

Human-Robot Interaction

Intelligent User Interfaces

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Readings

- Morency et al, Head Gestures for Perceptual Interfaces: The Role of Context in Improving Recognition, AIJ 2007 [*long paper*]
- Breazeal et al, Learning From and About Others: Towards Using Imitation to Bootstrap the Social Understanding of Others by Robots, Art. Life 2004 [*long paper*]

Basic Concepts

- *Physical Layer*
- *Software Layer*
- *Interaction Layer*

Physical Layer

- Sensors
 - camera (stereo)
 - microphones (array)
 - sonar, laser, infrared
 - touch (pressure)
- Actuators
 - motors (electric, pneumatic, hydraulic)
 - skin, eyes, tongue, etc.
 - locomotion (legged, wheel, ...)

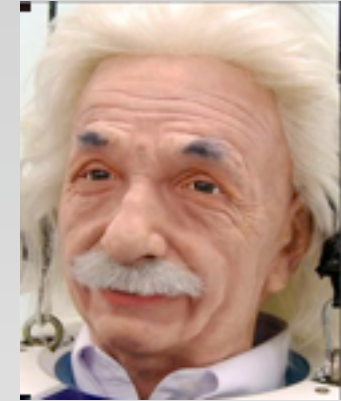
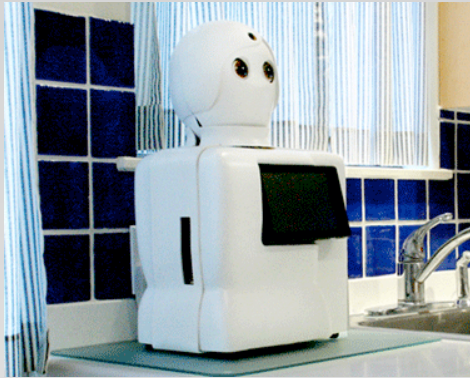
Software Layer

- Image processing
- Speech recognition and generation
- Dialogue management
- Navigation
- Emotion modeling
- Multi-modal integration
- Tasks, goals, planning
- ...

Interaction Layer

- Engagement
- Collaboration
- Social Understanding
- Empathy
- ...
- [NB: **Teleoperation** is an important part of field we are *not* focusing on.]

Spectrum of Human-likeness



humanoid

android

Readings

- Morency et al, Head Gestures for Perceptual Interfaces: The Role of Context in Improving Recognition, AIJ 2007
 - visual recognition by robot of human gestures
 - both robot and other UI applications
 - machine learning
- Breazeal et al, Learning From and About Others: Towards Using Imitation to Bootstrap the Social Understanding of Others by Robots, Art. Life 2004
 - complete interacting robot
 - focus on social/emotional interaction
 - machine learning