Gestural and Mobile Interaction

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Gestural and Mobile Interaction

Topics:

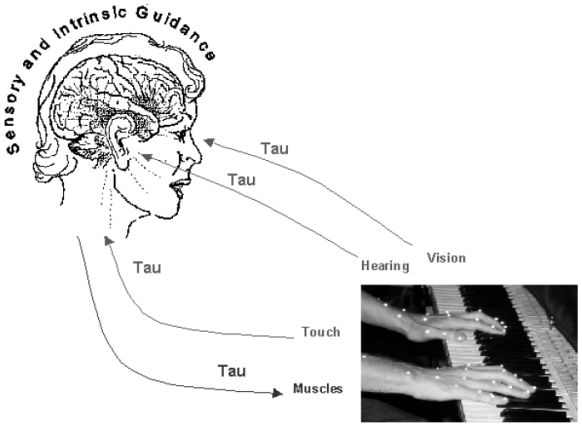
- Motor control and learning
- Interaction techniques
- Machine understanding of human movement
- Applications to mobile interaction
- Applications to embodied interaction

Motor Control and Learning

Constraints laws for movements

Interaction with the environment

- Perception-action coupling
- Feedback-feedforward mechanisms
- Tau-guide theory



Neurofunctional mechanisms of reaching and grasping

- Affordance and the brain
- Body schema and tool use
- Neural coding of spatial coordinates and spatial transformations in the brain

Learning

- Motor adaptation
- Skill acquisition

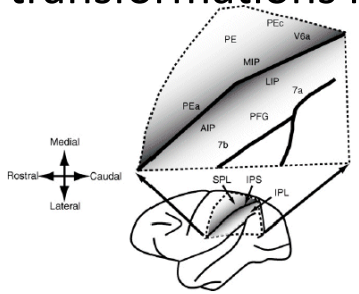


Fig. 1. Lateral view of the macaque monkey brain with the PPC highlighted and expanded. Shaded regions indicate the banks of the intraparietal sulcus (IPS). See text for definitions of abbreviations.

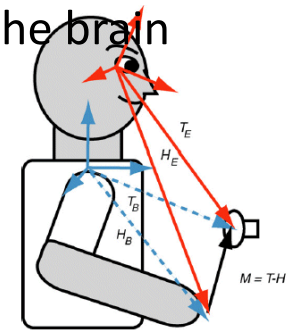
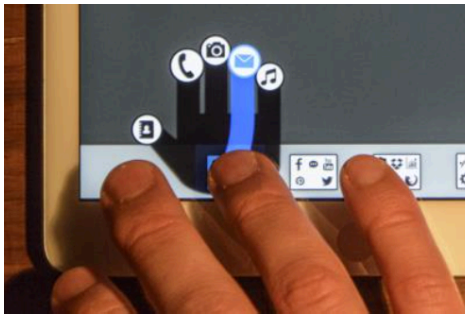


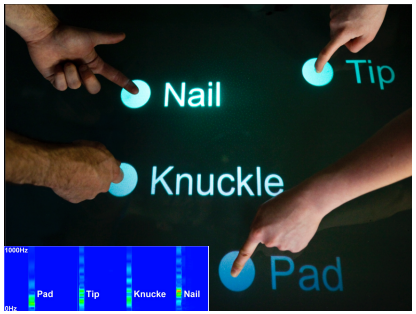
Fig. 2. Schematic showing the reach-related variables described in the text. *T*, target position; *H*, hand position; *M*, motor error; *B*, body-centered coordinates; *E*, eye-centered coordinates.

Interaction Techniques

Enrich the input bandwidth

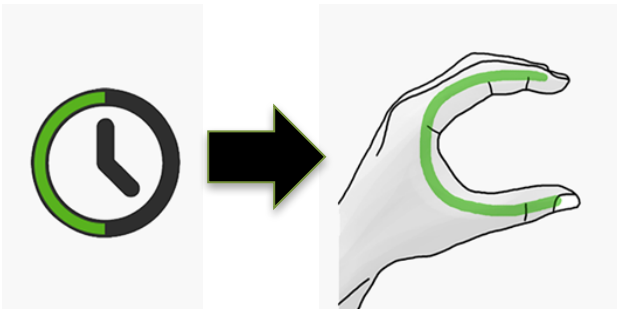
- Dimensions: 2D, 3D, multi-touch, pressure, etc.
- Advanced interaction techniques





Novice to expert transitions

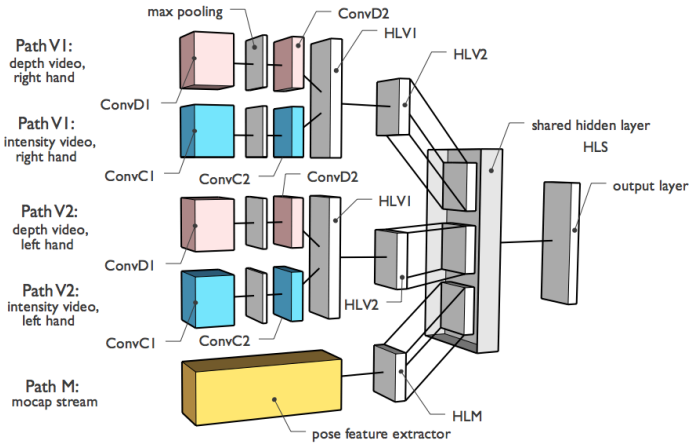
- Interactivity, Discoverability, Learning, Memorization
- Teaching Methods



Machine understanding of human movement

Goals

- To be able to **define a ML problem** (classification, regression, clustering, representation learning, etc.)
- To be able to **read and understand the literature**
- To know the available **modern technologies**
- To learn how to **design, train and test a classifier**
- To understand **learning quality and errors**



Format

- Mixed lectures and practical sessions
- Practical sessions in **python**

References

- Murphy. "*A Probabilistic Perspective of Machine Learning*". MIT Press, 2012
- Goodfellow, Bengio, Courville. "*Deep Learning*". MIT Press, 2016

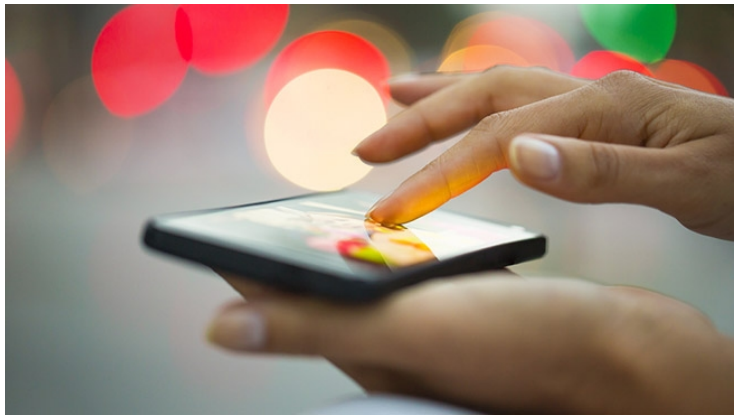
Mobile Interaction

Goals

- To know the state of the art (extended interfaces, always-available interaction, etc.)
- To be able to design interaction scenarios
- To be able to understand technical, usability and experience challenges

Format

- Lectures and practical sessions
- Practical sessions in javascript



Embodied Interaction

"Interaction Design for and with the Lived Body" (Dourish, 2001)

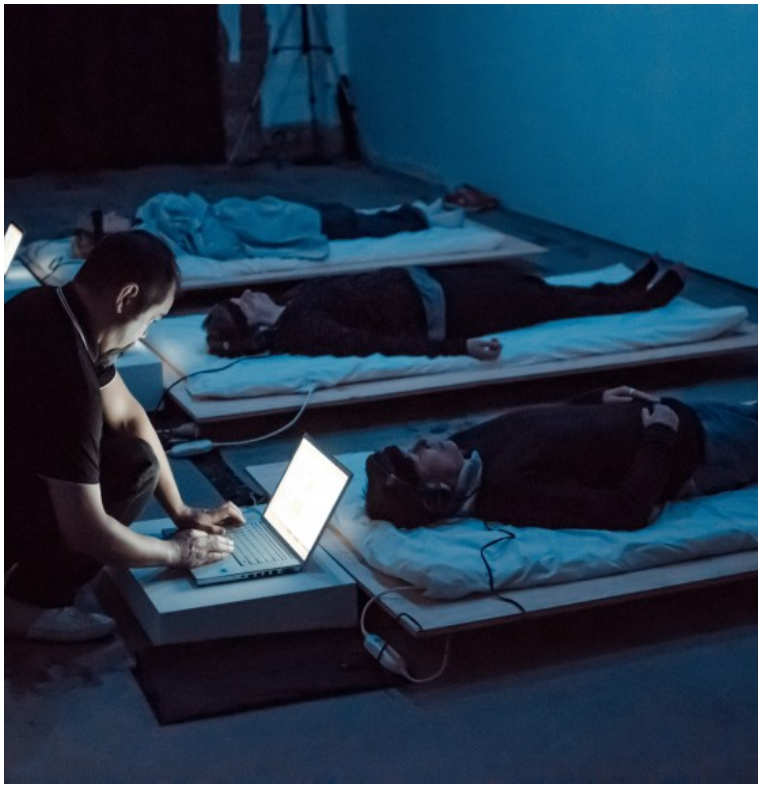
Goals

- To understand the notion of **Embodiment**
- To understand the **challenges** of an embodied approach of interaction (**technical and methodological**)

Format: lectures and discussions

References

- Dourish. "Where the action is: The foundation of Embodied Interaction". MIT Press, 2001



Resources

Website

- Hosted in personal page or lab page
- Slides, links, references

Development

- Github repository
- Examples in python and javascript