

Overview

Motivation

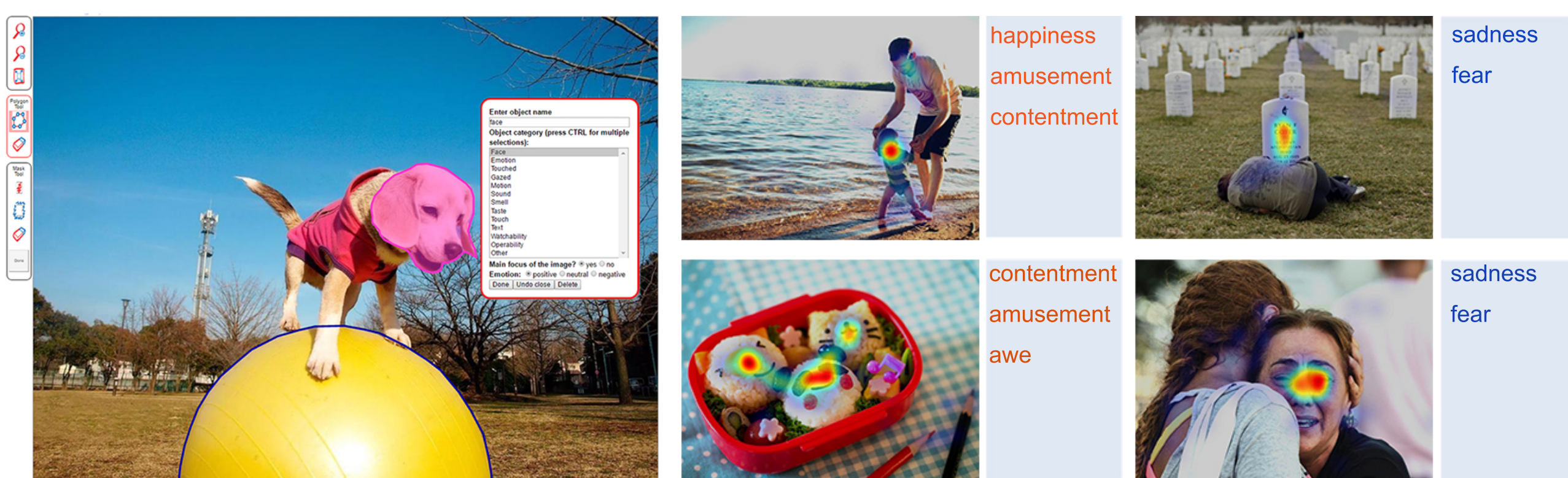
- Human visual attention generally prioritizes emotional elements over neutral ones.
- Computational models have not yet systematically measured the influence of emotional cues on visual attention, partly due to the lack of a proper dataset with both emotional content and eye tracking data.

EMOtionAl Attention Dataset (EMOAd)

- A collection of 1019 emotion-eliciting images
- Eye tracking data of 16 observers.
- Segmentation of 4302 objects.
- Extensive annotations regarding emotion, objects, semantics, and scenes.

Sentiment Categories

- Positive: 839
- Neutral: 2429
- Negative: 1034

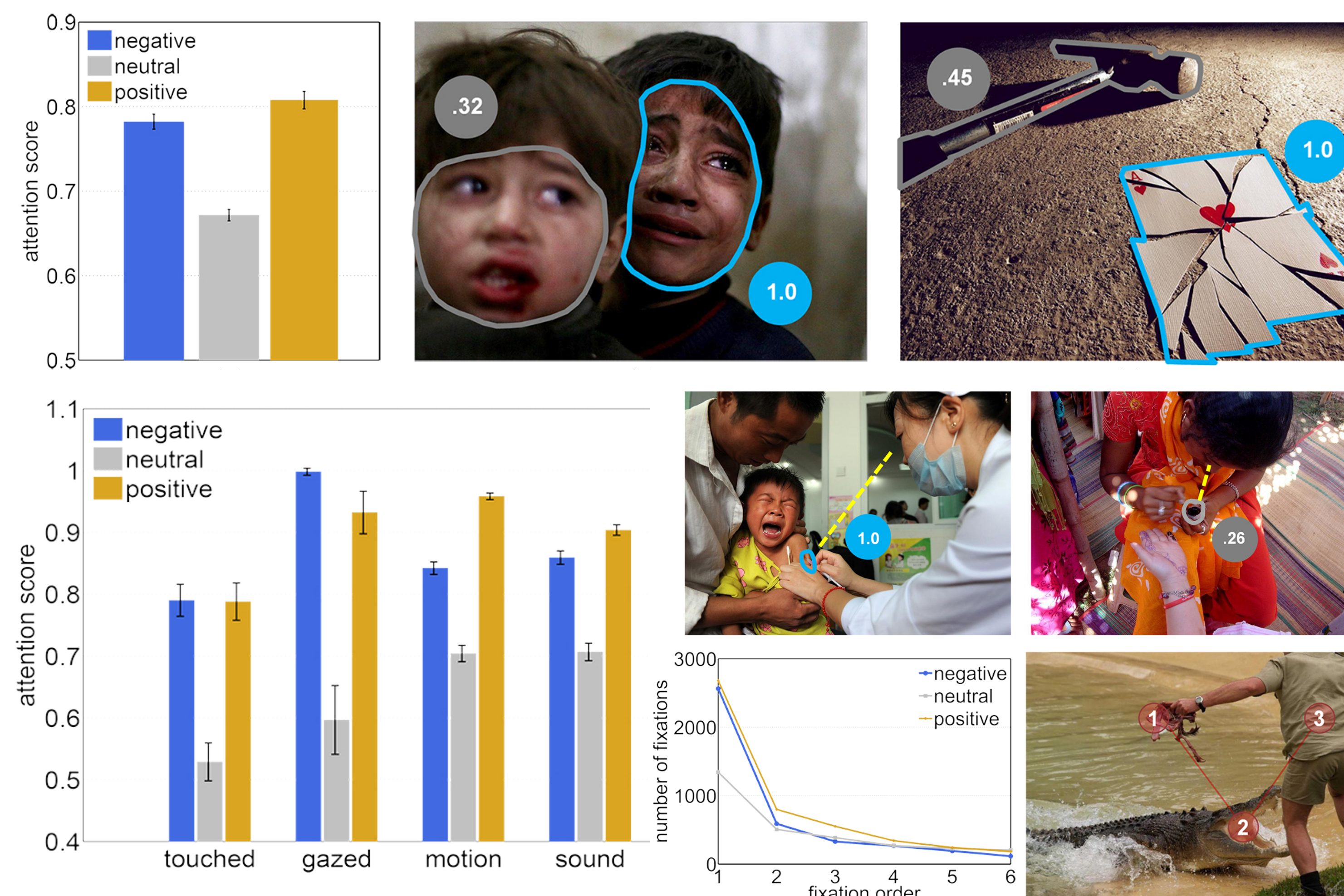


Type	Category	Description	Object No.	Image No.
Directly relate to humans	Face (emotional)	Faces with obvious emotional expressions.	899	422
	Face (neutral)	Faces without obvious emotional expressions.	890	443
	Gazed	Objects gazed upon by a human or animal.	111	92
	Touched	Objects touched by a human or animal.	322	244
Relate to other (nonvisual) human senses	Sound	Objects producing sound (e.g., people talking)	995	667
	Smell	Objects with a scent (e.g., a flower, a cup of coffee).	386	309
	Taste	Food, drink, etc.	104	54
	Touch	Notably tactile objects (e.g., a sharp knife).	664	570
To attract attention or to interact with humans	Text	Digits, letters, words, and sentences.	360	169
	Wachability	Objects made to be viewed (e.g., pictures, traffic signs).	186	78
	Operability	Natural or man-made objects held or used with hands.	689	445
Imply motion	Motion	Moving objects, includes gesturing humans/animals.	955	672

Attribute type	Detailed attributes
Emotions [4, 12]	Happiness; Surprise; Awe; Excitement; Amusement; Contentment; Sadness; Anger; Fear; Disgust
Self-Assessment Manikin [11]	Valence; Arousal; Dominance
Semantics [6]	Familiarity; Unusualness; Dynamics; Informativeness; Natural object combination
Aesthetics [8, 3]	Aesthetics; High quality; Colorfulness; Natural color combination; Sharpness
Spatial layout [10]	Have objects of focus; Single object focus; Close-up shot; Centered; Symmetry
Naturalness [5]	Photorealism
Related to people [5]	Attractive person; Posing; Eye contact; Positive expression

Key Observations from Eye-Tracking Studies

Emotion Prioritization Effect: Emotional elements attract human attention strongly and rapidly. A positive or negative sentiment strongly increases an object's odd of catching the first fixation.

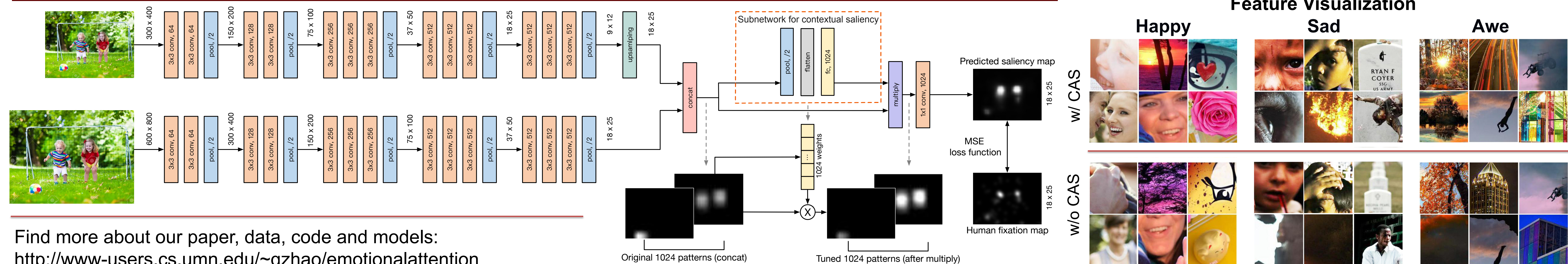


Results

Metric	EMOAd					CAT2000				
	CASNet	N-CASNet	SALICON	SalGAN	ML-Net	CASNet	N-CASNet	SALICON	SalGAN	ML-Net
AUC-Judd	0.83	0.82	0.82	0.83	0.82	0.82	0.81	0.80	0.81	0.79
AUC-Borji	0.80	0.79	0.80	0.80	0.76	0.79	0.77	0.78	0.80	0.73
sAUC	0.78	0.77	0.78	0.78	0.74	0.76	0.74	0.75	0.77	0.70
NSS	1.75	1.61	1.59	1.74	1.74	1.50	1.36	1.35	1.45	1.31
IG	1.58	1.48	1.45	1.13	1.21	0.46	0.30	0.27	0.08	0.04
CC	0.66	0.61	0.59	0.66	0.62	0.58	0.52	0.52	0.56	0.49
SIM	0.58	0.55	0.53	0.58	0.56	0.57	0.53	0.52	0.53	0.51
EMD	2.66	3.04	3.02	2.76	2.84	2.42	2.89	2.86	3.21	3.08
KL	5.54	5.61	5.67	5.83	5.78	5.82	5.93	6.03	6.08	6.08



Context-Aware Saliency Network (CASNet)



Find more about our paper, data, code and models:
<http://www-users.cs.umn.edu/~qzhao/emotionalattention>