



Emotions

Image Source <https://www.flickr.com/photos/62337512@N00/2665226890> by anthony kelly



Learning Goals

- Understanding how emotions evolve
- Expressions of emotions
- Emotions for HCI

What we've learnt

- Emotions:
 - Enforce to store information in long time memory (LTM)
 - Slow down process of forgetting
 - Influence the response choice in the human information processor (LTM: conditioning)
 - Are caused by needs and goals:

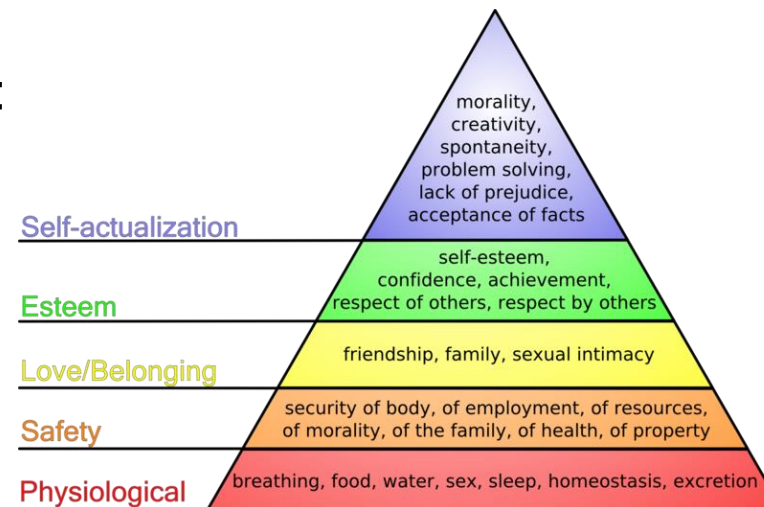


Image Source https://de.m.wikipedia.org/wiki/Datei:Maslow%27s_hierarchy_of_needs.png by J. Finkelstein

Emotions

- Various theories of how emotion works
 - James-Lange: emotion is **our interpretation** of a **physiological response** to a stimuli
“we are sad because we cry...”
 - Cannon: emotion is a **psychological response to a stimuli**
 - Schachter-Singer: emotion is the result of our **evaluation of our physiological responses**, in the light of the whole situation we are in
- Emotion clearly involves both cognitive and physical responses to stimuli

Basic Emotions

Reference	Basic emotions						
	“The Big Six”						Other
	Happiness (joy, enjoyment, play)	Sadness (grief)	Anger (rage)	Disgust	Fear/ anxiety	Surprise	
Plutchnik (1980)	✓	✓	✓	✓	✓	✓	Acceptance, anticipation
Oatley and Johnson-Laird (1987)	✓	✓	✓	✓	✓	✗	–
Ekman and Cordaro (2011)	✓	✓	✓	✓	✓	✓	Contempt
Izard (2011)	✓	✓	✓	✗	✓	✗	Interest
Levenson (2011)	✓	✓	✓	✓	✓	✓	Interest ^a , relief ^a , love ^a
Panksepp and Watt (2011)	✓	✓	✓	✗	✓	✗	Seeking, lust, care

Piórkowska, Magda & Wrobel, Monika. (2017). Basic Emotions. 10.1007/978-3-319-28099-8_495-1.

Emotion Expressions

Facial Expressions



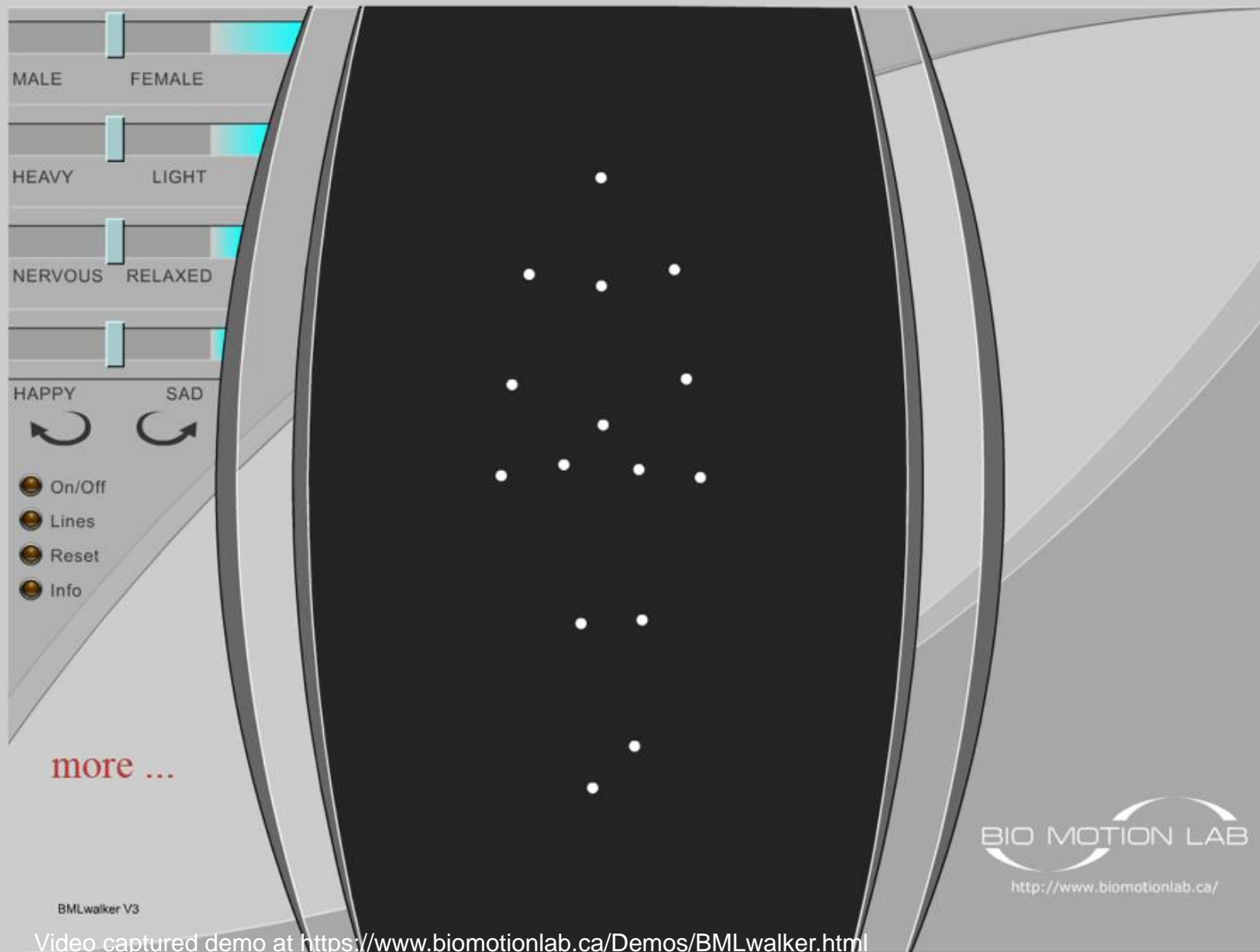
Image Source https://upload.wikimedia.org/wikipedia/commons/4/4d/Universal_emotions7.JPG by Icerko Lýdia

Emotion Expressions

Body Pose



Schindler et al. (2008) Recognizing emotions expressed by body pose: A biologically inspired neural model



Emotion Expressions

Voice

	Fear	Anger	Sadness	Happiness	Disgust
Speech rate	Much faster	Slightly faster	Slightly slower	Faster or slower	Very much slower
Pitch average	Very much higher	Very much higher	Slightly lower	Much higher	Very much lower
Pitch range	Much wider	Much wider	Slightly narrower	Much wider	Slightly wider
Intensity	Normal	Higher	Lower	Higher	Lower
Voice quality	Irregular voicing	Breathy chest tone	Resonant	Breathy blaring	Grumbled chest tone
Pitch changes	Normal	Abrupt on stressed syllables	Downward inflections	Smooth upward inflections	Wide downward terminal inflections
Articulation	Precise	Tense	Slurring	Normal	Normal

Brave, Scott & Nass, Clifford. (2002). Emotion in Human–Computer Interaction. The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications. 10.1201/b10368-6.

Emotion Expressions

Communication

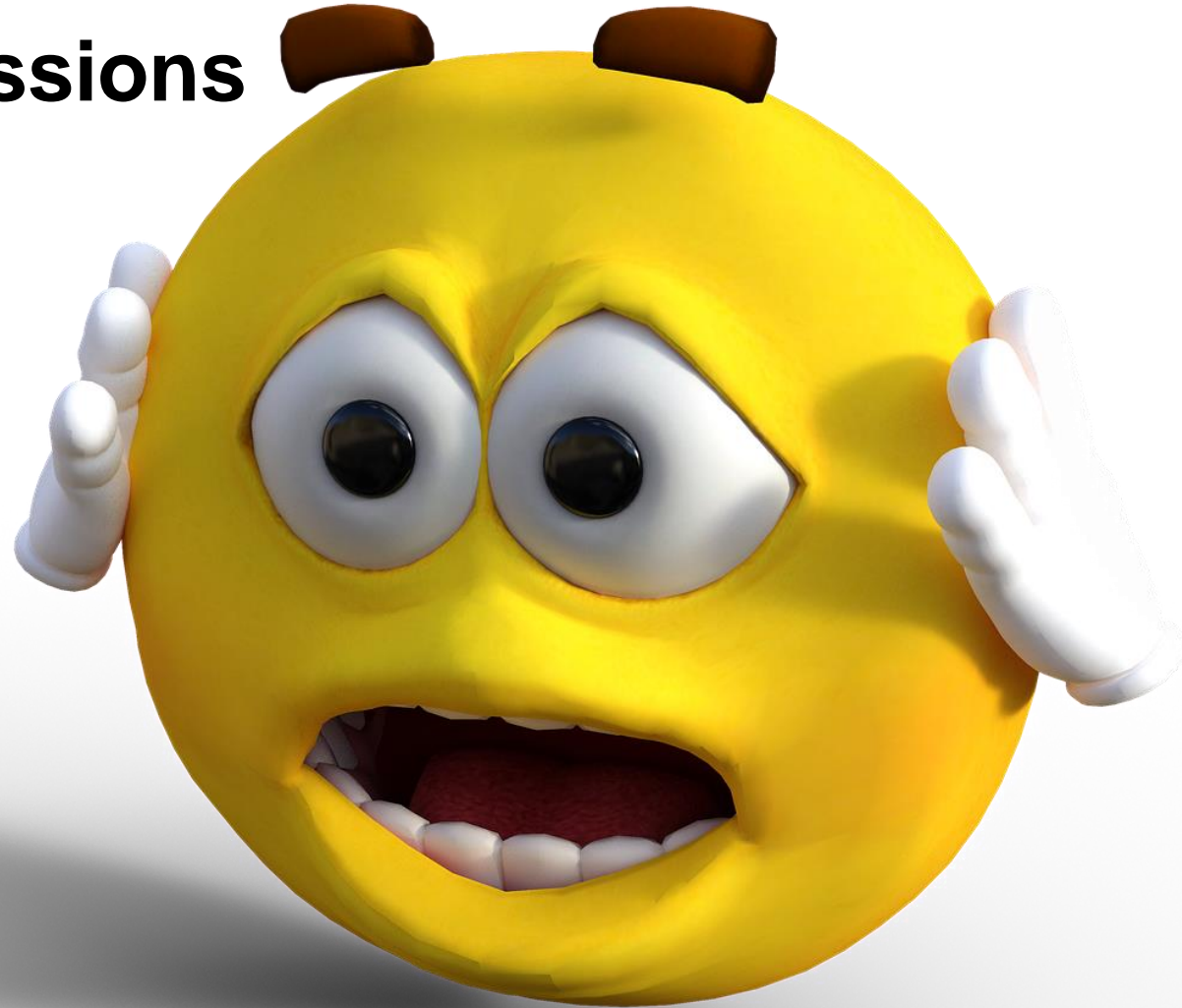
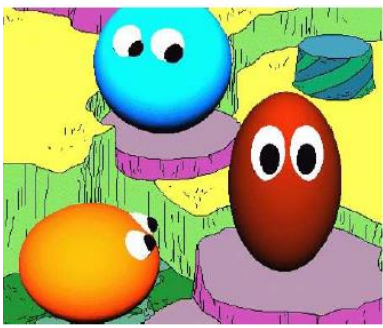


Image Source <https://pixabay.com/de/illustrations/smiley-emoticon-emoji-gelb-freude-4836210/>



(a)



(b)



(c)



(d)



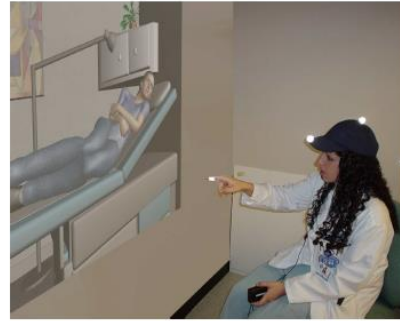
(e)



(f)



(g)



(h)



(i)



(j)



(k)



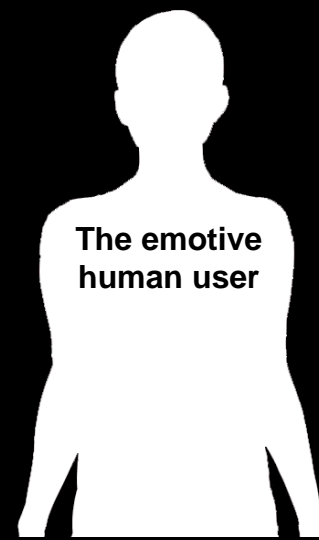
(l)

Vinayagamorthy, Vinoba, Marco Gillies, Anthony Steed, Emmanuel Tanguy, Xueni Pan, Celine Loscos, and Mel Slater. "Building expression into virtual characters." (2006).

Affects

- The biological response to physical stimuli is called *affect*
- Affect influences how we respond to situations
 - positive → creative problem solving
 - negative → narrow thinking
- “Negative affect can make it harder to do even easy tasks; positive affect can make it easier to do difficult tasks”

(Donald Norman)



**The emotive
human user**

Affective Computing:

systems and devices that can recognize, interpret, process, and simulate human affects



Image after <https://affect.media.mit.edu/areas.php> &
<https://www.needpix.com/photo/672566/female-standing-people-lifestyle-women-woman-standing-adult-healthy-girl> by PoseMuse

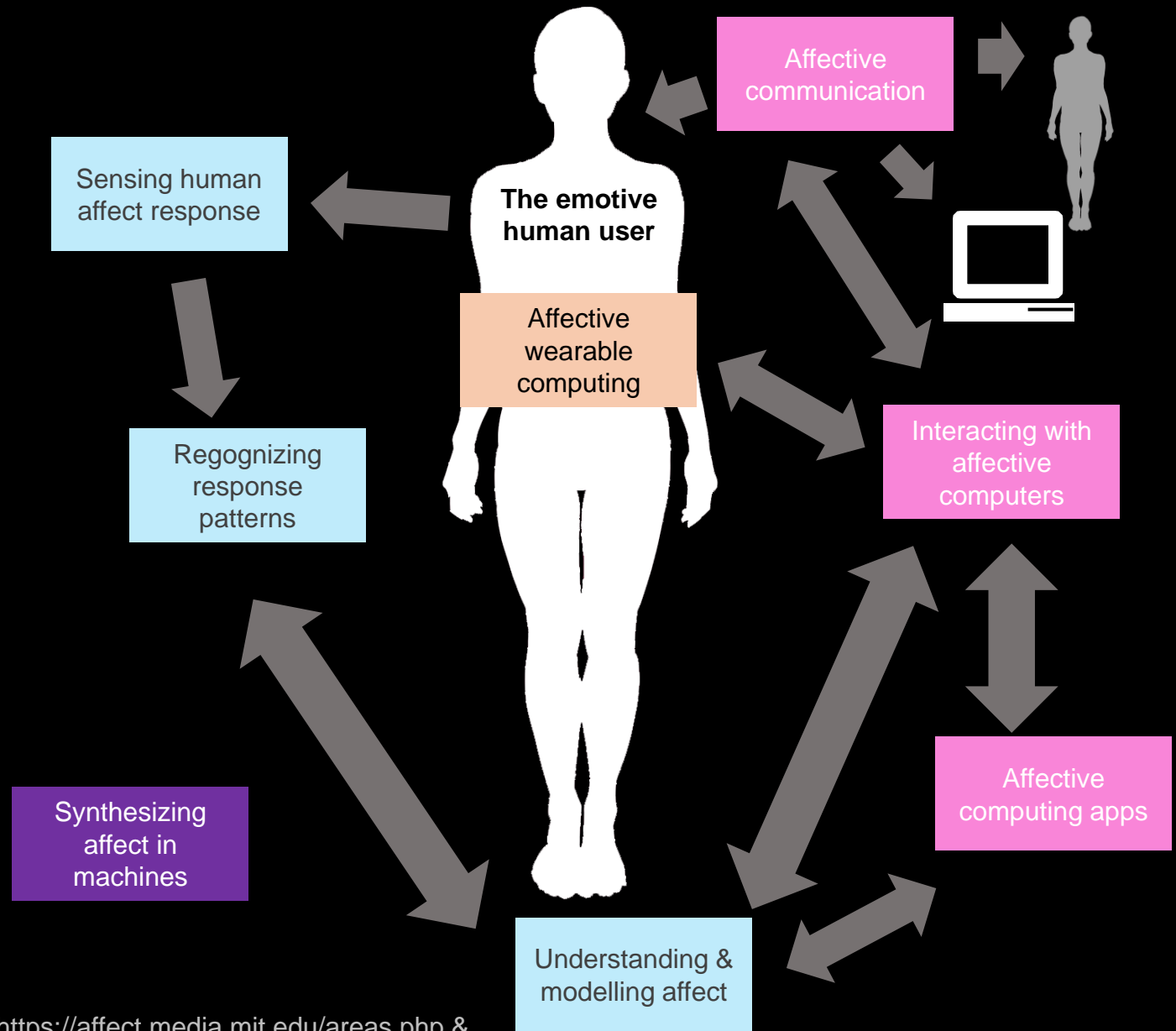
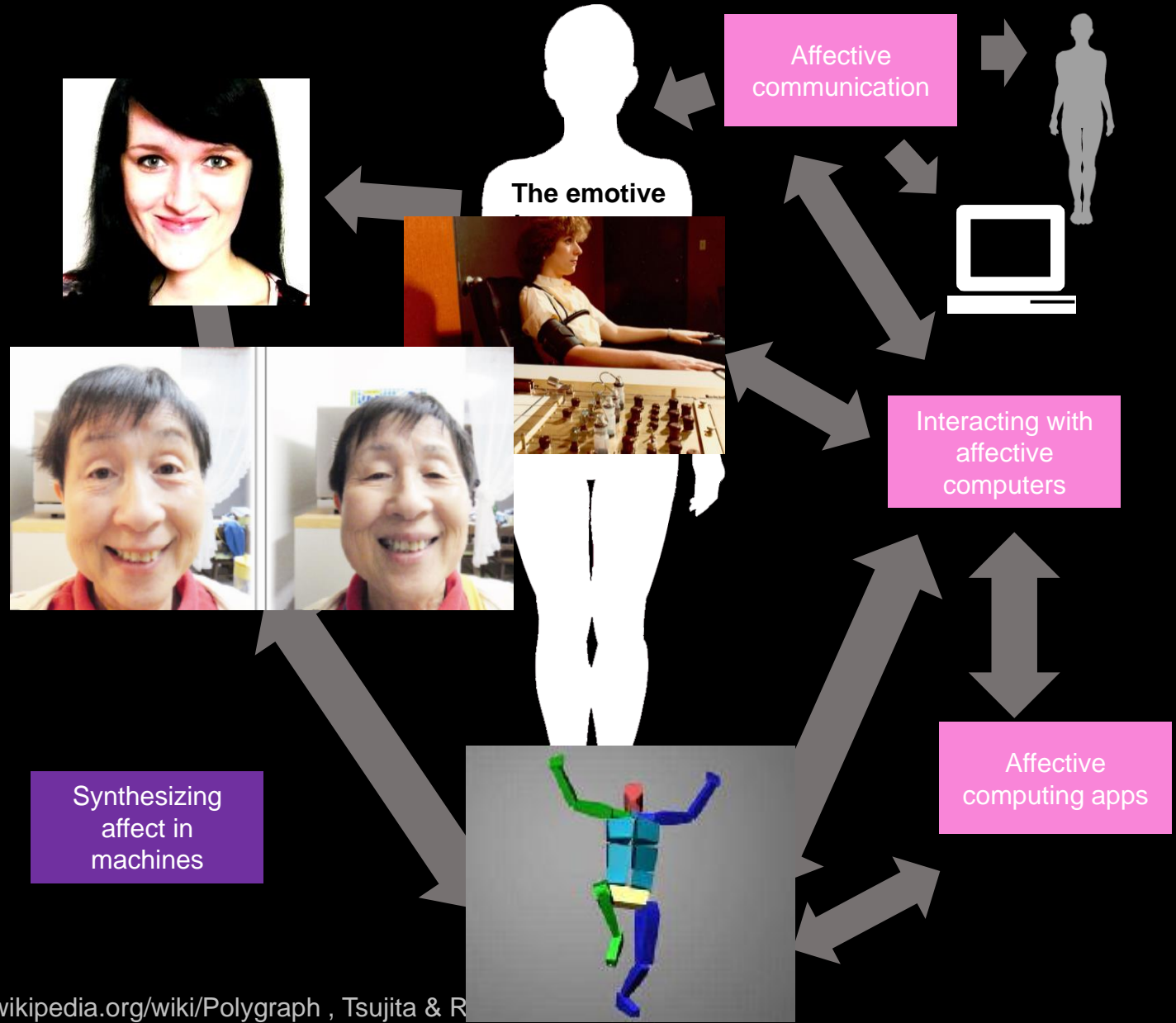
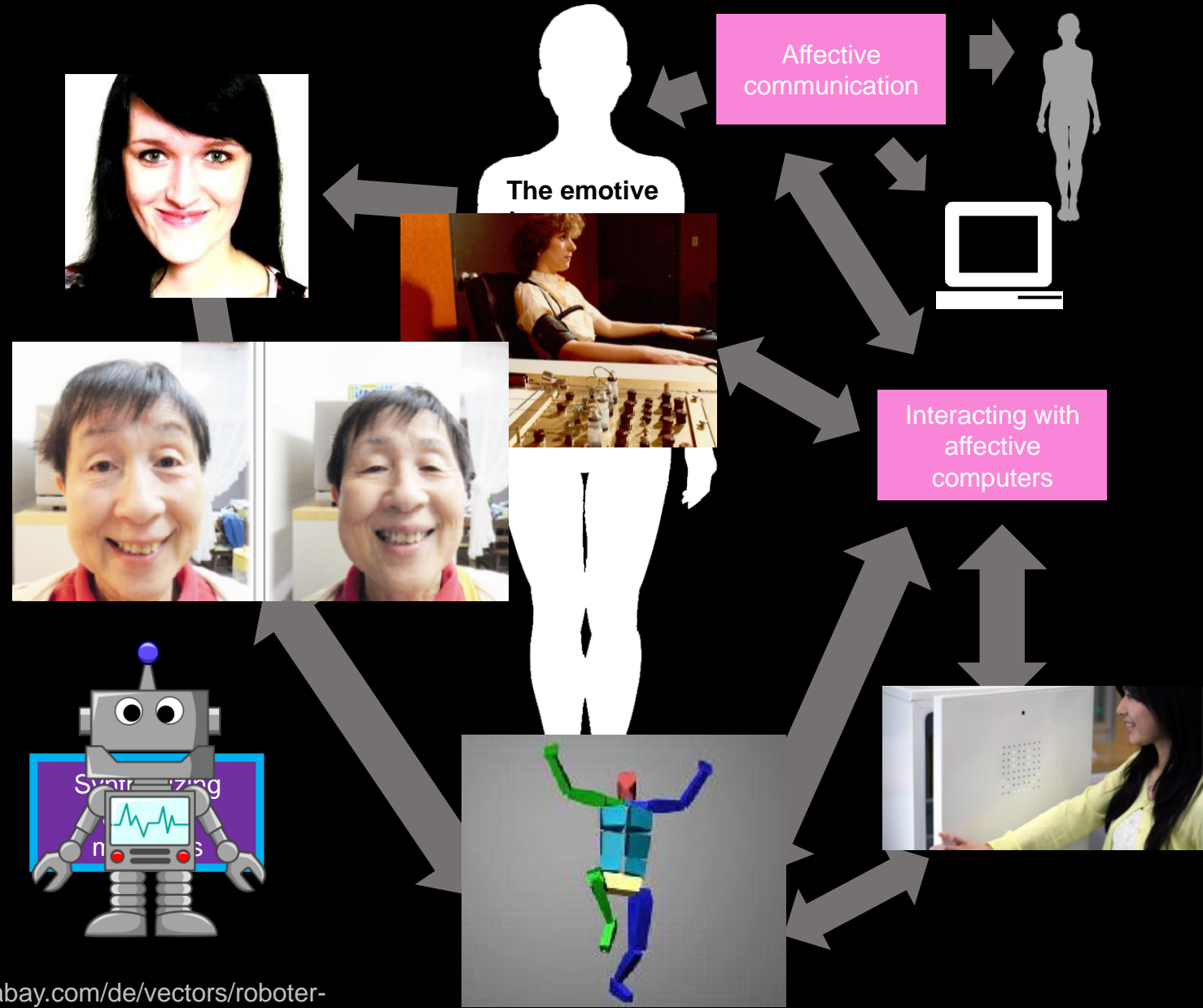


Image after <https://affect.media.mit.edu/areas.php> & <https://www.needpix.com/photo/672566/female-standing-people-lifestyle-women-woman-standing-adult-healthy-girl> by PoseMuse



<https://en.wikipedia.org/wiki/Polygraph> , Tsujita & R
 Us Happier & Kleinsmith, & Bianchi-B.:Recognizing Affective Dimensions from Body Posture.



<https://pixabay.com/de/vectors/roboter-schnurrbart-wissenschaft-161367/> & Tsujita & Rekimoto, Smiling Makes Us Happier & Kleinsmith

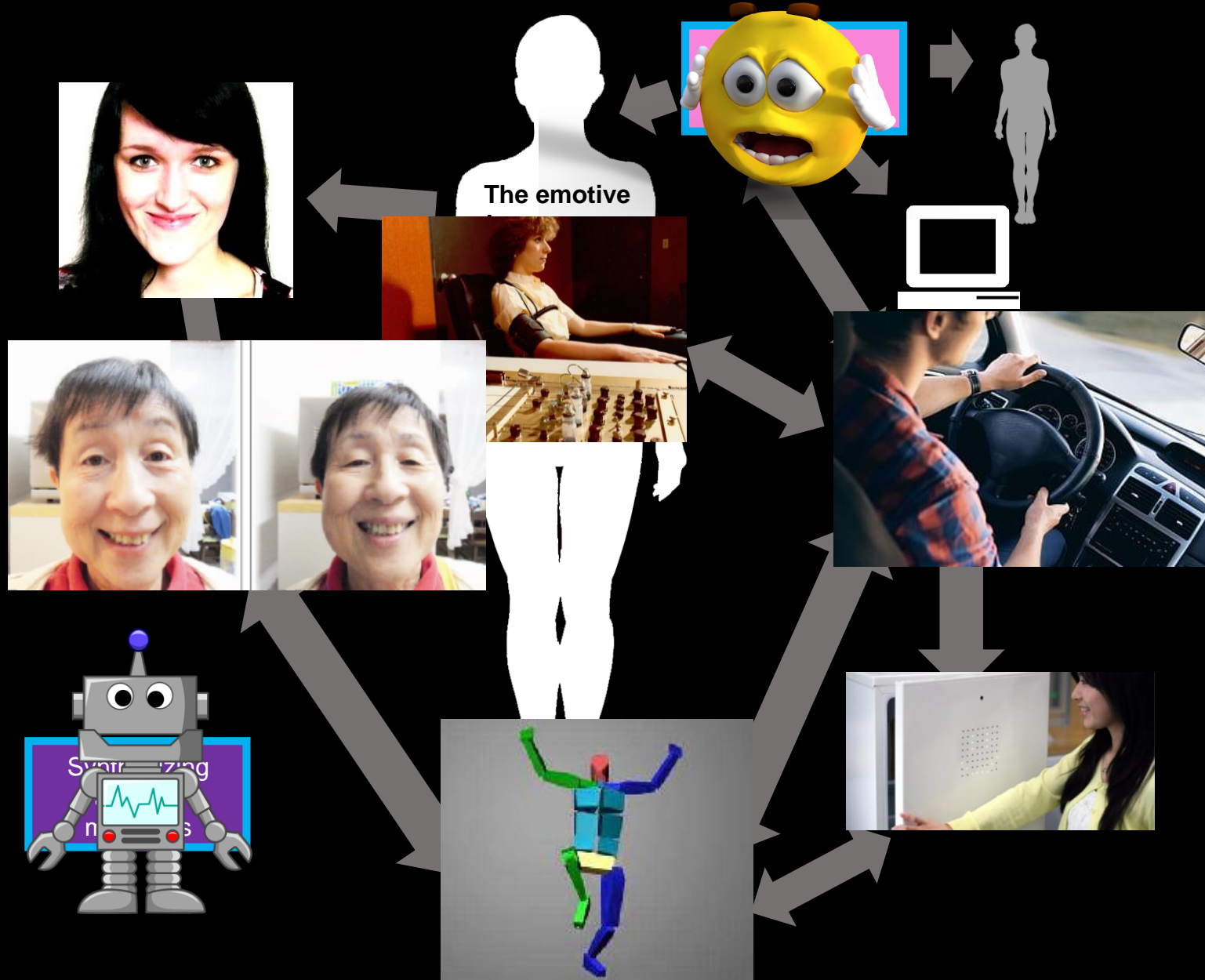
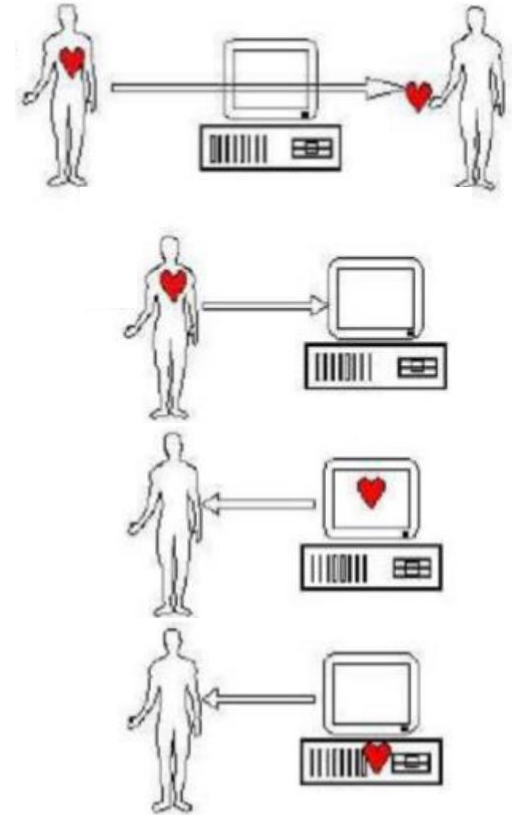


Image Sources <https://www.pxfuel.com/en/free-photo-qkvff>

Possible Uses of Emotions



- Broadcast: provide a special channel for emotional communication, such as ‘emoticons’ used in e-mails :)
- Recognition: emotional can be analyzed and used to alter the system reaction (such as Tsujita & Rekimoto)
- Simulation: Emotional expression can be mimicked by the system in order to enhance a natural interface (characters, agents, robots)
- Modeling: Internal models to represent user (virtual user studies)

Burkhardt, Felix, et al. "Emotion detection in dialog systems: applications, strategies and challenges." 2009 3rd International Conference on Affective Computing and Intelligent Interaction and Workshops. IEEE, 2009.

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