Lecture 3: Embodied Interaction

Human Robot Interaction

Victor Risager

February 26, 2024

1 Embodied Interaction

Example is *affective* body movement of a robot.
Agents paradigm of AI:

- Agents are systems that perceive their environment and act in it.
-

General model of the cognitive part of the agent.

- Perceive
- Act
- Reason

A good example of this is a thermostat. Depending on the temperature of the room. we let the warn or cold water flow through.

2 Gestures

Gestures complement what we say, and they may save time if used correctly (Explain where the buststop is without pointing).
Gestures may only have meaning in certain cultures or languages.
There are multiple taxonomies of the gesutres.

- Speech linked
- Non speech linked.

Gesture space is based around the center of the body. The are a periphary.
There are multiple ways of doing the same pointing gestures. Depending on the how far out in the periphary the gesture is performed.

3 Expressivity Parameters

Parameters:

- Spatial volume (amplitude of the movement.)
- Speed (how quickly it is done)
- Energy (the level of overshoot)
- Fluidity (How continuous is it)
- Repitition (How often the movement is expressed)

3 phases of gestures (preparation, stroke and the retraction)
A gesture speed must match the speed of the sentence, otherwise there would be waiting time either on speech or by gesture.

4 Spatial Behaviour

2 things to be aware of:

- Proxemics.
-

The size of robots has an effect on how close we allow the robot to get to us. pepper is like a child, so we automatically allow it to get closer.

5 Spatial orientation

A conversation between two persons, and a 3 person joins them. This is called F-formations for static group interaction.

- r-space
- p-space
- o-space

If the 2 initial persons that start facing each other, reforms the spatial oriantion to let the 3'rd person in.

6 Affective Interaction

You can use emotions in interactions. Intrapersonal and interpersonal.

6.1 Emotions

Categorial models there are different levels, refer to the slide.

- Anger
- Disgust
- Fear
- Enjoyment
- Sadness
- Suprise

It is also important to consider the dynamics of the emotions. E.g we may not know how you go from fear to sadness. What would happen?
PAD model (current way of determining dymanics)

-

7 Emotion recognition

Look at:

- Facial Expressions
- Posture
-
-
-

You can use emg to register emotional state.