**HRI Case Study: Roboceptionist and Gamebot**

Reid Simmons  
Illah Nourbakhsh

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**Research Objective**

*Can we create an interactive robot that will maintain interest over extended periods of time (months/years)*?

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**Approach**

- Make it both entertaining and useful
- Make a believable robot character
  - Expressiveness
  - Personality
  - Back story
- Make it social
- Have it evolve over time
- Personalize its interactions

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**Design Decisions**

- What should its **role** be?
- How should it **behave**?
- What should it **look** like?
Avoiding the Uncanny Valley

• Mori, 1970

The Anatomy of a Roboceptionist

• Graphical, expressive face
• Pan/Tilt Head
• Mobile Base
• Speech generation
• Text-based interaction
• Laser scanner to detect people

The Underlying Technologies

• Expressive, graphical face
• Real-time speech generation and lip-synching
• Text-based input
• Laser scanner and RGB camera
• Interactive behaviors
  – Verbal
  – Non-verbal

Generating Expressions

• Why a graphical face?
  – Very expressive
  – Very adaptable
  – Doesn’t break!
• Building expressions
  – Based on Del Sarte
  – Normal
  – Head Posture
  – Eyes
  – Mouth

Behaviors

• Greeting people
  – Try to infer who is interested in the robot
• Acknowledging people
  – Depends on “zones”
  – Depends on what else is happening
• Fake phone calls
• “Back channeling”

The Story Line

• Written as a "soap opera"
  – 3-4 plot lines
  – Dramatic arcs over time
  – Temporal database doles out content
  – Story-line push vs. pull
• "Universal" themes
  – Misunderstandings
  – Friends and family
  – Aspirations
  – Robot rights
**Observations**

- Socialability
  - Greetings, thankings, annoyance
- Continued interest
  - Feedback on storylines
- Short interaction times
- Small group interactions
  - Increase in human-human interaction

**Gamebot**

- Address some of the observations from roboceptionist
  - Task oriented (Scrabble)
  - Multi-user
  - Focus on mood/emotion
  - Personalization

**Anatomy of a Gamebot**

- Graphical, expressive face
- Camera
- 3 DOF neck
- LED “heart”
- Microsoft Surface
- Keyboards
- Dual lasers
  - Future: Kinect
- Score/chat monitors

**Interacting with Gamebot**

**The Character**

- **Victor**
  - 17-year-old, from Detroit
  - Parents are line robots
  - Attending CMU on a scrabble scholarship
  - Brash / nerdy / sarcastic
  - Needy / low self-esteem
  - Moody

  Need for consistency in character – expressions, motion, heart, language, speech

**The Underlying Technologies**

- Encased head and 3 DOF neck
- Physics-based game engine
- AI game playing
- Recipe-based interaction manager
- Changing Moods
  - Based on game state and text inputs
- Simple natural language processing
- Historical data base
Upcoming Features

- Anecdotes
- Sports, Movies
- Personalization...
- Better Natural Language Processing
- Facebook and Twitter (!)
- Speech Recognition
- Face Recognition
- Play in Multiple Languages

Mini-Homework (Individual)

- Read the article “Believable Robot Characters” (available from the homework section of the course website)
- Pick a film that features humanoid robots
- Write a 2-page paper (12pt font, single spaced) comparing and contrasting the realities of current-day robots with the film depiction, in terms of capabilities, intelligence, perception by people, etc.
  - The paper should include details from the article and the film to support your arguments
  
  **Due Wednesday 1/21 at 2:50pm**
  - Electronic submissions preferred