

Perception and Action

- video2*
- 1. Anatomic conventions & Lateralization
 - 2. Perception & Action in the brain
 - 3. Perception of biological motion
 - 4. Conclusion

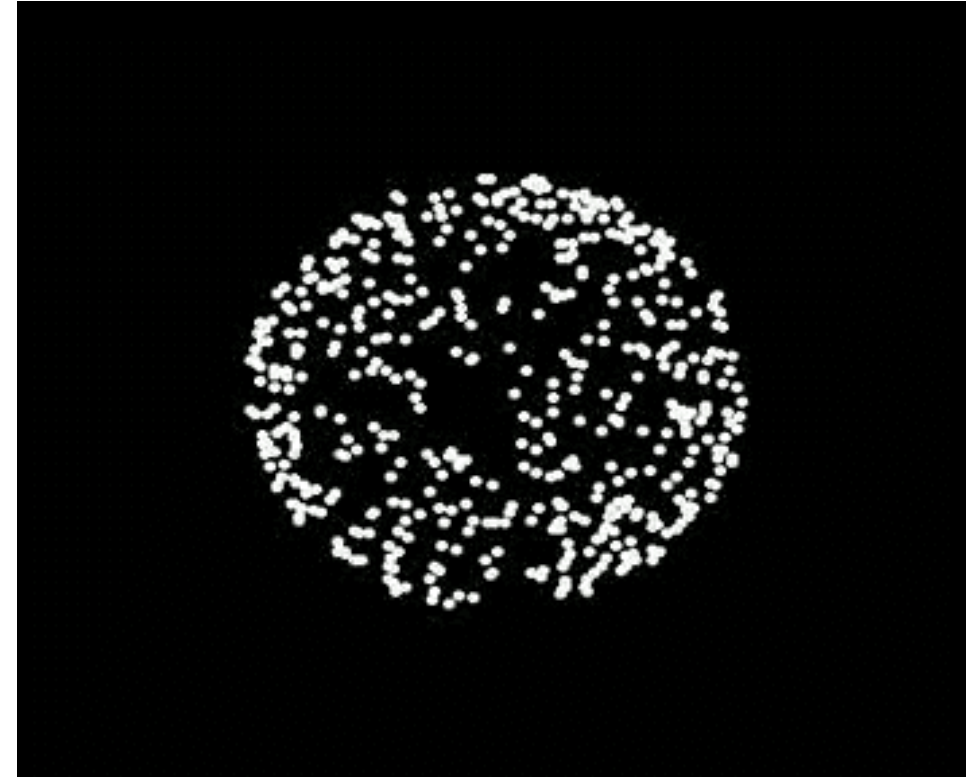
[références]

3. Perception of biological motion

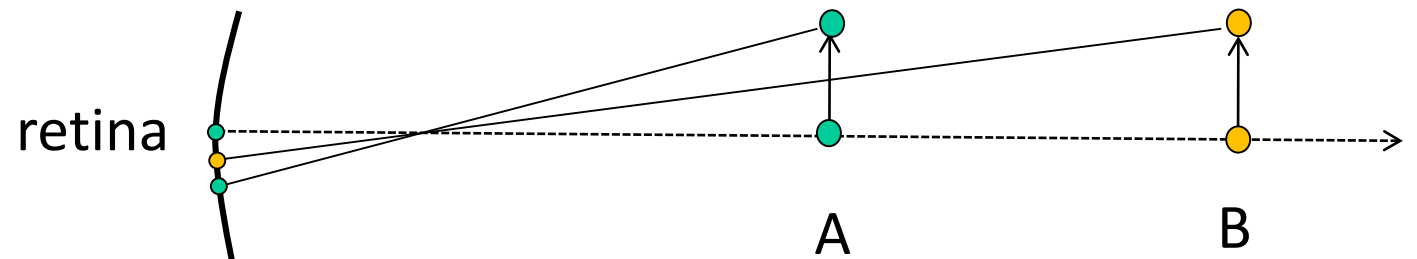
3.1 3D shape from rigid body movement

A 3D shape can be conveyed solely from the motion information owing to the *motion parallax*:

- for 2 entities with the same size, located at different depths and moving perpendicularly to the view axis, the closer one moves more on the retina than distant one.



George Mather : kinetic depth



3.2 Point light display of biological movements

The discovery of the mirror neurons by Rizzolatti et al. in 1995 confirms the intuitions from Johansson about human high sensitivity to the perception of biological motion [J 1973].

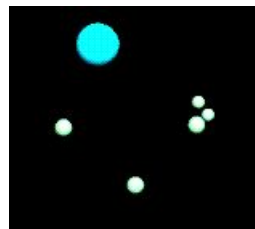
200ms are sufficient to detect a human motion

Many motion attributes can be detected
in addition to the action itself :

1) Nikolaus Troje
(Univ. Toronto, Bio
Motion Lab)



2) Franck Pollick (Univ.
Glasgow, Dept. Psychology)
study on knocking styles [P
2001]



Choose from:

- . Neutral
- . Happy
- . Sad
- . Excited
- . Relaxed
- . Angry
- . Affraid
- . Weak
- . Tired
- . Strong

3.3 Neural path of human movement processing

In 1997 Jeannerod used some *point light display* to show that the neural path of the visual processing differ significantly depending on the nature of the observed movement :

- **without human character** : activity only in the visual cortex
- **with human character**:
 - **without meaning**, e.g. *sign language*
 - **fast dorsal pragmatic** stream: emphasis on spatial understanding
 - **with meaning**, .e.g. a *pantomime* of a known action
 - ventral *semantic* stream

Note: an accelerated human movement loses its human character and is only processed in the visual cortex.

4. Conclusion

Human viewers have high expectations regarding the animation quality of human beings and other living entities they view in the real world.

A movement that does not respect the human dynamics (e.g. too fast or discontinuous) may be disregarded as being performed by a human-like character

Can induce a Break in Presence (BIP)

Or a Break in Embodiment (BIE) if it is about an avatar

Other requirements on the plausibility of Virtual Humans will be studied in a future lecture.

[References]

[J 1973] Johansson, G. (1973). Visual perception of biological motion and a model for its analysis. *Perception And Psychophysics*, 14(2), 201-211.

[P 2001] Pollick FE, Paterson HM, Bruderlin A, Sanford AJ., Perceiving affect from arm movement., *Cognition* 82 (2001)

[TRV 2006] *Traité de Réalité Virtuelle*, Ed. P. Fuch, vol 1, chap 11 Eds A. Berthoz & J.L. Vercher

Web links:

www.georgemather.com/MotionMP4.html

<http://www.biomotionlab.ca/Demos/BMLwalker.html>