

HRI Case Study: **Roboceptionist and Gamebot**

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What Makes a Robot Engaging?



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Research Objective

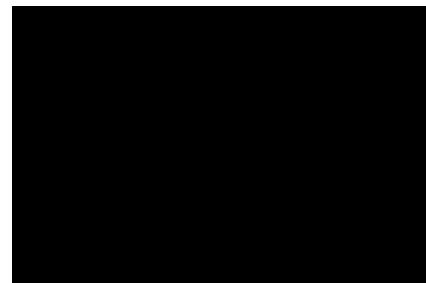
**Can we create an interactive robot
that will maintain interest over
extended periods of time (months/years)?**

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Interacting with the Roboceptionist



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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

**Collaboration
with Drama**

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Design Decisions

- What should its **role** be?
- How should it **behave**?
- What should it **look** like?

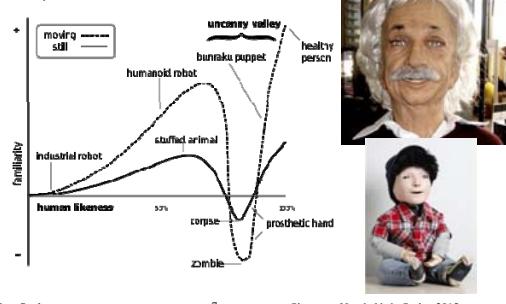
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Avoiding the Uncanny Valley

- Mori, 1970



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The Anatomy of a Roboceptionist

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



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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

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Generating Expressions

- Why a **graphical** face?
 - Very expressive
 - Very adaptable
 - Doesn't break!
- Building expressions
 - Based on **De Sarte**
 - Normal
 - Head Posture
 - Eyes
 - Mouth



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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”

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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



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Observations

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

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Gamebot

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

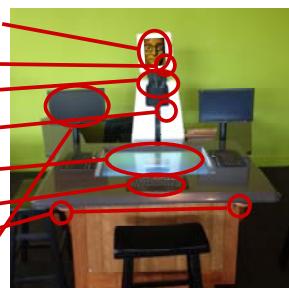
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Anatomy of a Gamebot

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

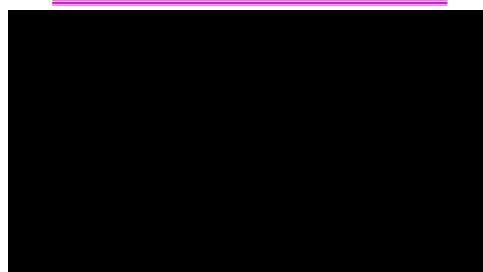


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Interacting with Gamebot



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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

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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

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Upcoming Features

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

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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

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