

Multimodal analysis of human emotions : a Neuro-Physiological and Facial Dynamics Approach

F team :

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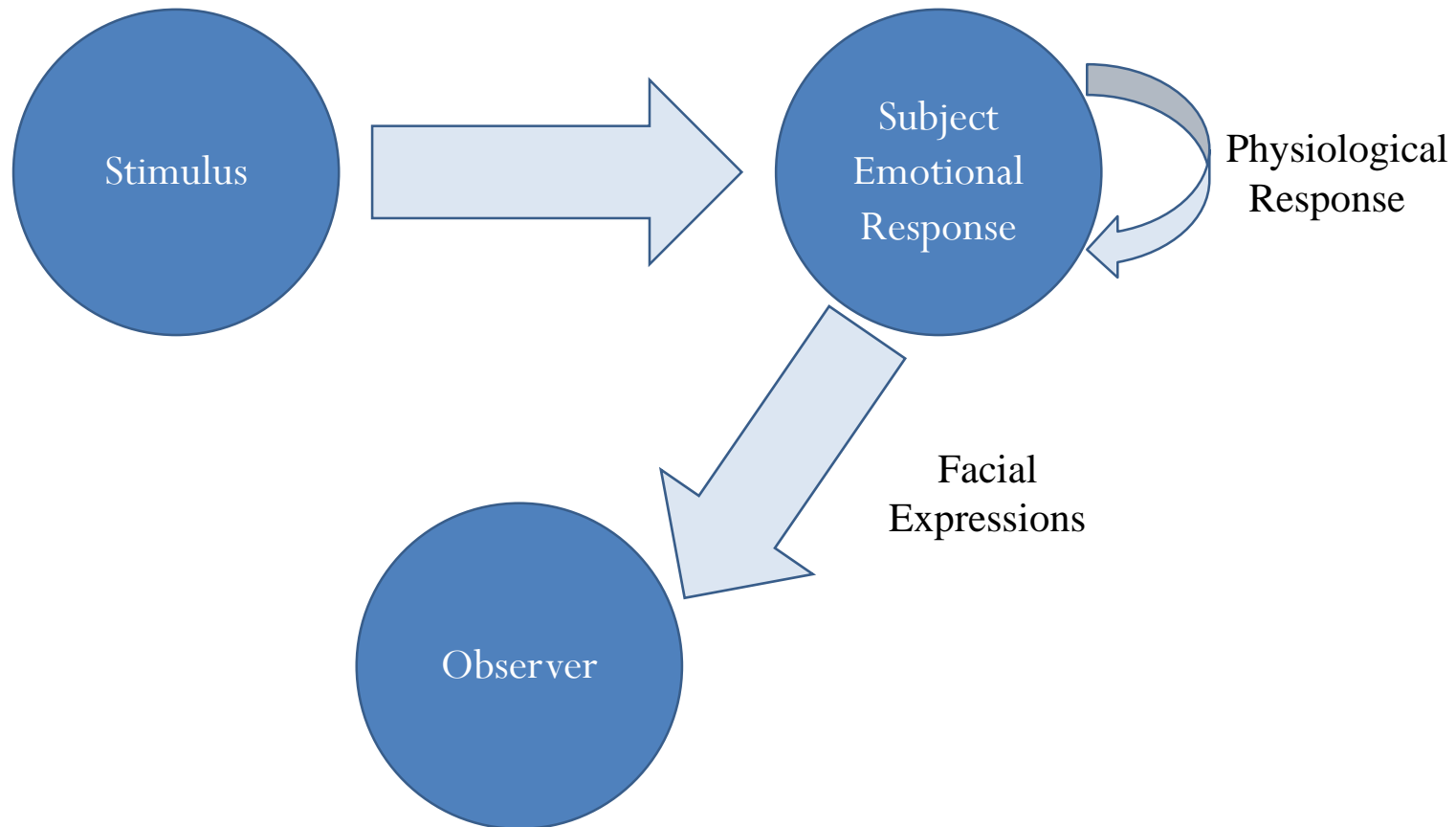
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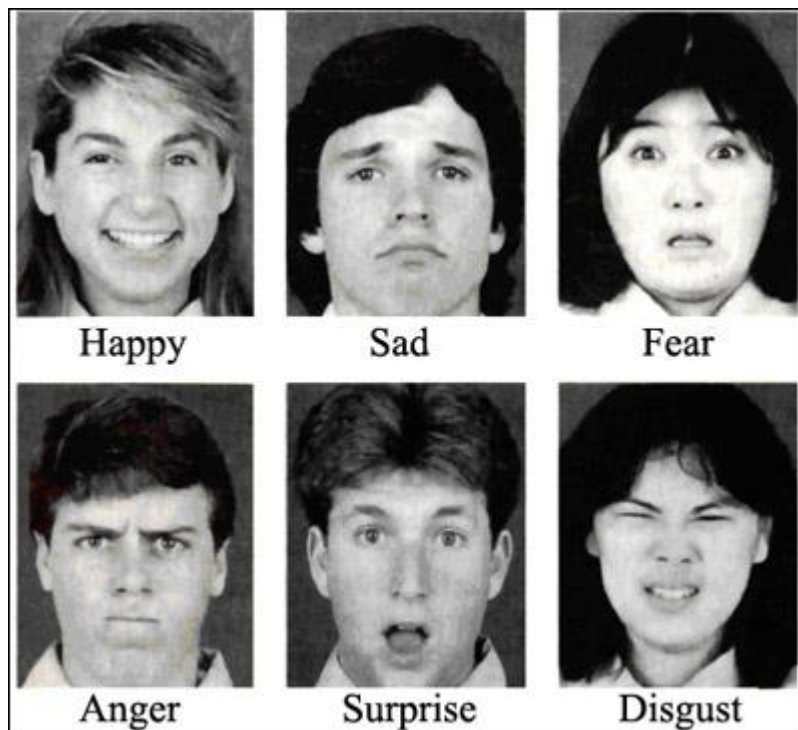
-Project Introduction-

Scope of Interest



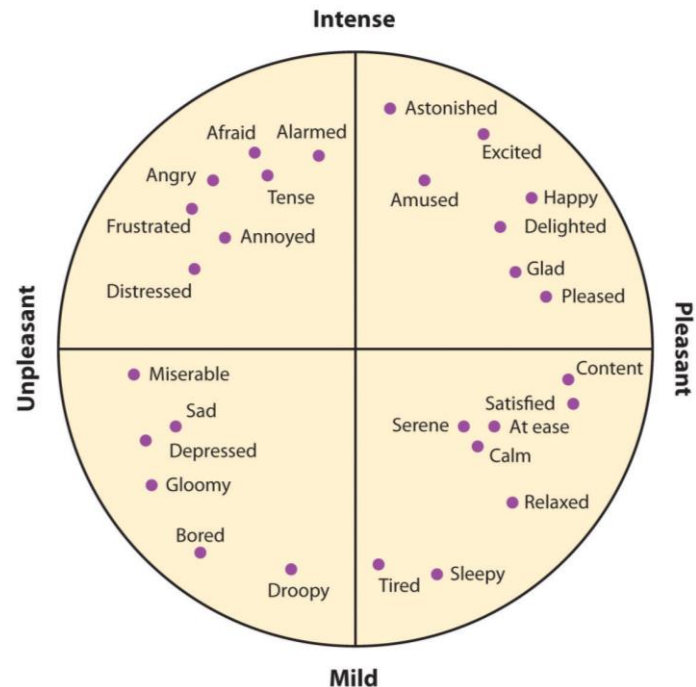
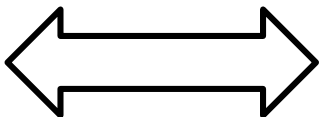
Emotions and Facial Expressions

- Basic Emotions
 - In the early 70s Ekman et. al identified 6 basic emotions (and corresponding their expressions) that are universal across cultures, race, gender etc..



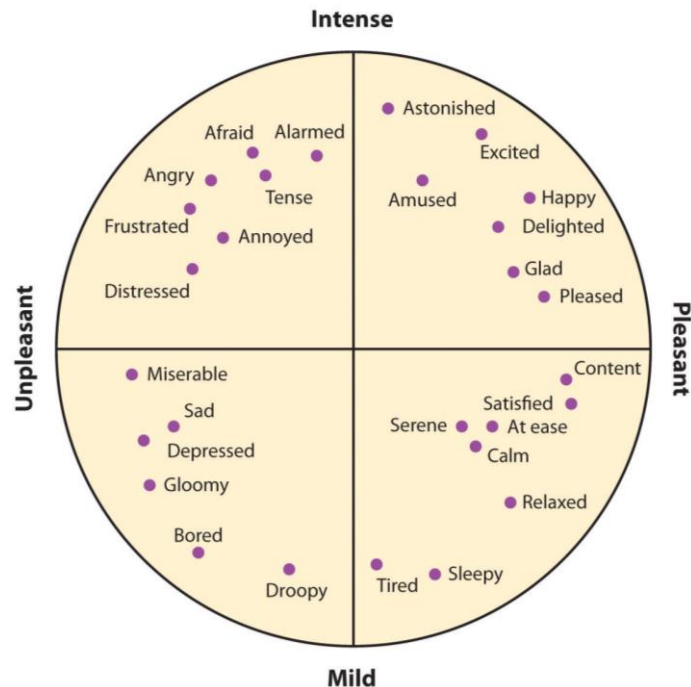
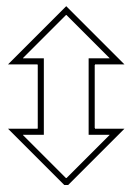
Emotions and Facial Expressions

- Multi-dimensional analysis
 - In 1980, James A. Russell (a psychologist) introduced the **valance** and **arousal** dimensions in order to interpret the emotions
 - **Valance**: describe how positive or negative the emotion is.
 - **Arousal**: describe how intense the emotion is.



Emotions and Facial Expressions

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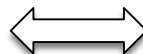


-Challenges-

Real world Expression Recognition

- Facial Expressions in Real World

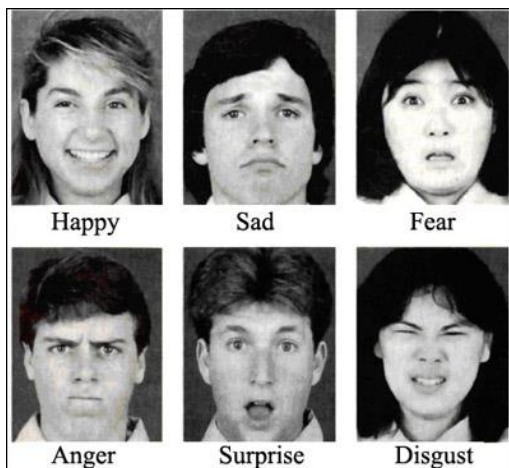
Posed Expressions



Spontaneous Expression



Basic Expressions



Non-basic Expressions

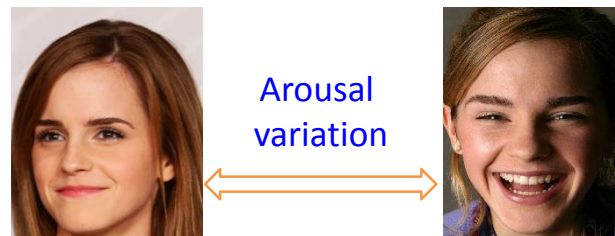


Engagement, Frustration, Boredom,
Stress, Excited, Relaxed, Depressed...

- Challenges -

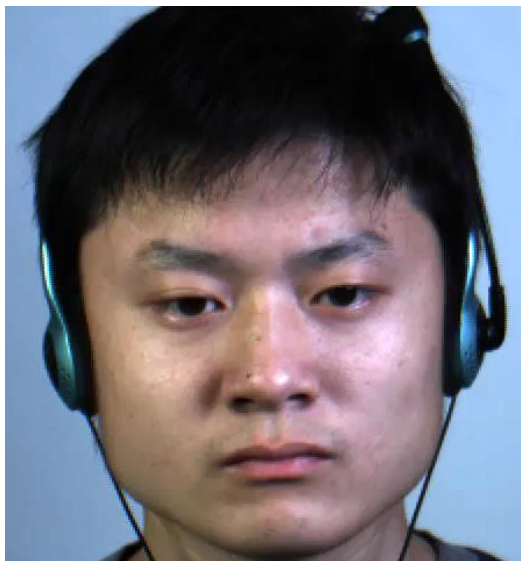
Expression Recognition Challenging points

- Challenges of facial expression recognition in the real world
 - Variations of expressions
 - Differences in subject appearance
 - Image capture environment changes (illumination changes, pose variation ...)
 - Expression intensity (arousal levels) variations

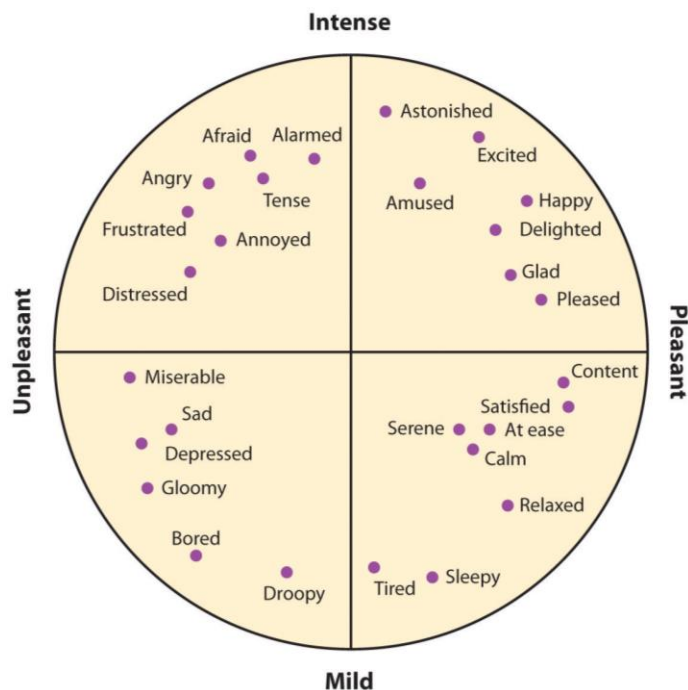


- Challenges - Subtle Emotions

- Subtle Expressions
 - Expressing emotions: e.g. Private V.S. Public
- Spontaneous Expressions:
 - Differ in appearance from prototypical expressions



Disgust

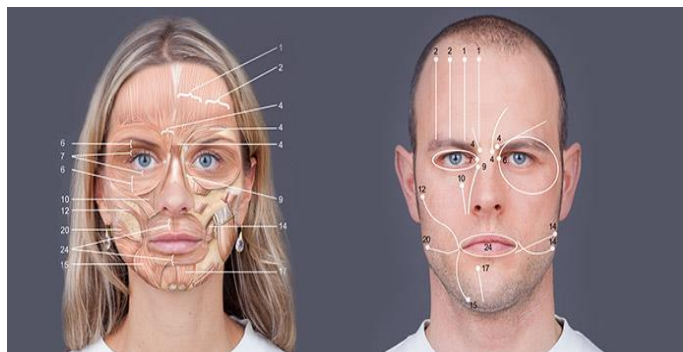


happiness

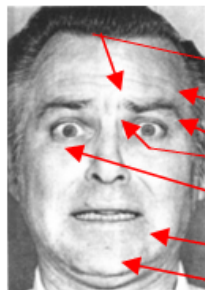
-Research Direction-

Facial Action Unit recognition in Learning Centered Emotions

- Facial Action Coding System (FACS) which would be useful to depict various facial emotions.



FACS example

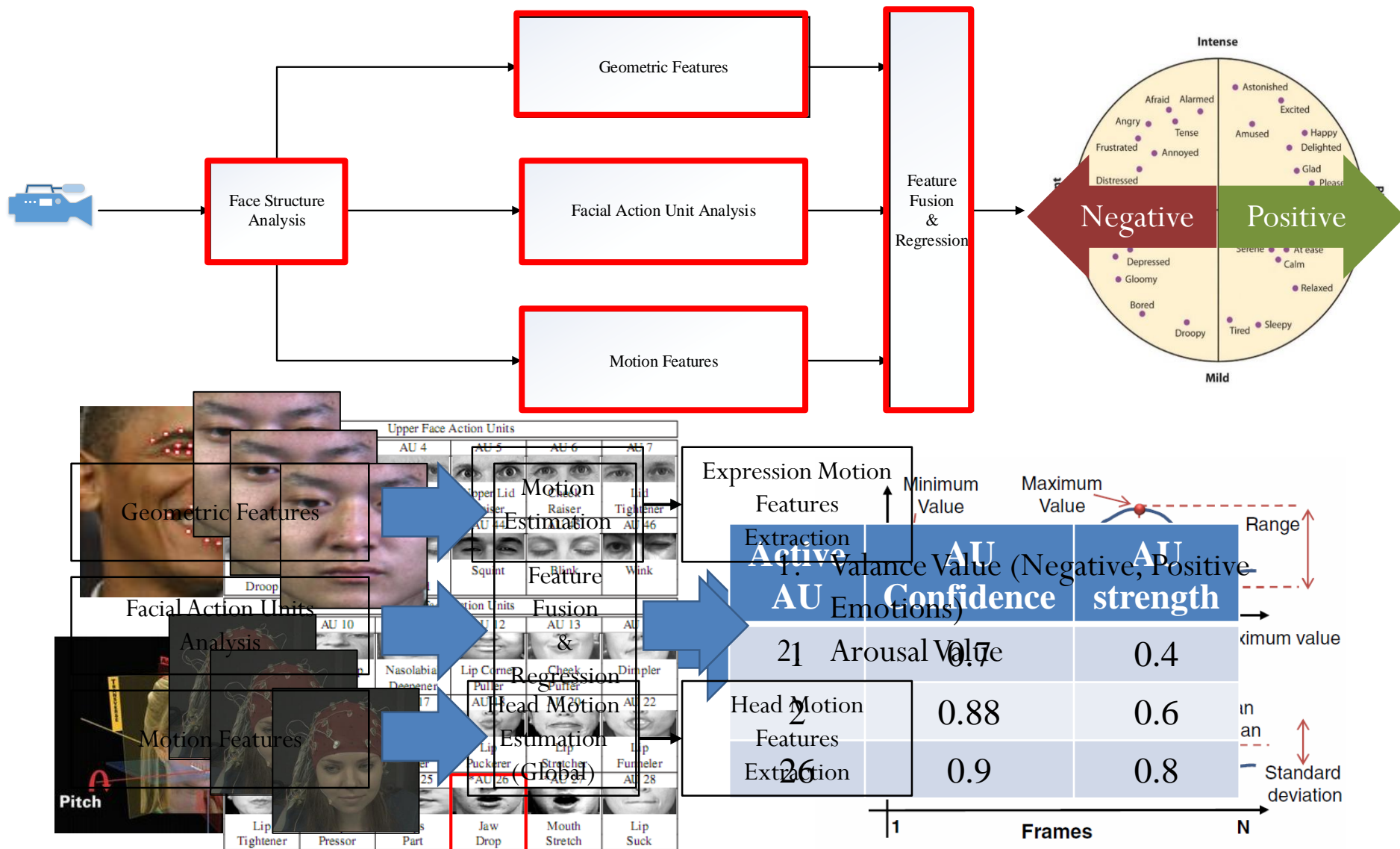


E.g., Action code: 1, 2, 4, 5, 7, 20,

- 1C Inner brow raise
- 2C Outer brow raise
- 4B Brow lower
- 5D Upper lid raise
- 7B Lower lid tighten
- 20B Lip stretch
- 26B Jaw drop

Upper Face Action Units					
AU 1	AU 2	AU 4	AU 5	AU 6	AU 7
Inner Brow Raiser	Outer Brow Raiser	Brow Lowerer	Upper Lid Raiser	Cheek Raiser	Lid Tightener
*AU 41	*AU 42	*AU 43	AU 44	AU 45	AU 46
Lid Droop	Slit	Eyes Closed	Squint	Blink	Wink
Lower Face Action Units					
AU 9	AU 10	AU 11	AU 12	AU 13	AU 14
Nose Wrinkler	Upper Lip Raiser	Nasolabial Deepener	Lip Corner Puller	Cheek Puffer	Dimpler
AU 15	AU 16	AU 17	AU 18	AU 20	AU 22
Lip Corner Depressor	Lower Lip Depressor	Chin Raiser	Lip Pucker	Lip Stretcher	Lip Funneler
AU 23	AU 24	*AU 25	*AU 26	*AU 27	AU 28
Lip Tightener	Lip Pressor	Lips Part	Jaw Drop	Mouth Stretch	Lip Suck

Research Directions



Thank you for Listening

Questions?