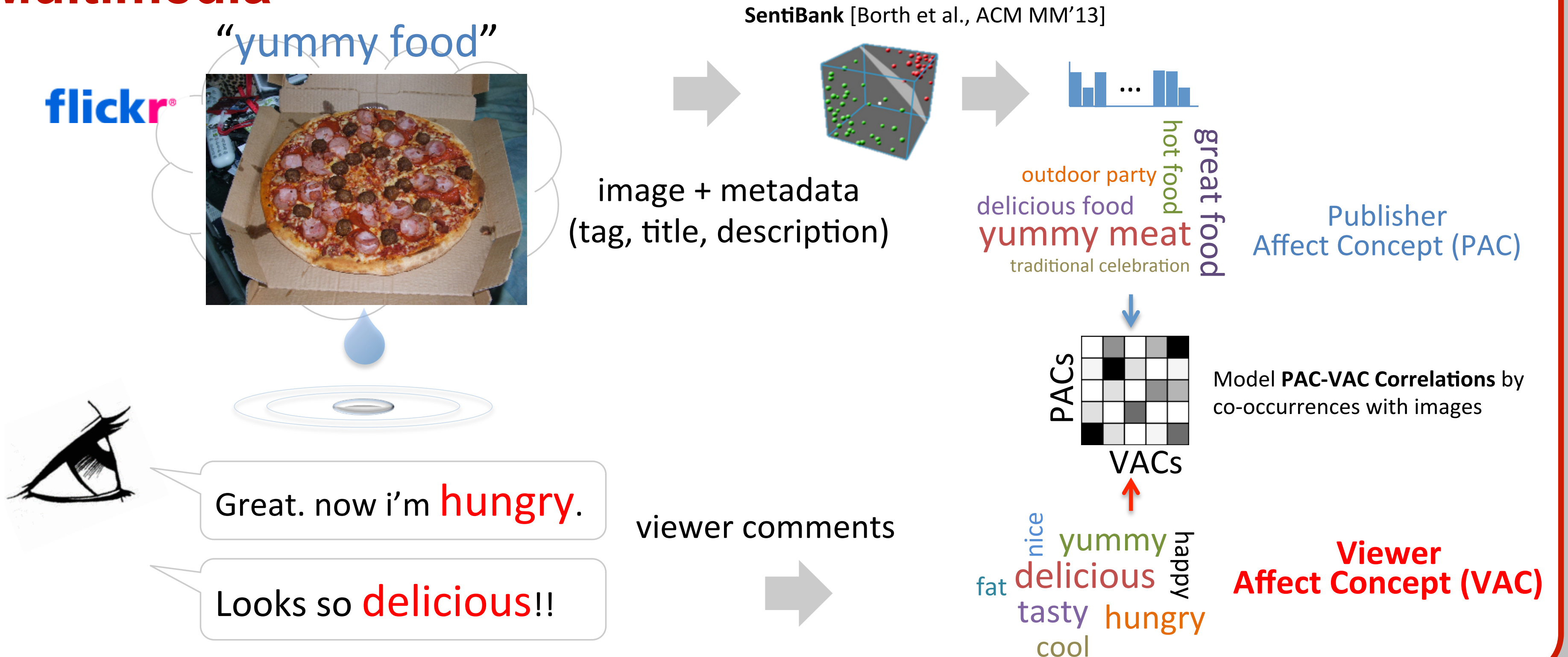
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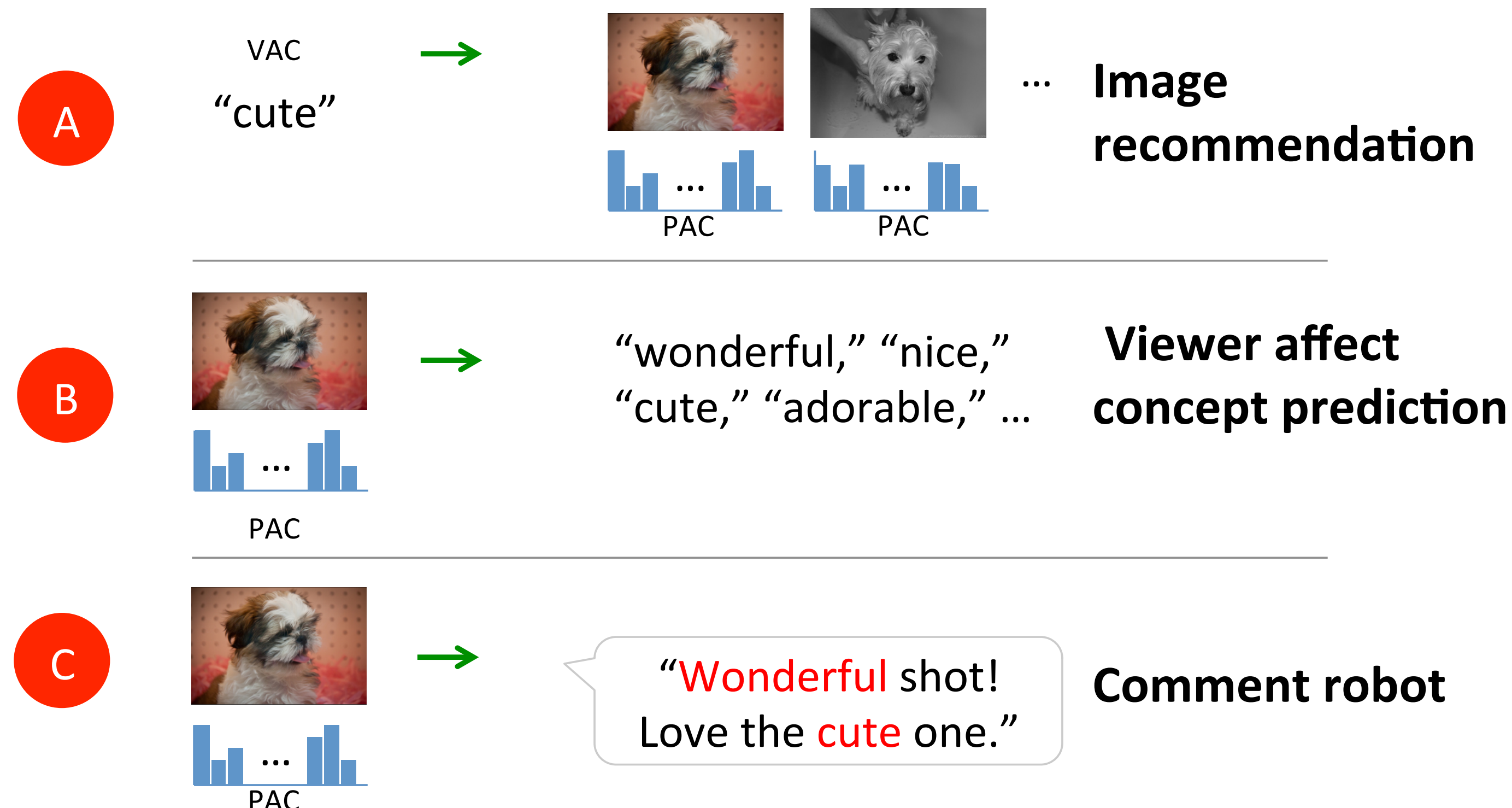


Viewer Affect Concepts in Social Multimedia

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



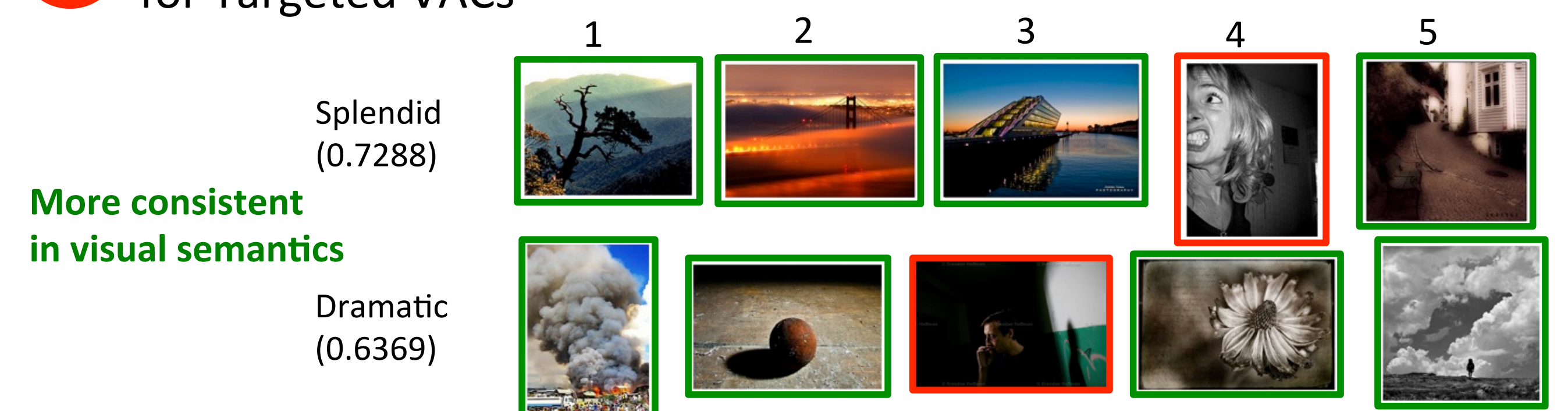
Experiments

PAC	#1 VAC	#2 VAC	#3 VAC
tiny dog	cute	adorable	little
weird dog	weird	funny	cute
crazy cat	hysterical	crazy	hilarious
cloudy morning	ominous	serene	dramatic
dark woods	mysterious	spooky	moody
powerful waves	dynamic	powerful	sensational
wild water	dangerous	dynamic	wild
terrible accident	terrible	tragic	awful
broken wings	fragile	poignant	poor
bright autumn	bright	delightful	lovely
creepy shadow	creepy	spooky	dark
happy halloween	spooky	festive	scary
pretty flowers	delicate	joyful	lush
fresh leaves	fresh	green	vibrant
wild horse	wild	majestic	healthy
silly girls	sick	funny	cute

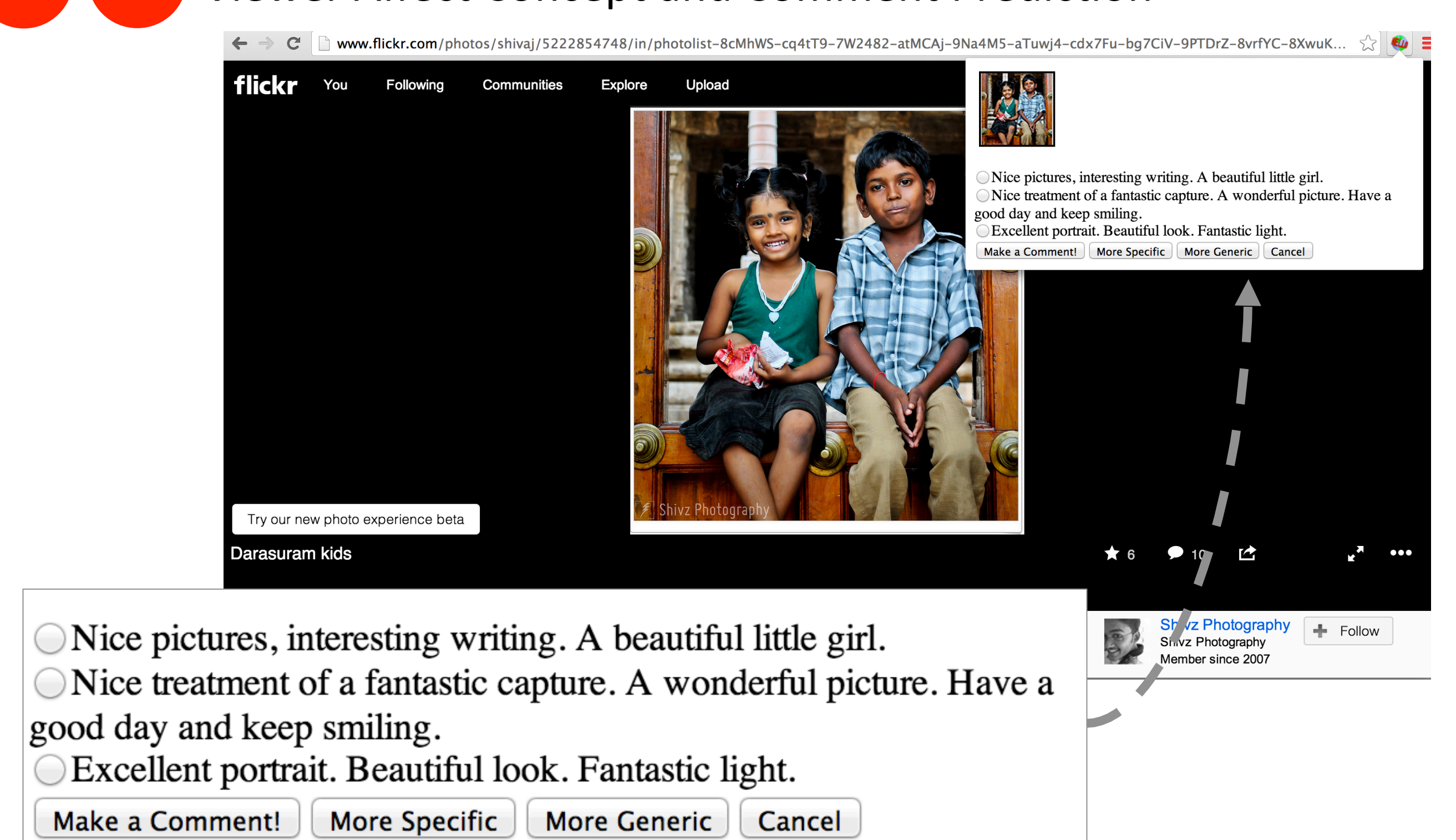
PAC and the evoked VAC are correlated

PAC and the evoked VACs may present opposite sentiment

A Image Recommendation for Targeted VACs



B C Viewer Affect Concept and Comment Prediction



Probabilistic PAC-VAC Correlation Model

- Measuring PAC-VAC Co-occurrences:

$$P(p_k | v_j; \theta) = \frac{\sum_{i=1}^{|D|} B_{ik} P(v_j | d_i)}{\sum_{i=1}^{|D|} P(v_j | d_i)}, \quad B_{ik}: \text{presence of } p_k \text{ in the metadata of } d_i$$

A - Recommending images by Multivariate Bernoulli formulation:

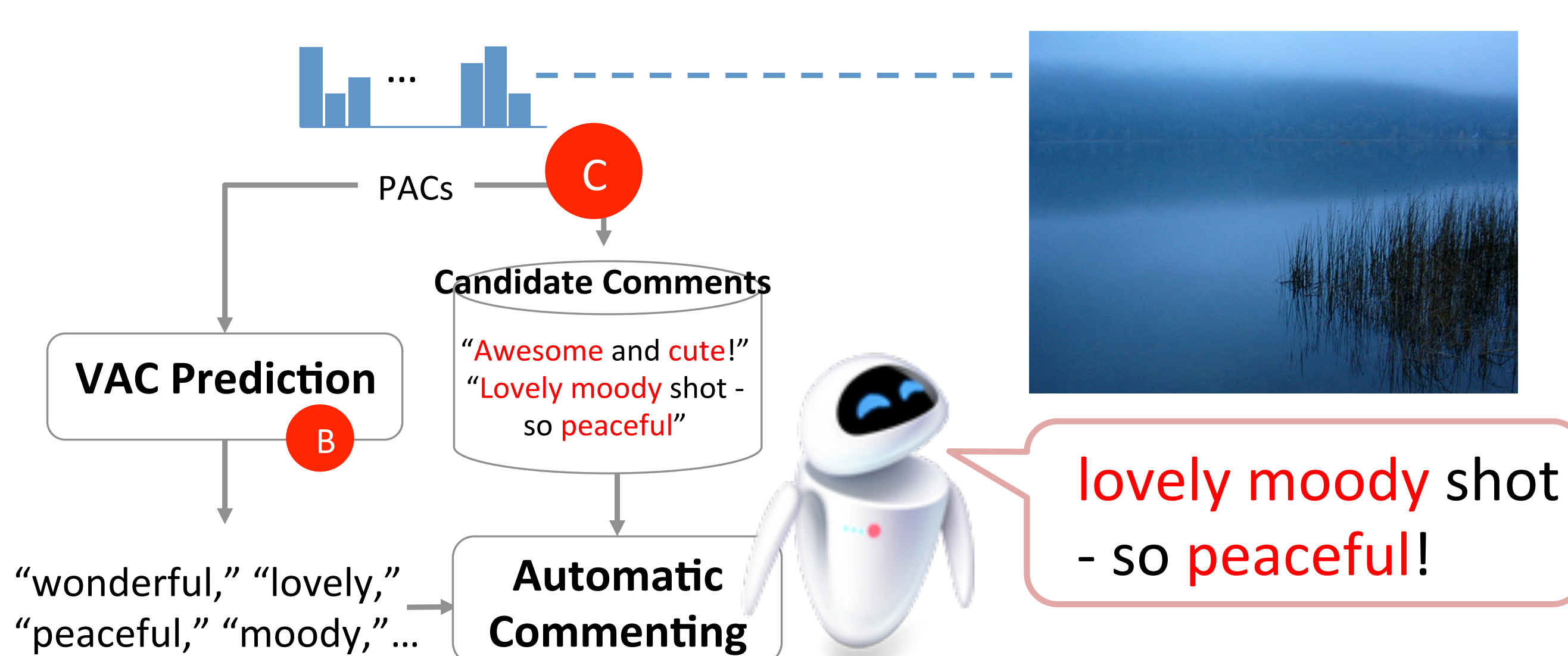
$$P(d_i | v_j; \theta) = \prod_{k=1}^{|A|} (P(p_k | d_i) P(p_k | v_j; \theta) + (1 - P(p_k | d_i)) (1 - P(p_k | v_j; \theta)))$$

Visual-based detection score of p_k in d_i

B - Predicting VACs for the given image by Bayes probabilistic model:

$$P(v_j | d_i; \theta) = \frac{P(v_j | \theta) P(d_i | v_j; \theta)}{P(d_i | \theta)}$$

Viewer Affective 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.