Human-Robot Interaction

Intelligent User Interfaces

Professor Charles Rich
Computer Science Department
rich@wpi.edu

CS 525U (S 08)

1

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*]

CS 525U (S 08)

2

Basic Concepts

- *Physical Layer*

- *Software Layer*

- *Interaction Layer*

WPI CS 525U (S 08)   3

Physical Layer

- Sensors
  - camera (stereo)
  - microphones (array)
  - sonar, laser, infrared
  - touch (pressure)

- Actuators
  - motors (electric, pneumatic, hydraulic)
  - skin, eyes, tongue, etc.
  - locomotion (legged, wheel, ...)

WPI CS 525U (S 08)   4
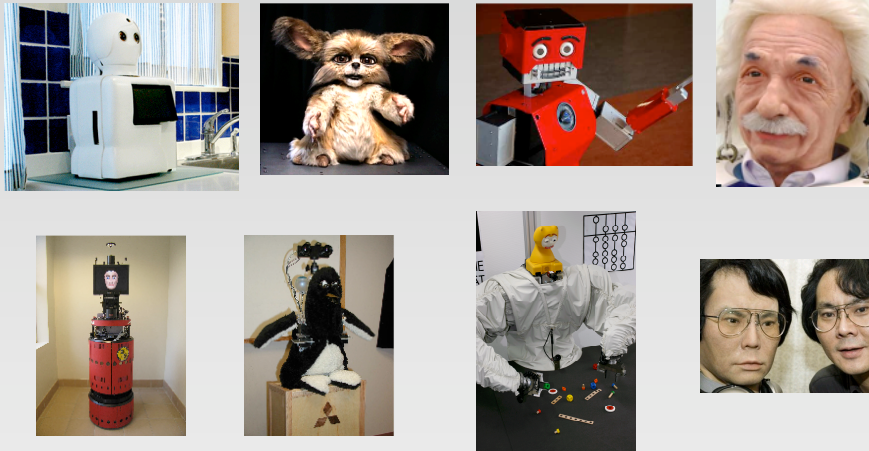
Software Layer

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

WPI CS 525U (S 08)   5

Interaction Layer

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

WPI CS 525U (S 08)   6

Spectrum of Human-likeness

humanoid   android

CS 525U (S 08)   7

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

CS 525U (S 08)   8