Adventures in emotion recognition

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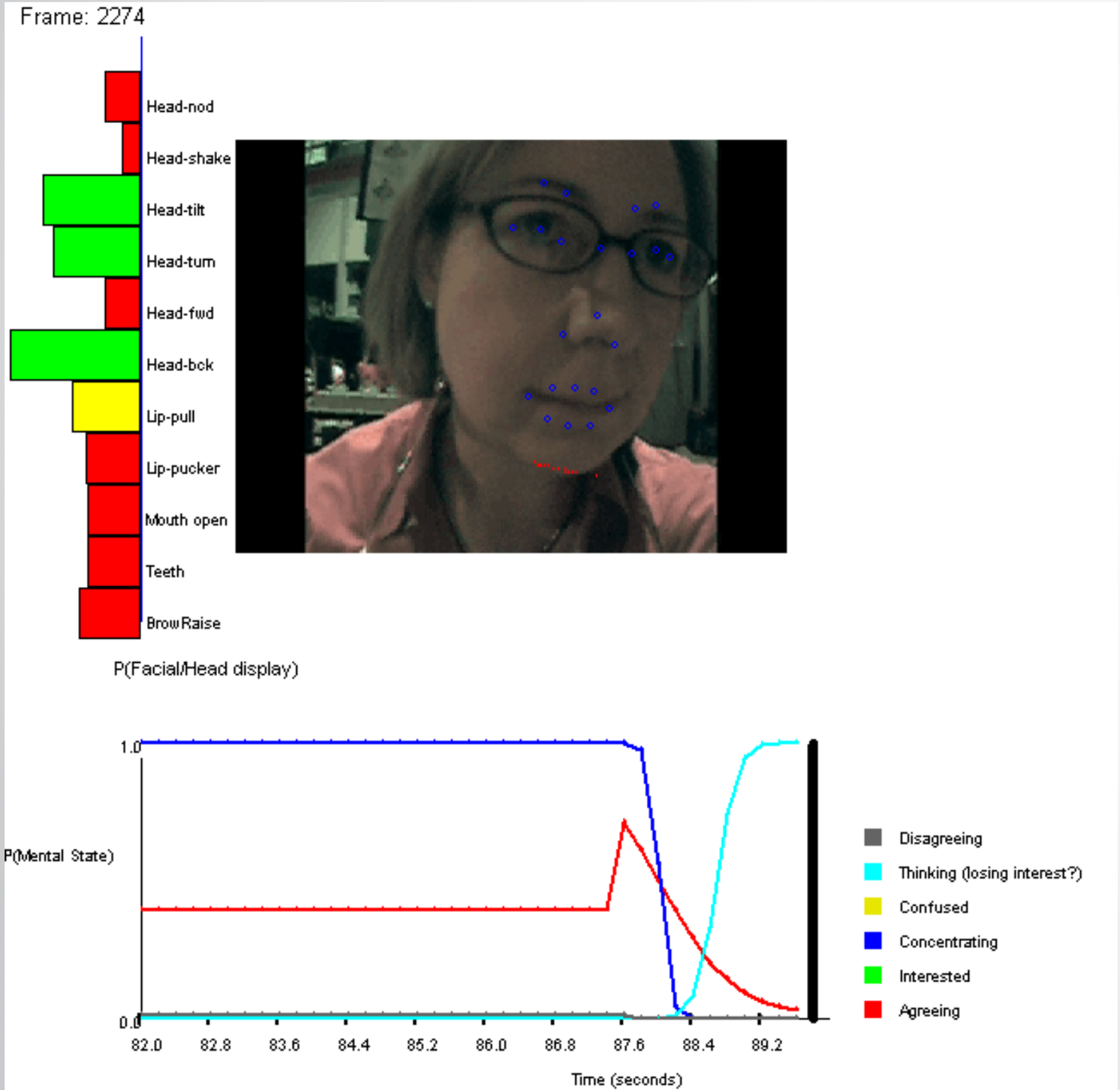
Goal: Help people on the autism spectrum

Tools to learn about social-emotional expressions

Collaboration with Groden Center in Providence, RI

Monologue detector (Mono-logger)



"Can you give us something that tells us when to back off?"
-Adults w/Aspergers

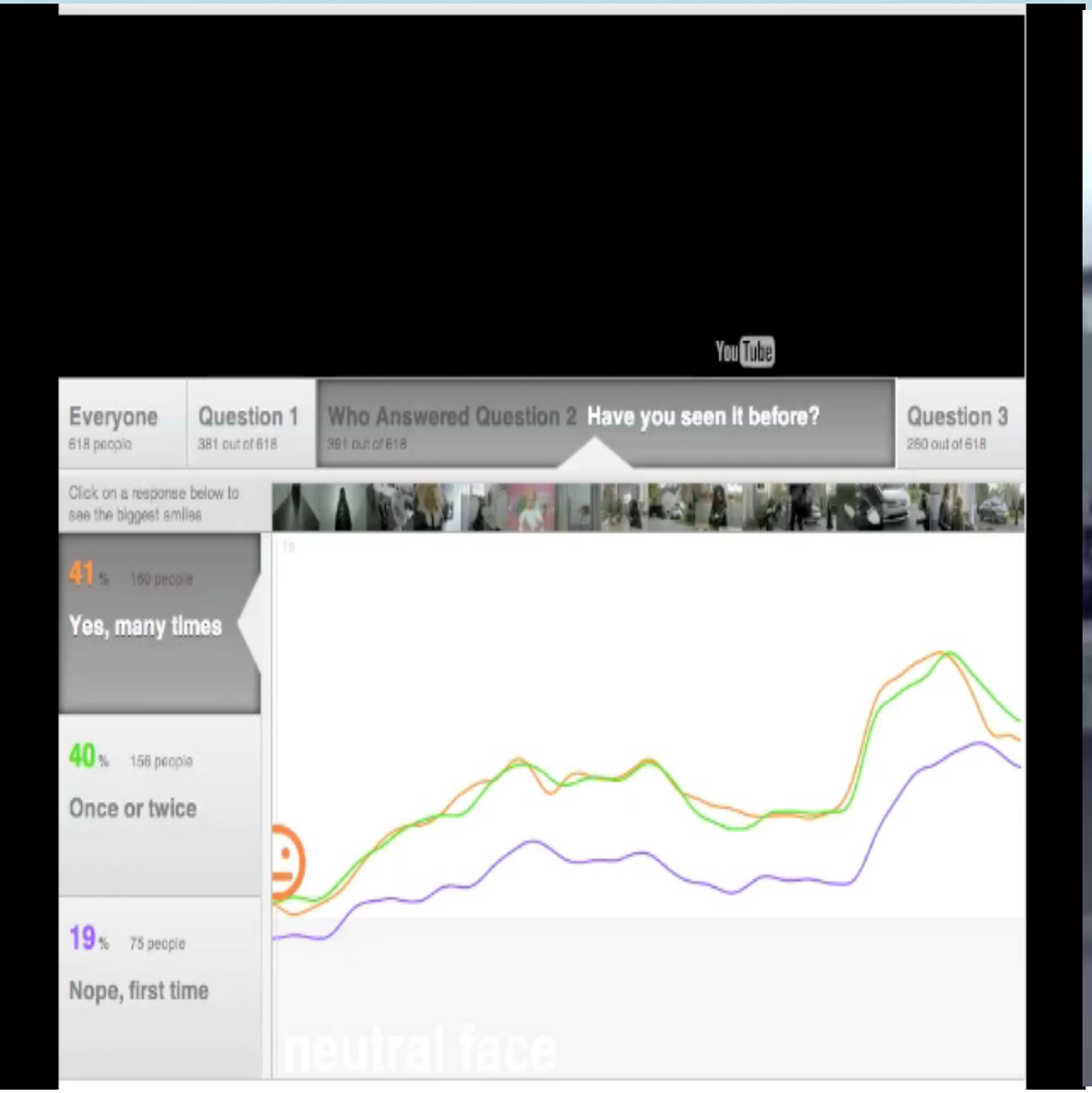
Visualize expressions of interest, boredom, turn-taking patterns and couple with dialogue and features

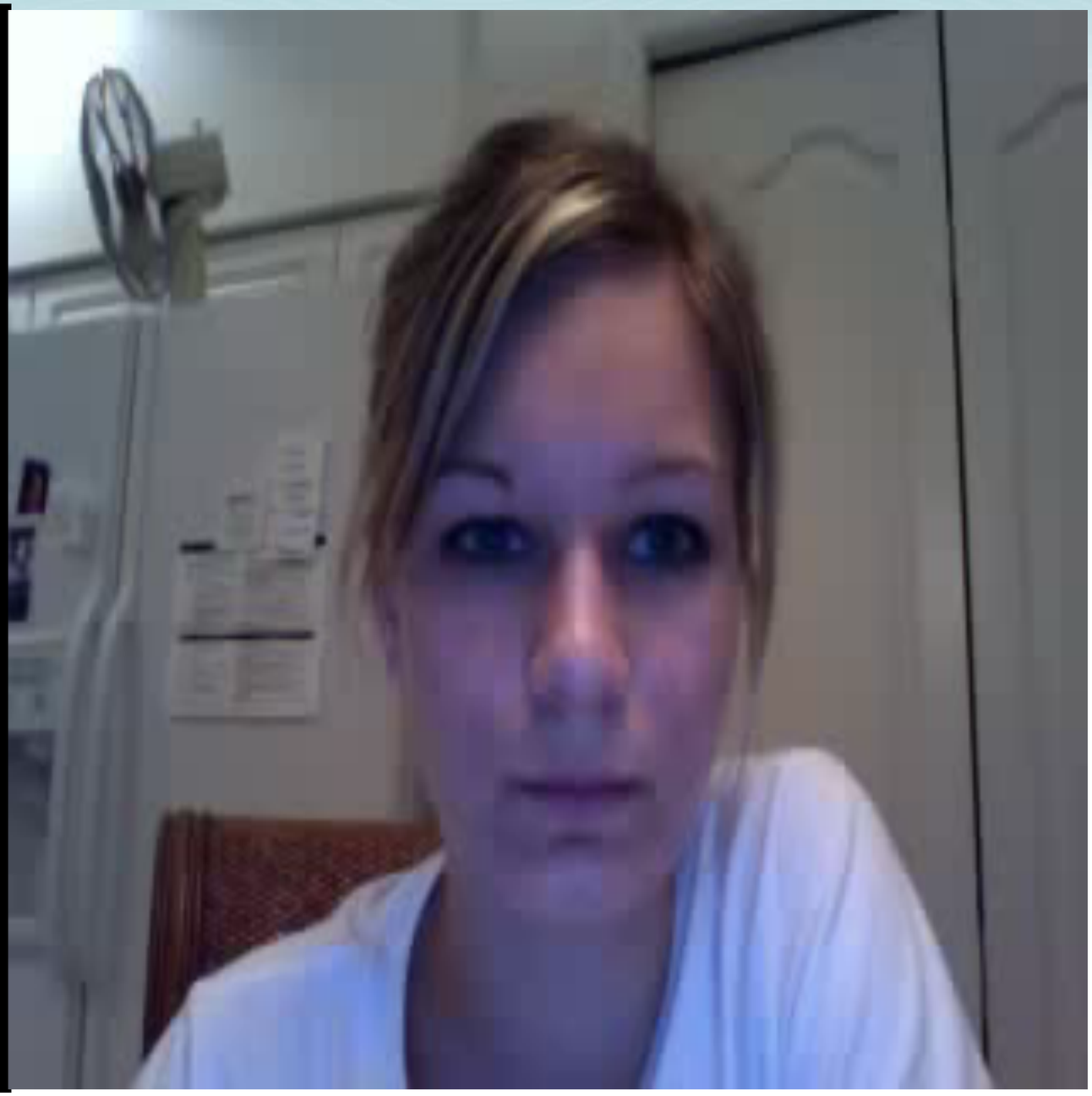
"I like being online. Nobody knows I'm autistic when I'm online"

The first research provided hundreds of labeled videos and cost over $1,000,000

How can we afford to get millions of videos?

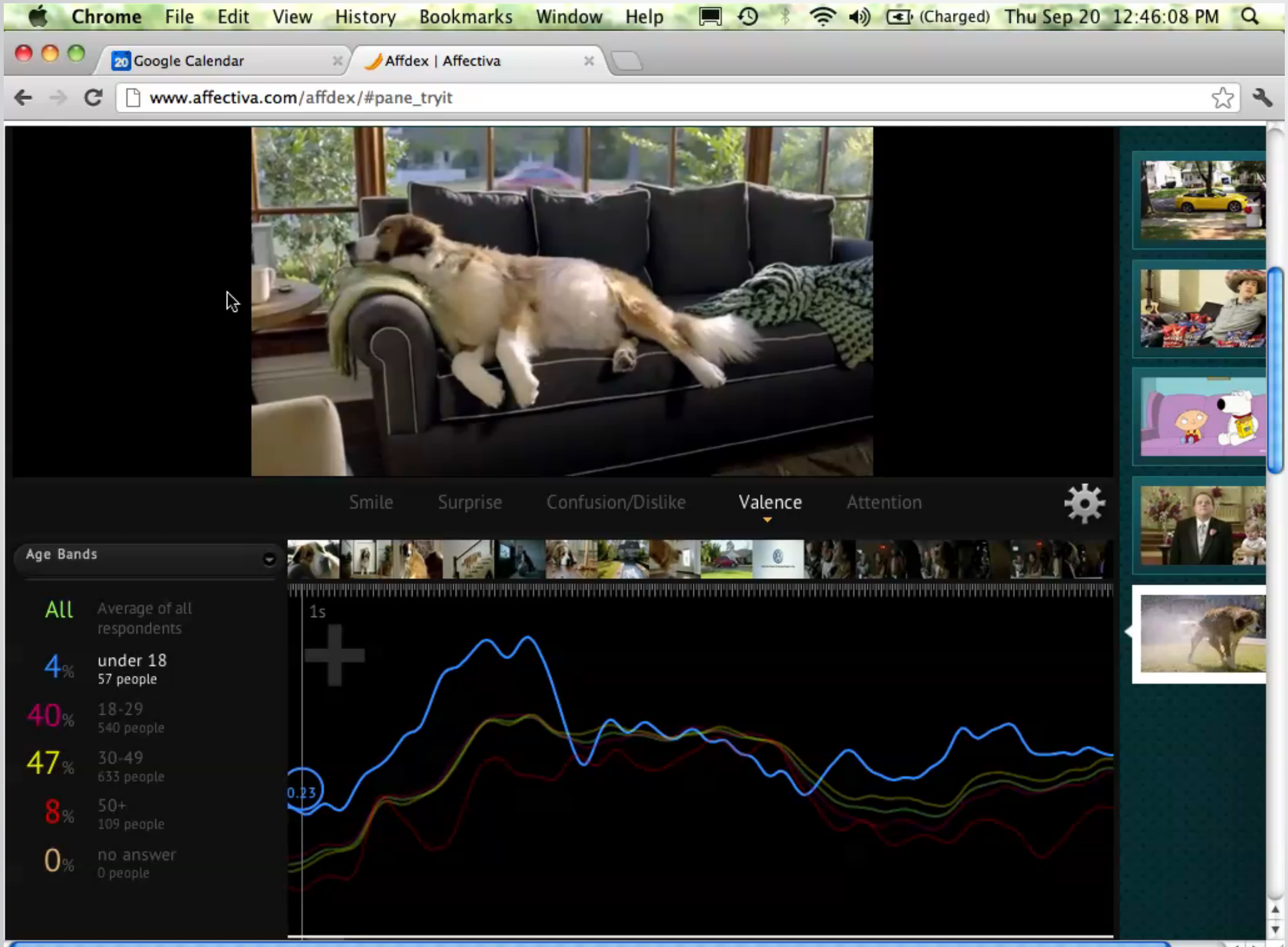
Affdex.com: try demo live with your webcam





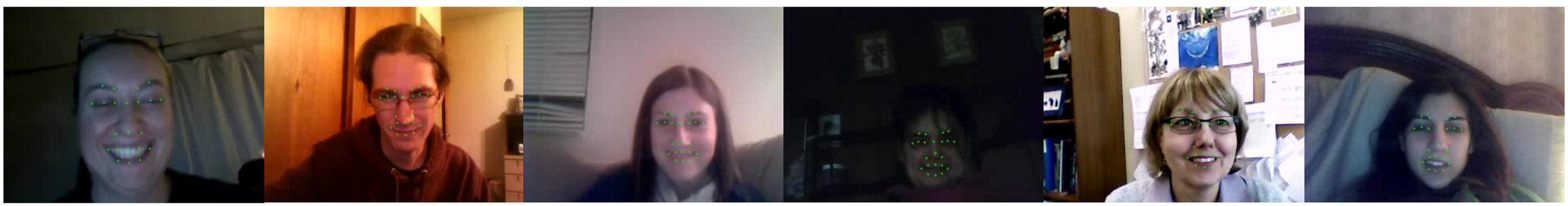
McDuff, el Kaliouby, Picard, "Crowdsourcing Facial Responses to Online Videos," IEEE Transactions on Affective Computing, 2012

Affdex: view results interactively (affectiva.com)



Data from the wild raises the bar

Academic tradition: Posed expressions, no head movement; well lit, high res, small scale. Results: ~90% AUC on posed, ~65% AUC on real-world spontaneous expressions



High intensity Subtle intensity Blurry video Dark, small face Cluttered Asymmetric

Affdex: Improves science results >= 90% AUC on posed expressions, >=80% AUC on real-world spontaneous expressions

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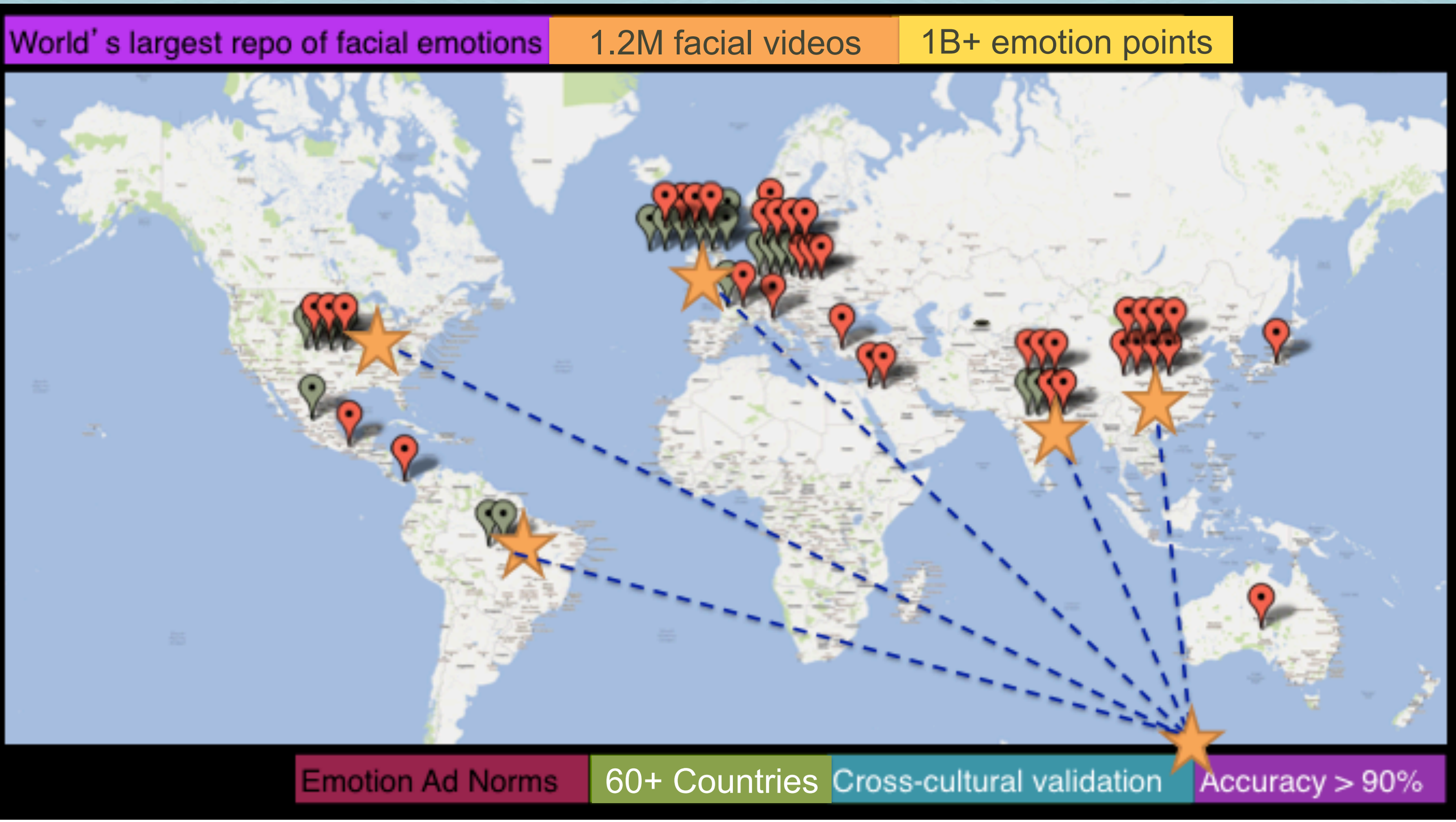

Validation studies completed in Brazil, China, India, United Kingdom, USA, …with over 300 Global brands!

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Face Videos

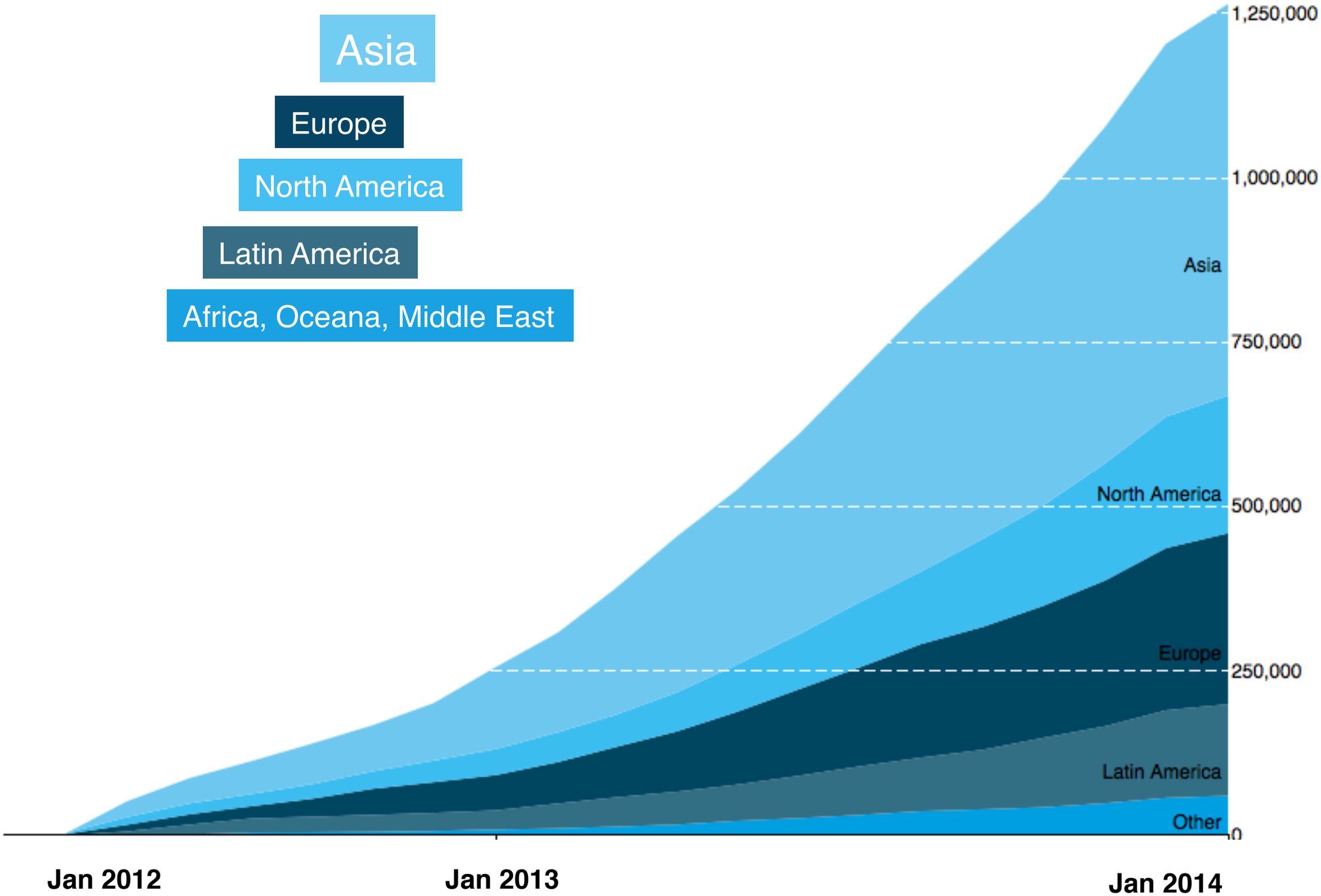
Asia

Europe

North America

Latin America

Africa, Oceana, Middle East



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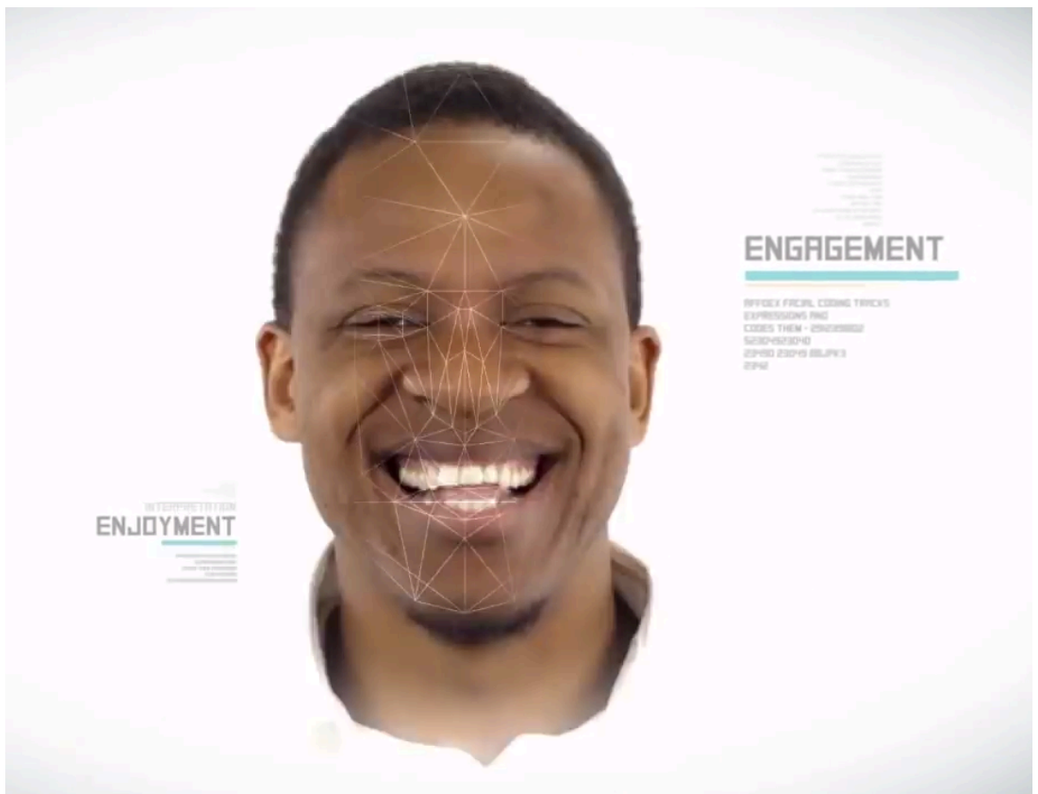
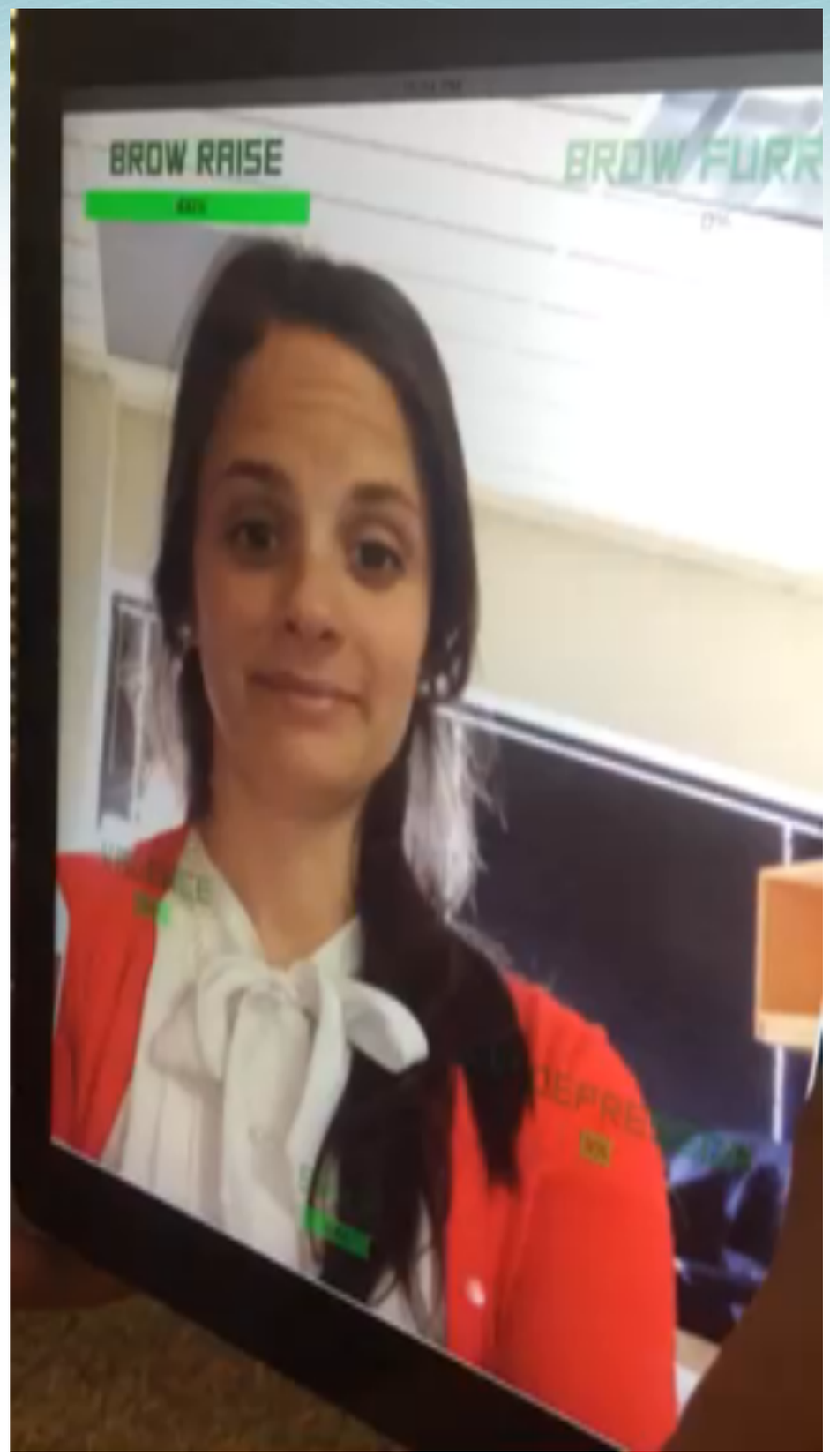
New FREE SDK!

SDK adds interactive Affdex to iOS apps on **iPhone, iPad**

Android SDK “in Q2”.



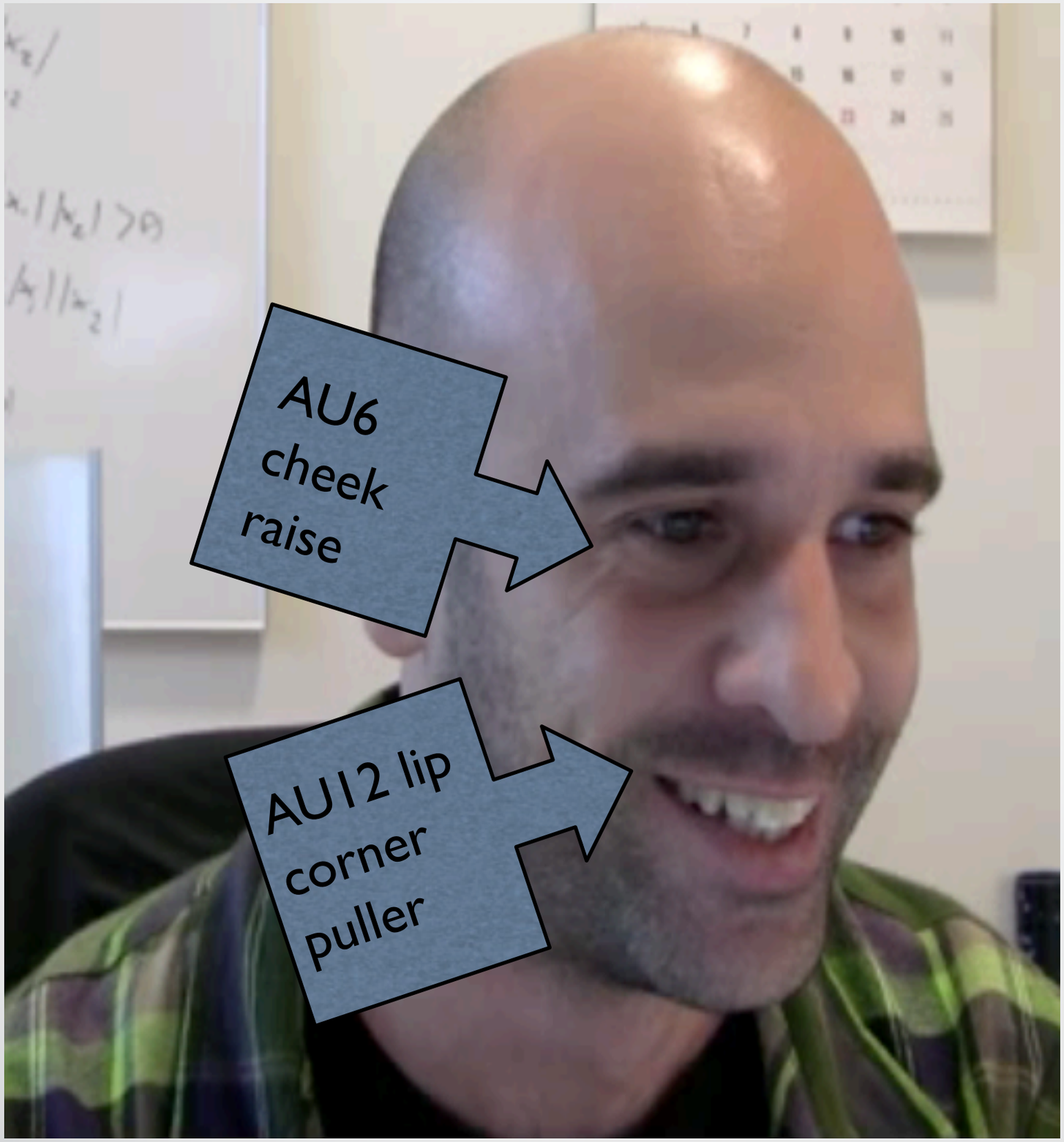


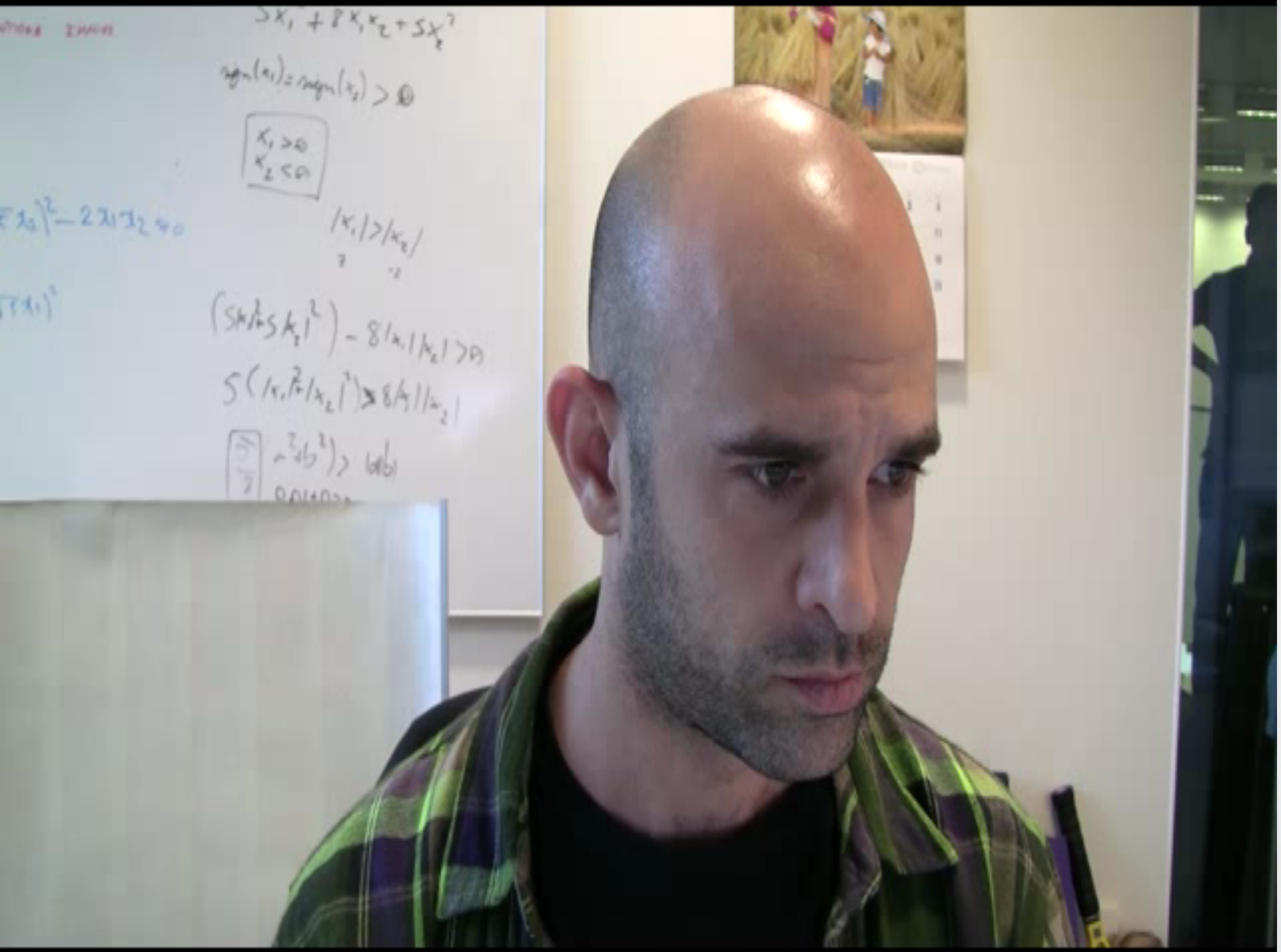
What is the most common emotion that technology elicits?

Hint: This next video is a person alone in his office trying to fill out a web form.

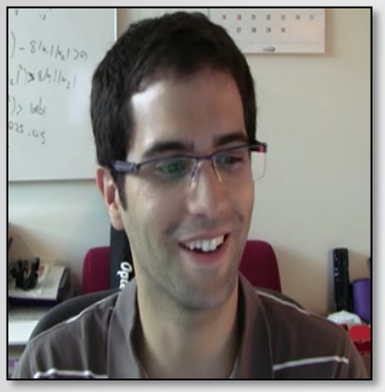
We didn't tell him we used "impossible" captchas

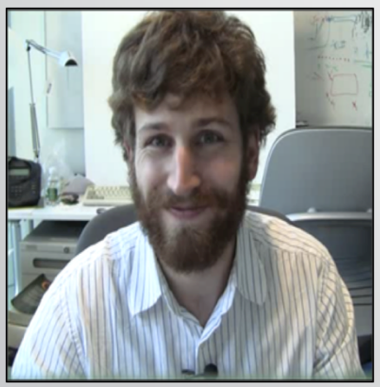
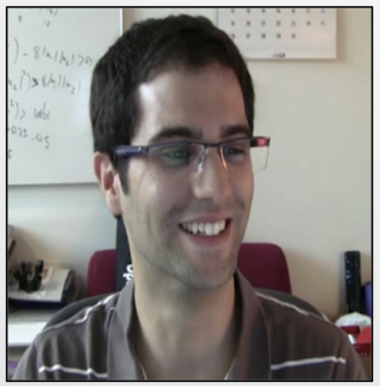
Smile = delight?

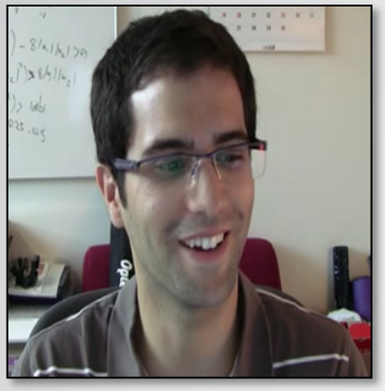




Delight smile or Frustration smile?





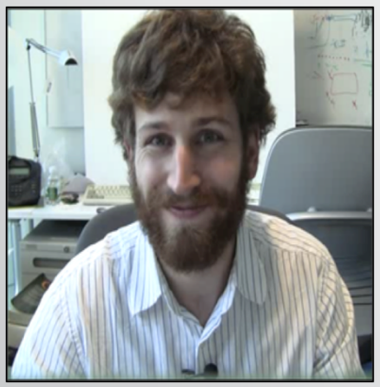
Frustration

Frustration

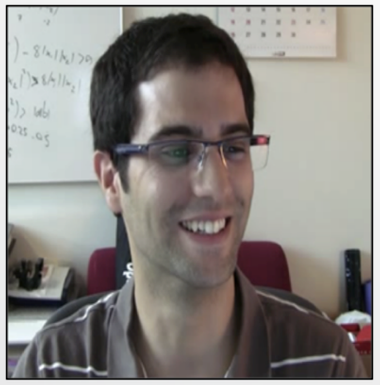
Frustration

Delight

Delight



Frustration

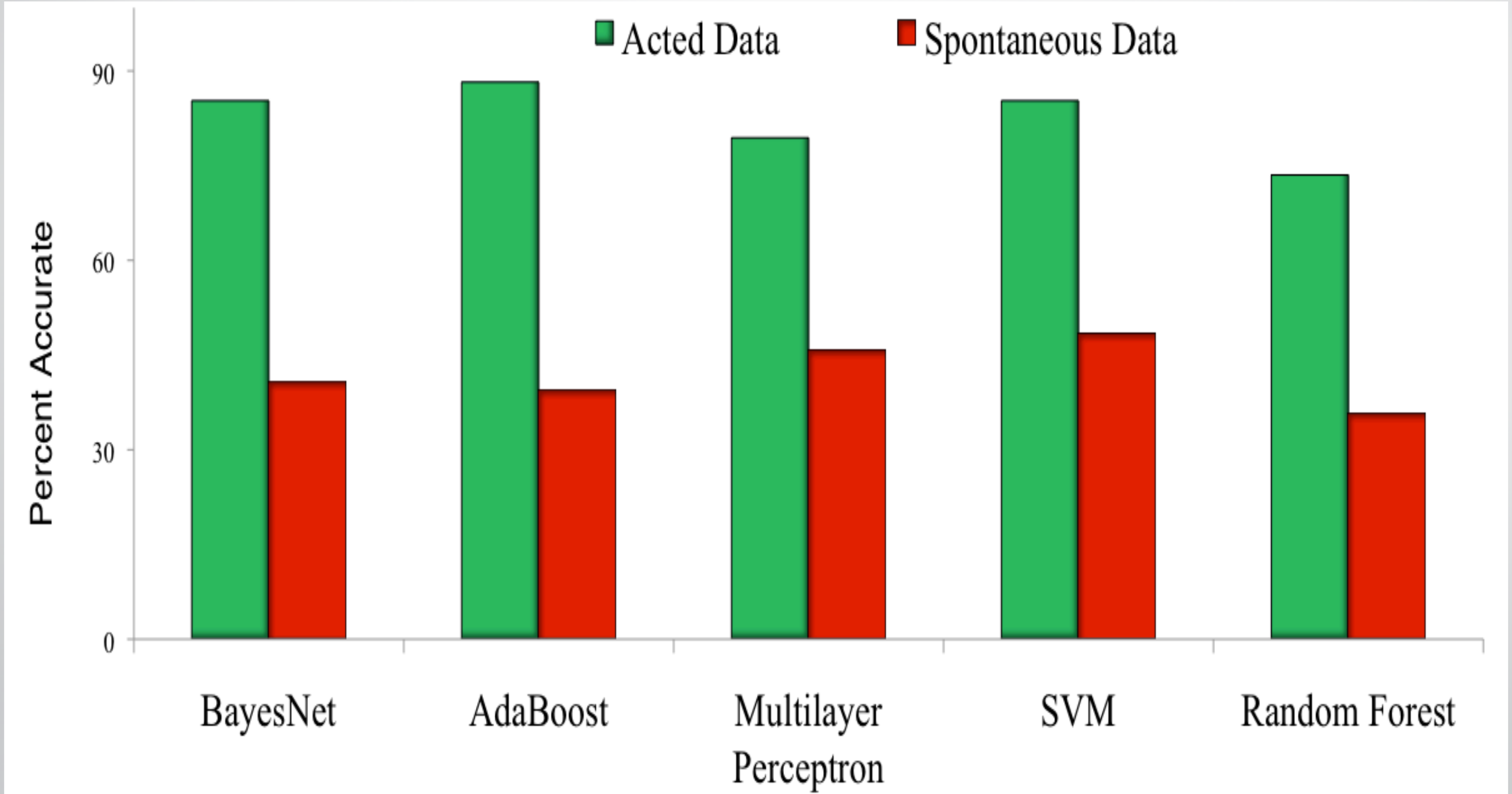


Delight

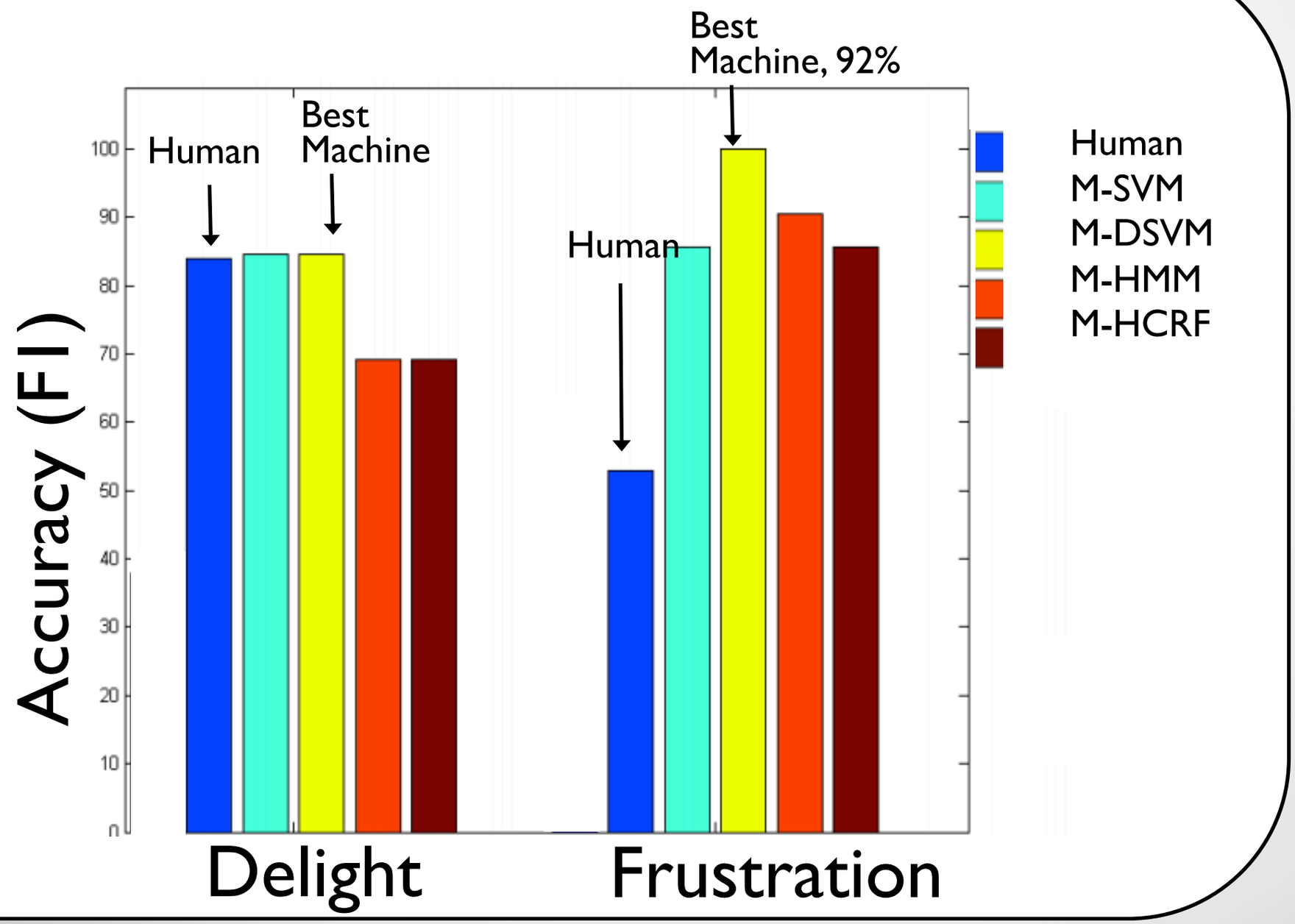
Delight

Machine recognition of spontaneous emotion is VERY HARD

Classification accuracy of recognizing frustration, delight and neutral states, leave-one-clip out



Machine learning w/dynamics recognizes delight and frustration smiles *Hoque, McDuff, Picard (2012) IEEE Trans. Affective Computing*



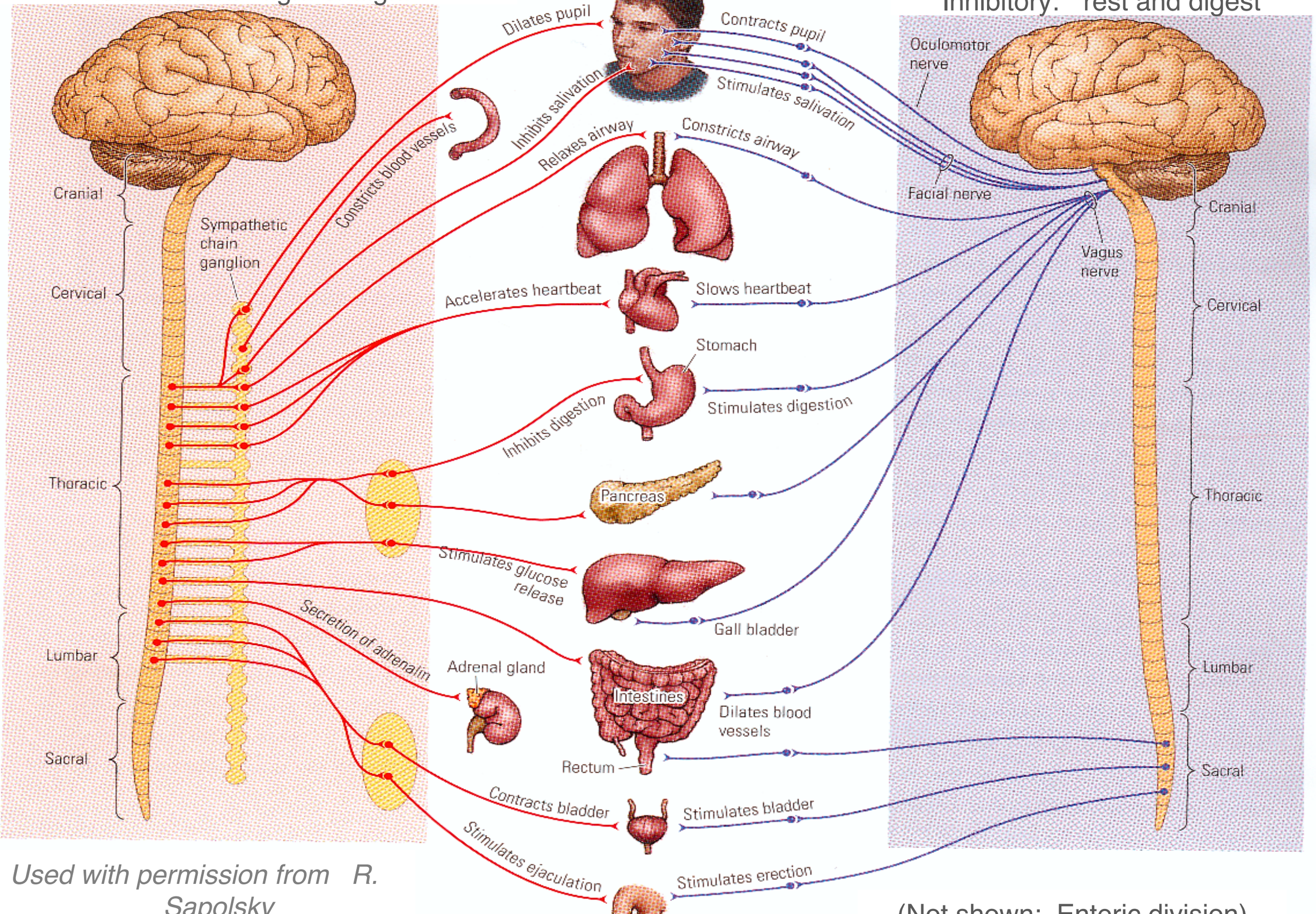
AUTONOMIC NERVOUS SYSTEM

Sympathetic division

Stimulation: "fight or flight"

Parasympathetic division

Inhibitory: "rest and digest"

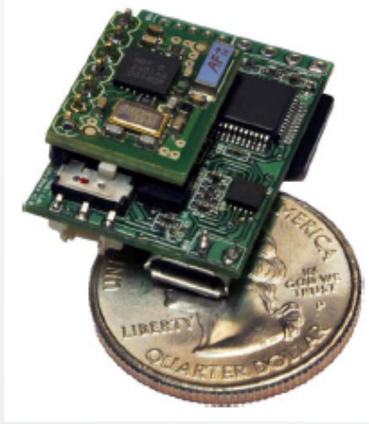


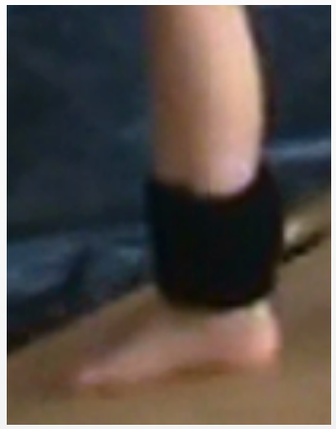
Used with permission from R. Sapolsky

(Not shown: Enteric division)

Electrodermal Activity (EDA) Sensors

Traditional

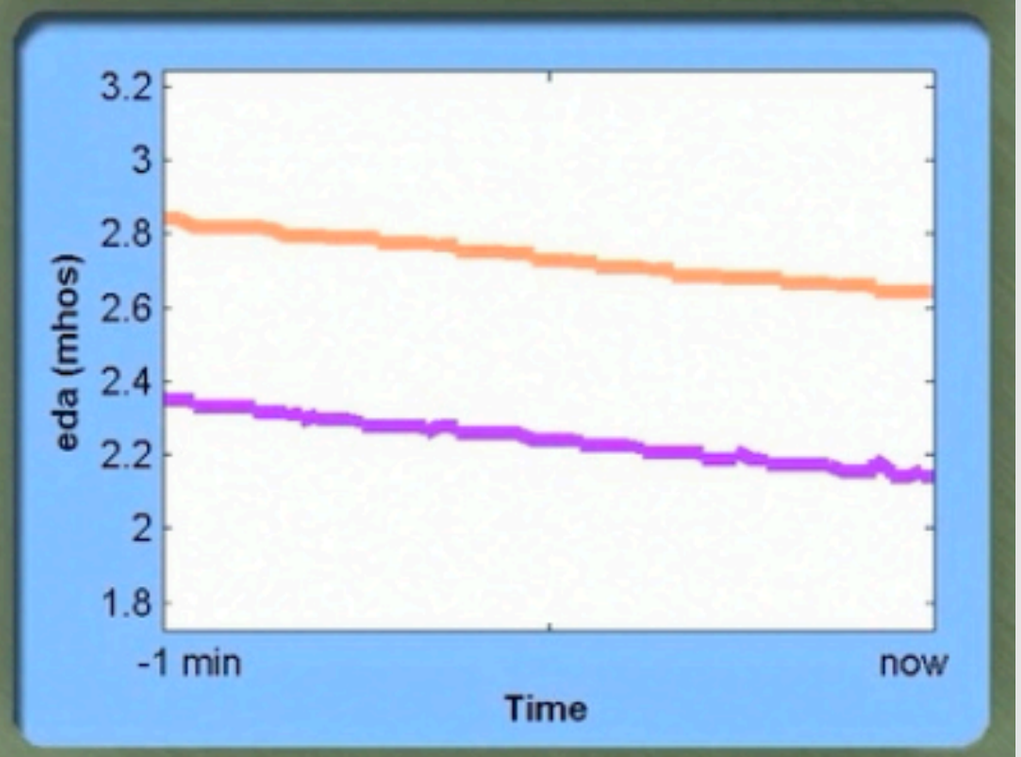


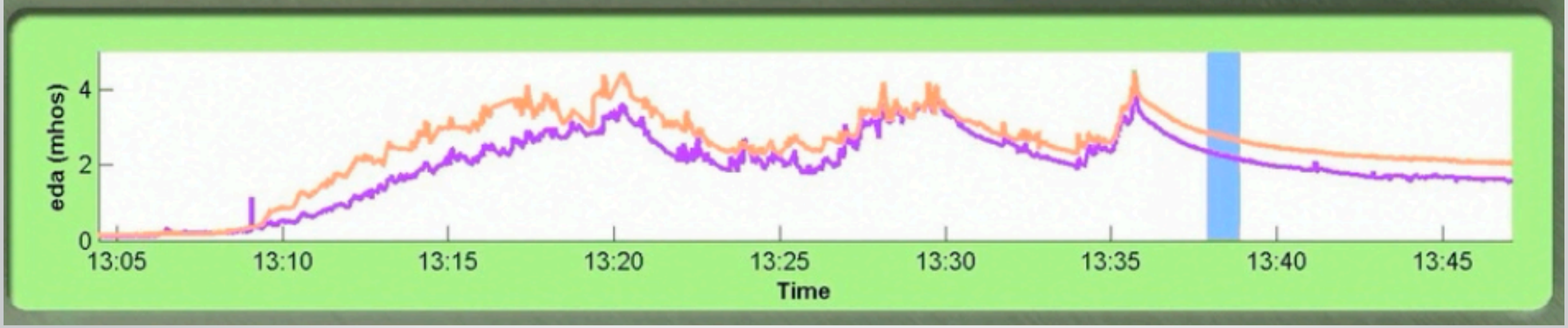


Media Lab Innovations

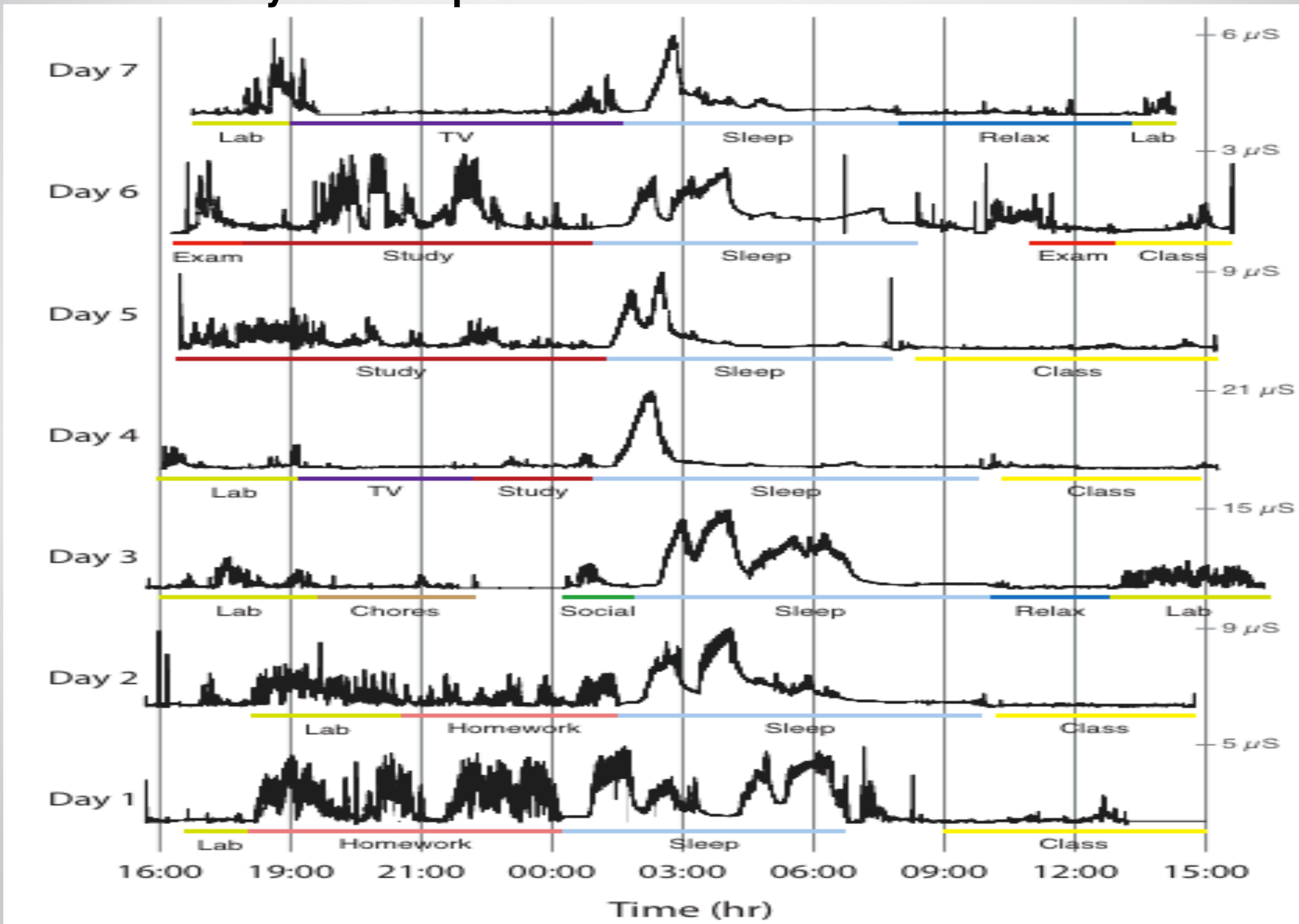
Q™ Sensor, Empatica E3p

Example: Measuring sympathetic nervous system response via electrodermal activity (EDA) on lower legs





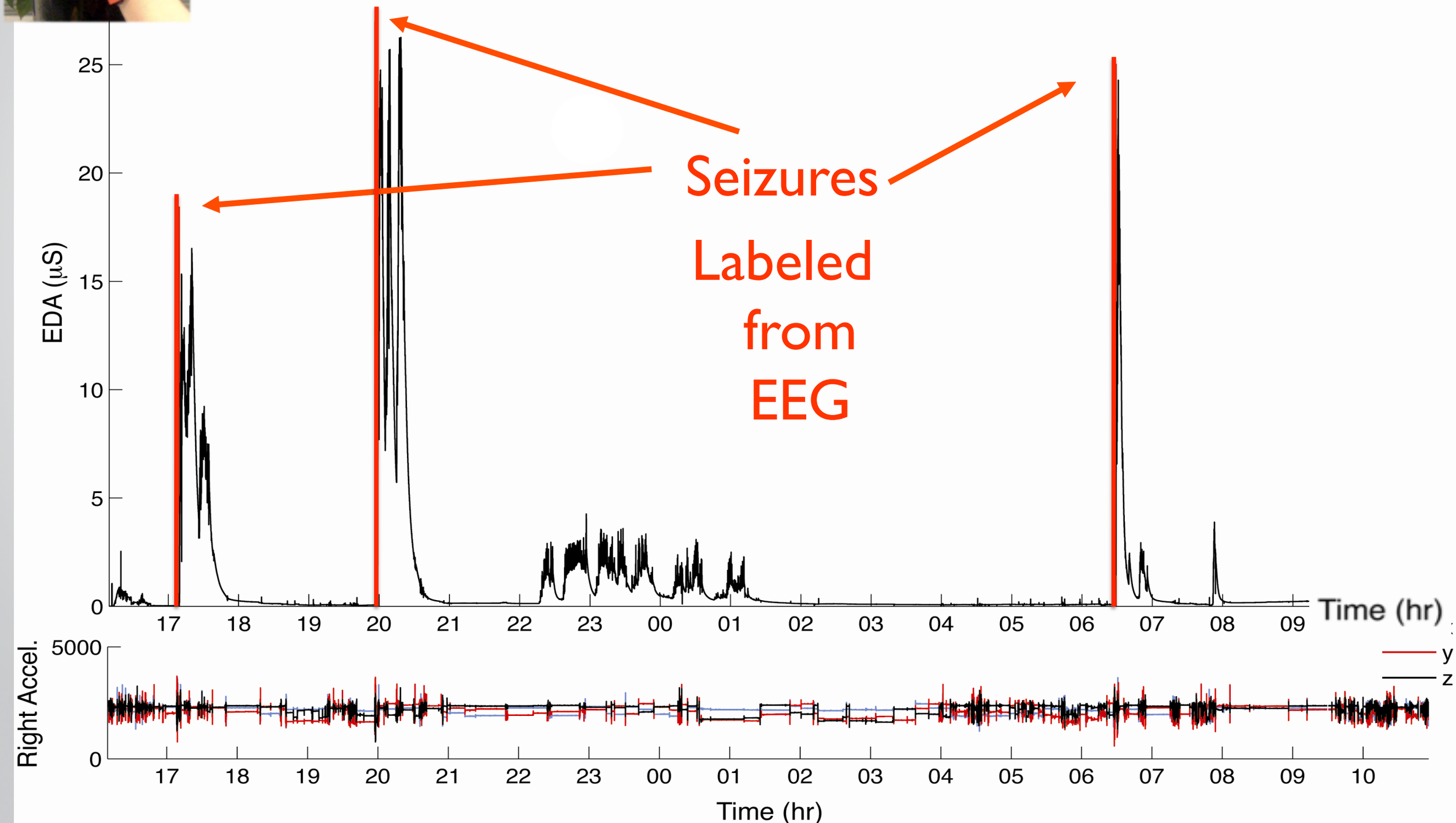
Now we can log autonomic data – sympathetic nervous system response 24/7 “in the wild”



Wrist sensor data is best for determining who improved the most on a learning task

(compared EDA, sleep staging, actigraphy, and EEG: C3, C4, O1 and O2, 100Hz, n=24 x 3= 72 nights; *Sano et al, BSN, 2013*)

94% accurate convulsive seizure detection using wrist electrodermal activity and accelerometry
Poh et al (2012), ***Epilepsia***.



“Emotion is the fourth vital sign.”
- Peter Weinstock, MD PhD

MIT Media Lab

Computational Empathy, and Preventing Cyber-bullying

With Karthik Dinakar and Henry Lieberman

Computational Empathy

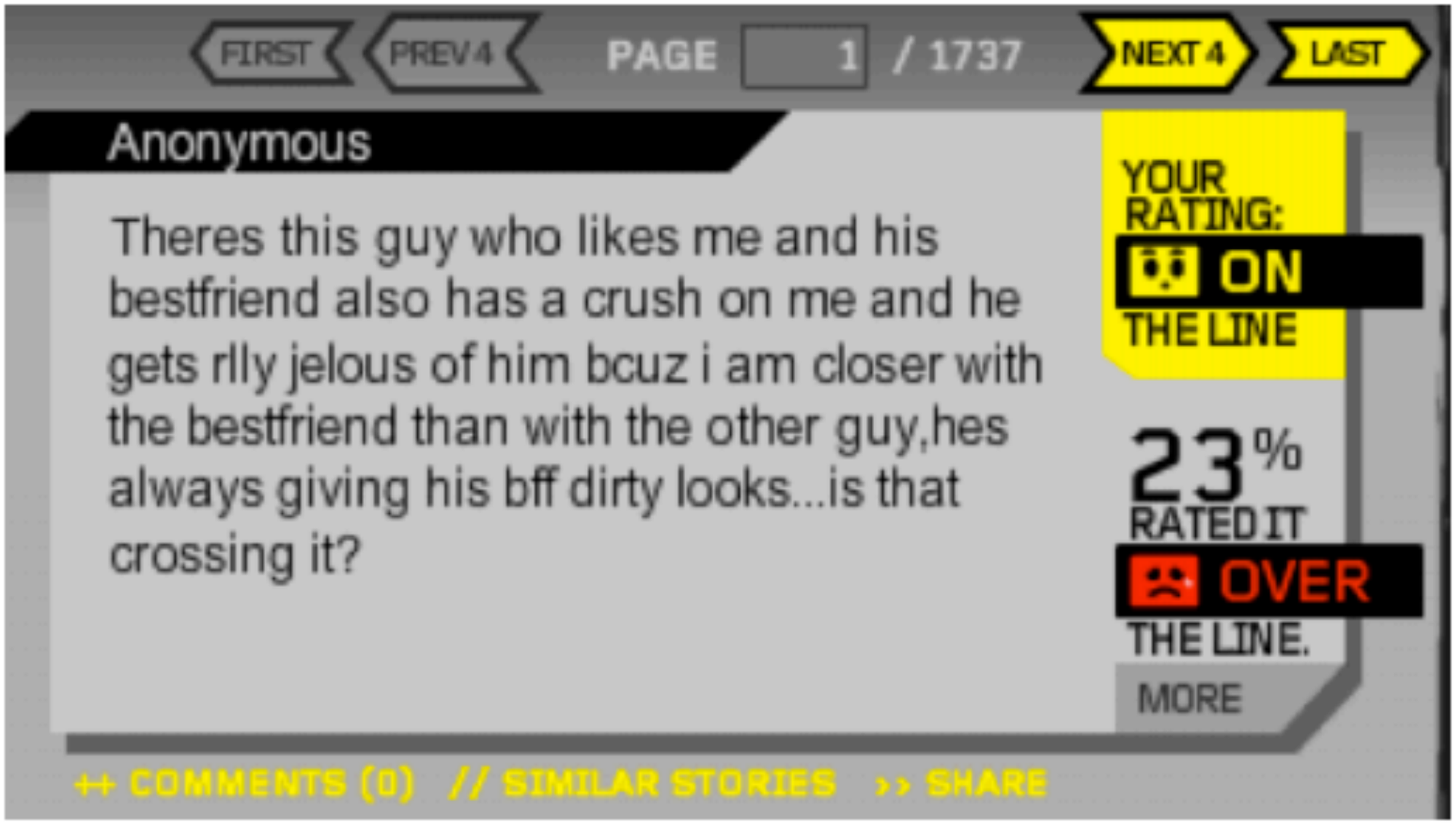
Dinakar, K., Jones, B., Havasi, C., Lieberman, H., Picard, R.W., "Common Sense Reasoning for Detection, Prevention, and Mitigation of Cyberbullying", ACM Transactions on Interactive Intelligent Systems, Volume 2 Issue 3, September 2012.

Helping distressed teens through story matching

- Identify underlying emotional state information and topics using probabilistic graphical models

- Use parameters from the model to promote self-reflection in distressed teens by showing them similar stories from other teenagers.

MTV: http://www.athinline.org/overtheline



	% Strongly Agree		% Agree		% Strongly Disagree		% Disagree		% Neither agree nor disagree	
	LDA+	Control	LDA+	Control	LDA+	Control	LDA+	Control	LDA+	Control
Q1	45.0%	0%	22.1%	3%	15.9%	46%	17%	51%	0%	0%
Q2	35.3%	0%	23.0%	8.3%	15%	31.0%	13.2%	35.1%	13.5%	25.6%

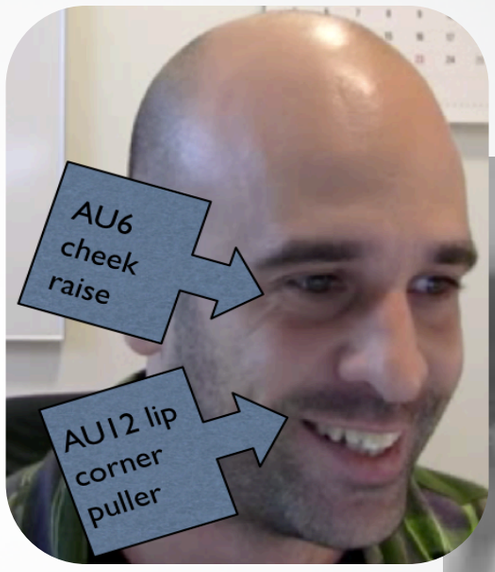
n = 12 participants

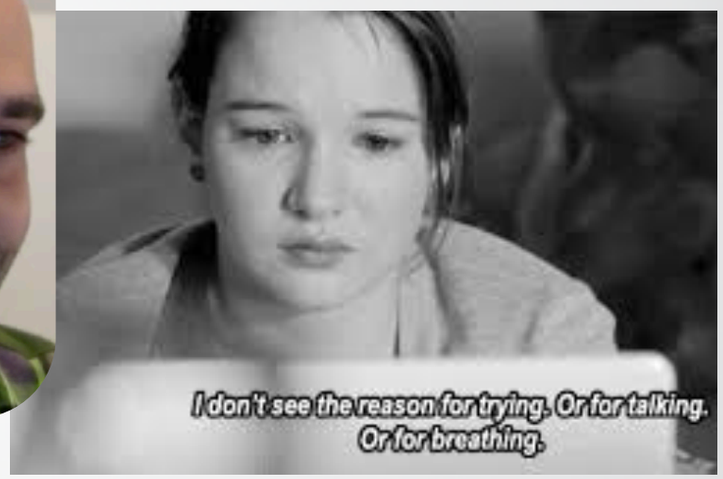
Q1 ‘The themes of the story presented matched the themes of the story I wrote’

Q2 ‘After reading the presented story, I can imagine that someone in a similar situation would not feel alone’

Lieberman, H., Dinakar, K., Jones, B., "Crowdsourced Ethics With Personalized Story Matching", in the proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems, Paris 2013.

Adventures in Emotion Recognition: Face + Physiio + Text





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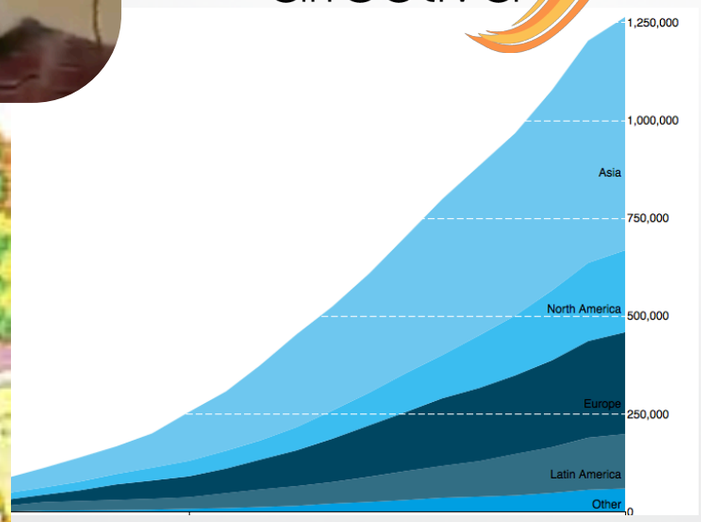
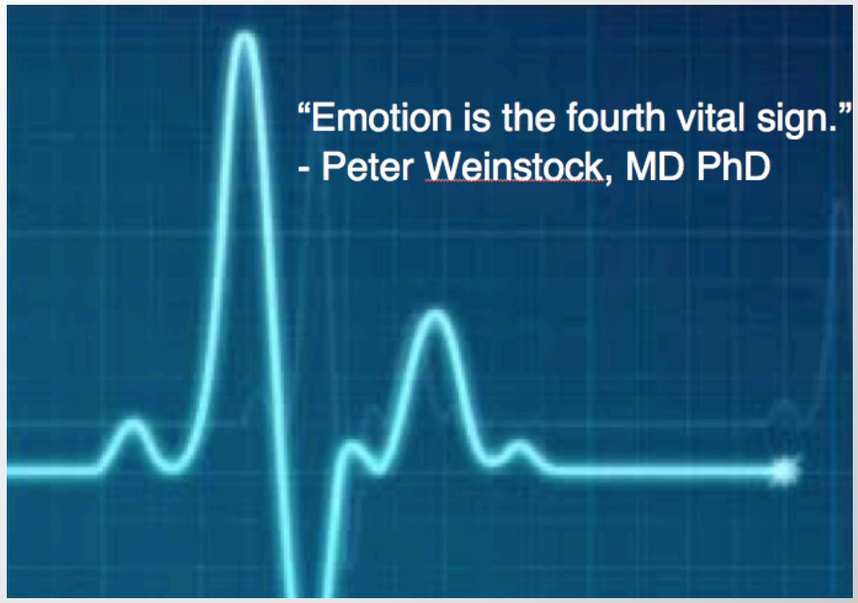


1B+ emotion points



Free software/publications:
http://affect.media.mit.edu
http://affect.media.mit.edu/publications.php

picard@media.mit.edu

Tweet #RosalindPicard

Free SDK: affdex.com

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