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## ***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)?***

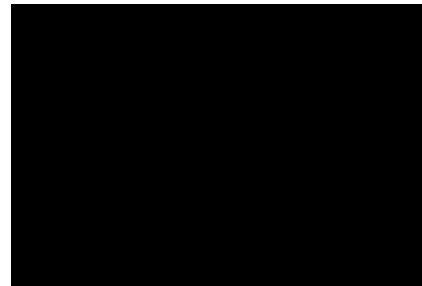
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## ***Interacting with the Roboceptionist***



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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?

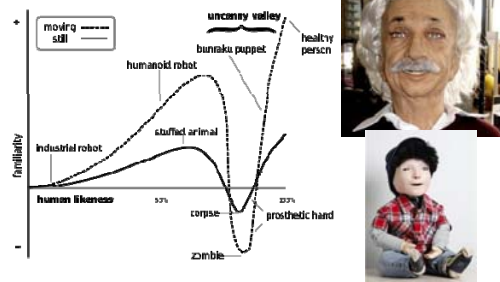
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## Avoiding the Uncanny Valley

- Mori, 1970



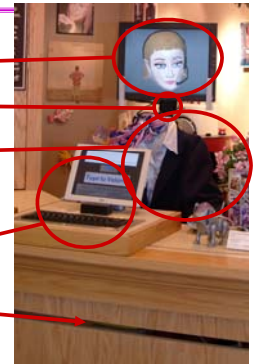
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## The Anatomy of a Roboceptionist

- 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 **Del 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

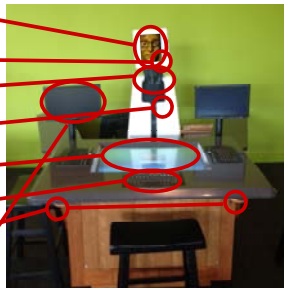
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## Anatomy of a Gamebot

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

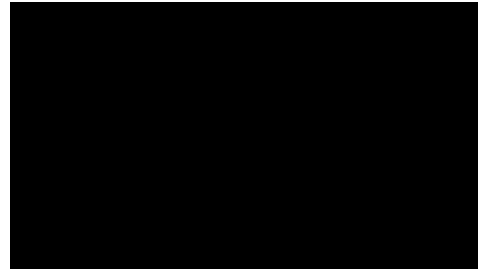


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## Interacting with Gamebot



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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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