

Week 07

Conversational UIs: Underlying Theories

HCI 이론 및 실습 2020 Spring

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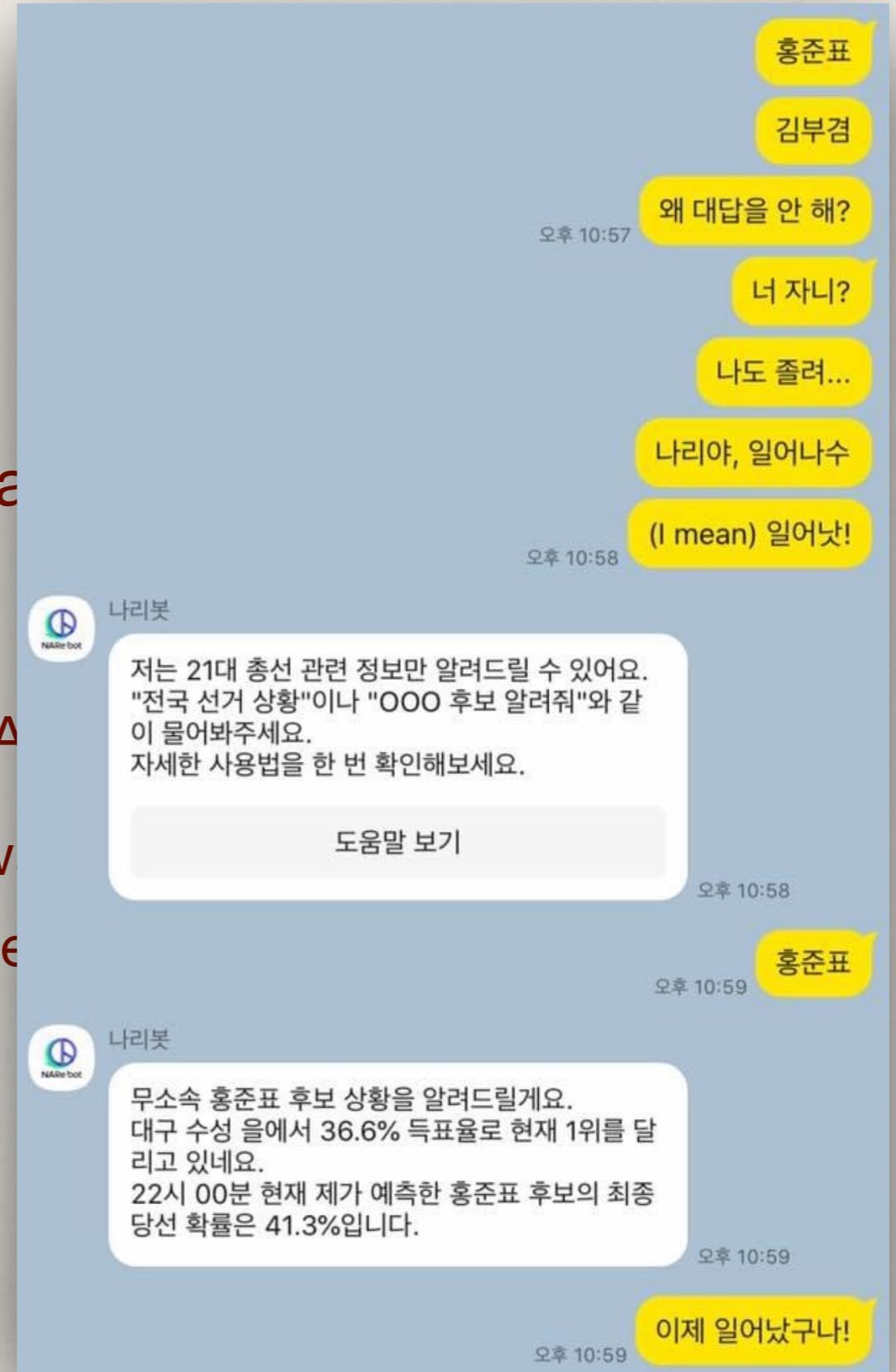
Premise of HCI/HRI Research

Media Equation

- ❖ Media (computer) = real (actual person)
- ❖ CASA framework
 - ❖ Computers are Social Actors (Reeves & Nass, 1996)
 - ❖ Social response: The way people treat media is fundamentally the same as the way they deal with real people or things

Media Equation

- ❖ Media (computer) = reality
- ❖ CASA framework
 - ❖ Computers are Social Agents
 - ❖ Social response: The way people respond to computers is fundamentally the same as they respond to other people or things



Media Equation

- ♦ Even when the ‘non-humanness’ tendency of the system itself is emphasized, such as Text-to-Speech (TTS), people apply social cues to media (Nass & Lee, 2000)
- ♦ Therefore, in general, **interaction with agents** such as human-computer or human-robot is also **based on interpersonal communication.**

Common Ground / Mental Model

- ❖ Communication between people requires coordination to reach mutual understanding
 - ❖ **Common Ground:** a large amount of shared knowledge that determines the process of coordination
(Clark & Brennan, 1991)
- ❖ Least collaborative effort is important - people in conversation minimize their collective effort to gain understanding

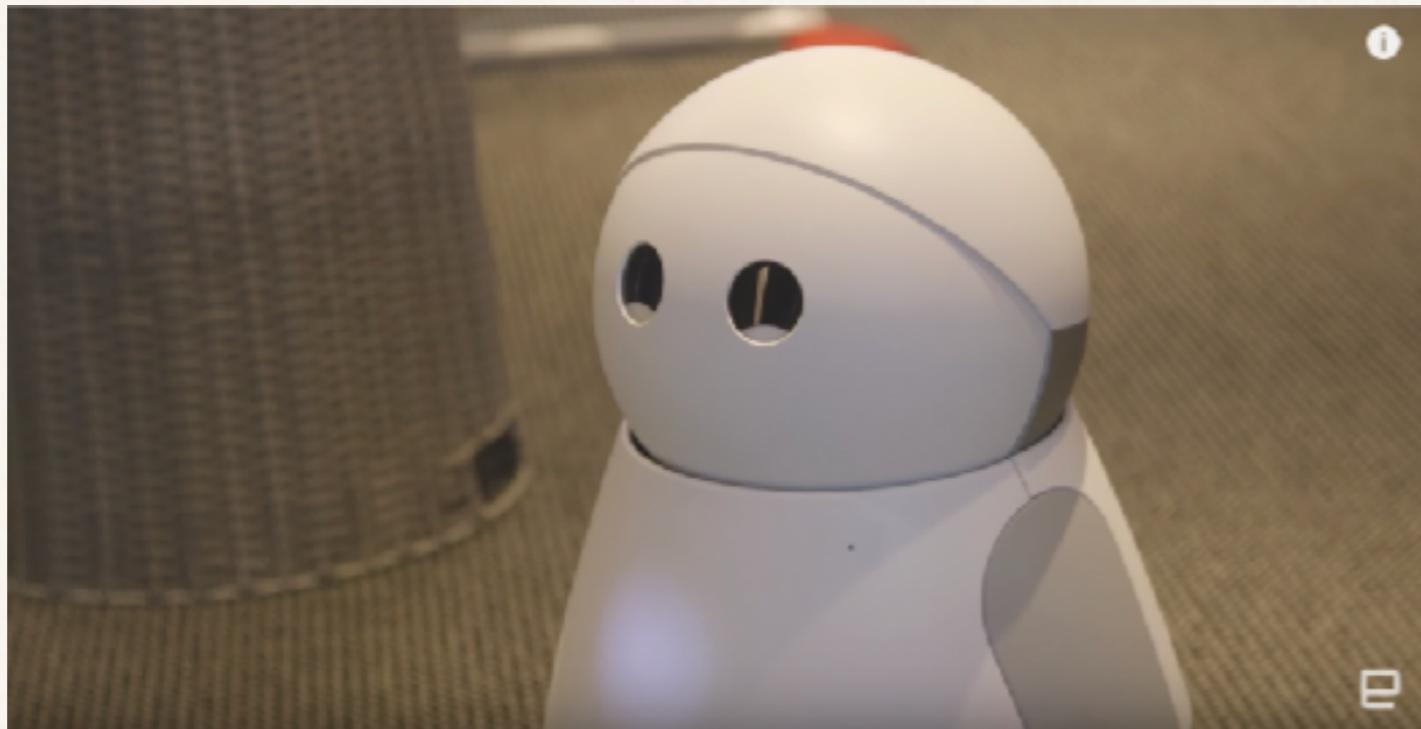
Common Ground / Mental Model



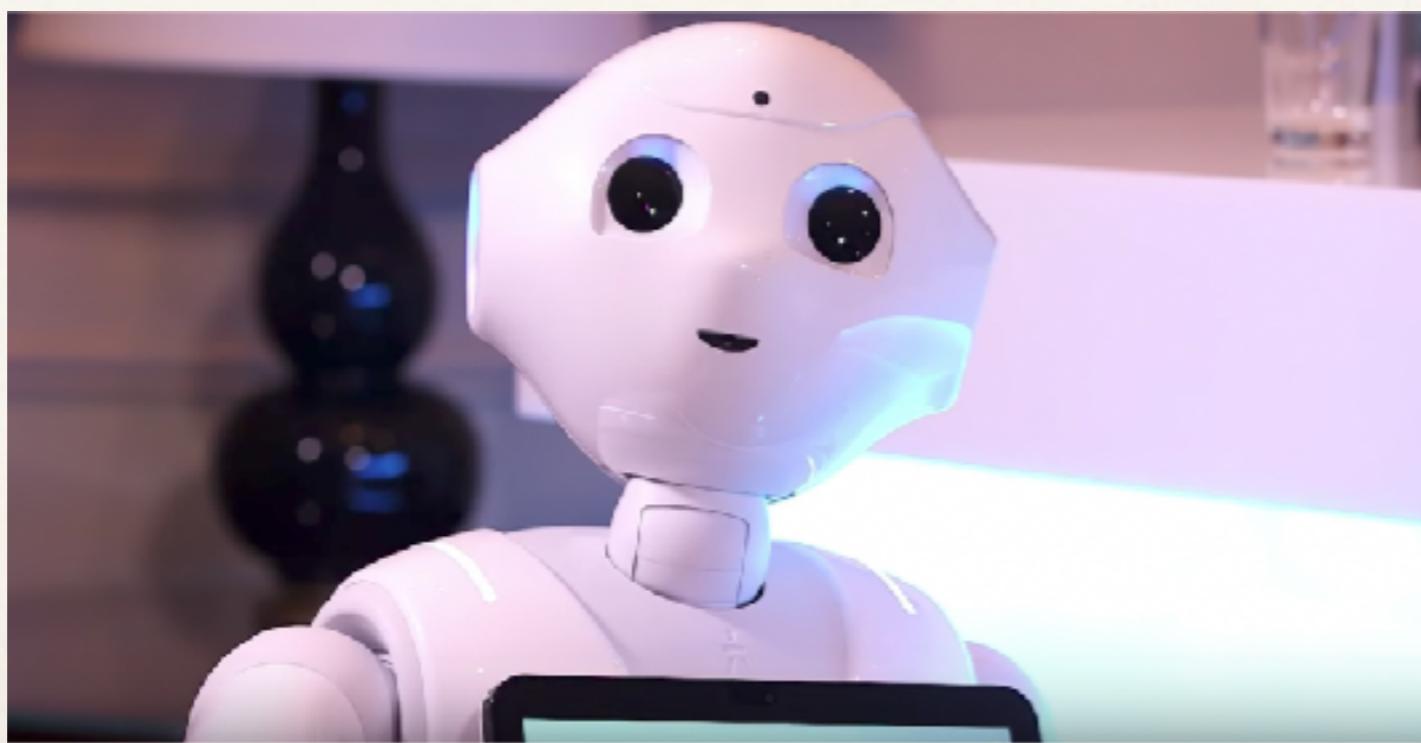
Common Ground / Mental Model

- ♦ To form common ground, compatible **mental models** must be developed of one another
 - ♦ an estimation process, which leads to expectations of the behavior, role, and capability of the other

Mayfield Kuri & SoftBank Pepper



[https://www.youtube.com/
watch?v=bg7-3A2zeyw&t=3m7s](https://www.youtube.com/watch?v=bg7-3A2zeyw&t=3m7s)



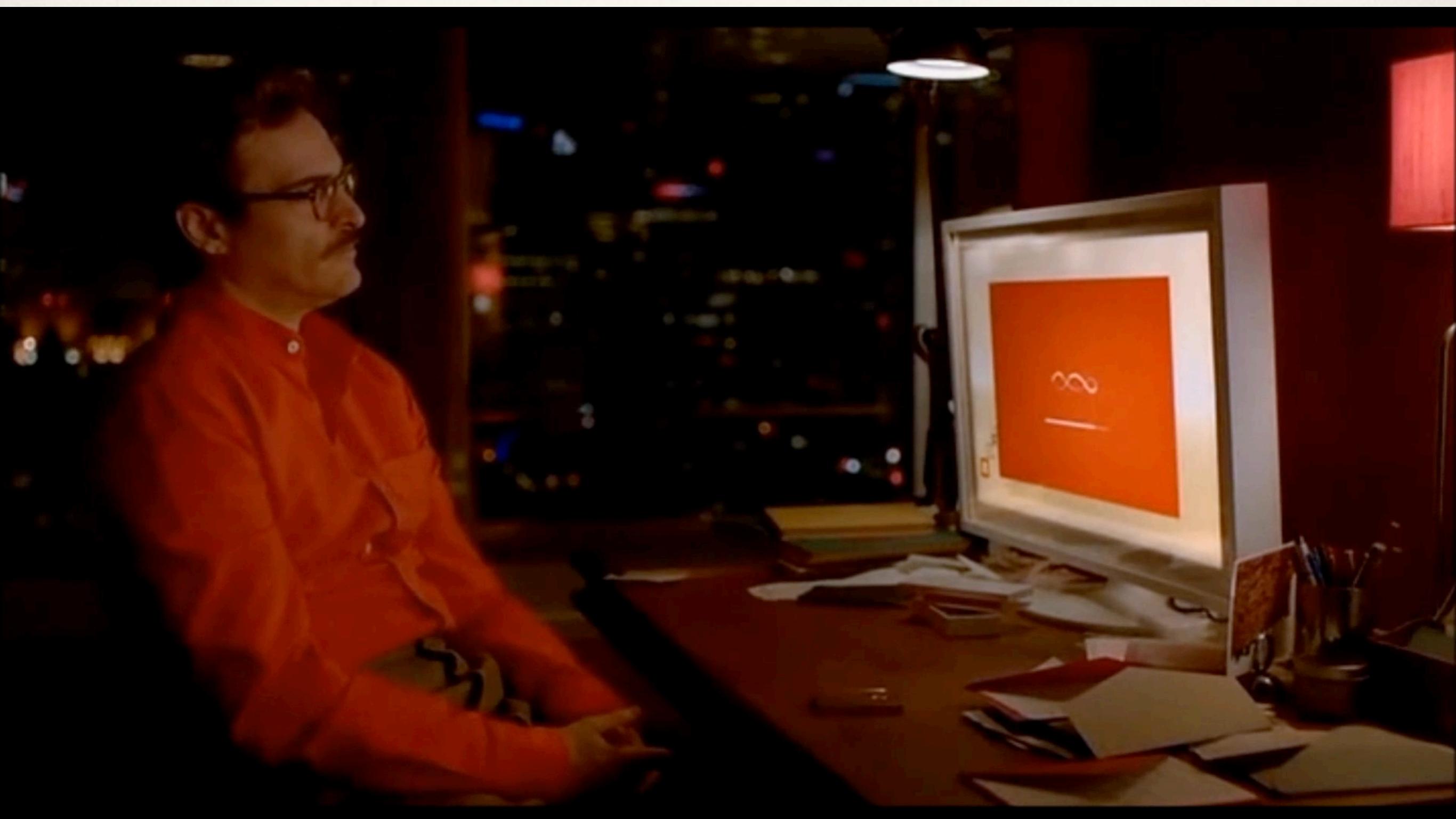
[https://www.youtube.com/
watch?v=aZ5VkgvQFBU](https://www.youtube.com/watch?v=aZ5VkgvQFBU)

Interpersonal Communication

Expectancy Violations Theory

- ❖ **Expectancies** include cognitive and affective components and include judgments of what behaviors are possible, feasible, appropriate, and typical for a particular setting, purpose, and set of participants (Burgoon & Hale, 1988)
- ❖ Used to predict interaction patterns and outcomes (Le Poire & Burgoon, 1994)
 - ❖ pattern: reciprocity, compensation etc.
 - ❖ outcome: attraction, credibility etc.

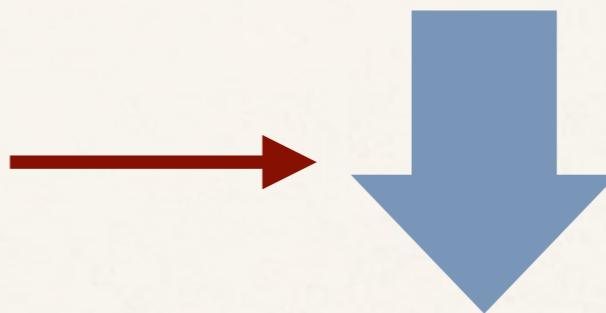
Movie “Her”



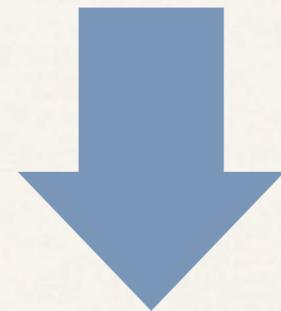
Expectancy Violations Theory

Violations of expectancies

violation valence
or communicator reward valence



Evaluation of the violation



Behavioral response / Communication pattern

Expectancy Violations Theory

- ❖ **Violation Valence** (Burgoon & Le Poire, 1993)
 - ❖ (behavior valence) value of a specific unexpected behavior, regardless of who does it
 - ❖ positive valence: do more than expected
 - ❖ negative valence: do less than expected

Expectancy Violations Theory

- ❖ **Communicator Reward Valence** (Burgoon & Le Poire, 1993)
 - ❖ crucial when the meaning of an action is unclear
 - ❖ violations by high-reward communicators
 - ❖ positive violation: resulting in increased involvement
 - ❖ negative violation: resulting in increased involvement
 - ❖ violations by low-reward communicators
 - ❖ positive violation: resulting in increased involvement
 - ❖ negative violation: resulting in decreased involvement

Expectancy Violations Theory

- ❖ Expectancies are more likely to be influential when individuating information is absent or open to interpretation (Hamilton, Sherman, & Ruvolo, 1990)
- ❖ The role of expectancies may pale in comparison to the actual here-and-now behavior of the partner (Burgoon, Le Poire, & Rosenthal, 1995)

Social Penetration Theory

- ❖ **Social Penetration** refers to the process of developing deeper intimacy with another person through mutual self-disclosure and other forms of vulnerability
 - ❖ individuals maintain protective outer layers that surround a central core that represents the true self
 - ❖ the outer layers must first be exposed, experienced, and successively shed before the inner and intimate layers are revealed

Social Penetration Theory

- ❖ What behaviors?
 - ❖ self-disclosure: exchange of information (attitudes, values, biographical-demographic, personal data) and expressions (positive and negative affect)
 - ❖ mutual activities: sports, dating, studying, etc.
- ❖ Dimensions
 - ❖ breadth of penetration: amount of interaction
 - ❖ depth of penetration: degree of intimacy

Social Penetration Theory

- ❖ Gender Difference (Collins & Miller, 1994)
 - ❖ compared with male same-sex friendships, female same-sex friendships are characterized by more frequent and more intimate disclosure
- ❖ Need to consider situation factors
 - ❖ stage of the relationship, content of the disclosure, context within which the disclosure takes place

Workshop: Dialog Design

More to think about...

- ❖ How do we apply the theories in designing dialog?
- ❖ What is “conversation” we pursue with AI agent?
 - ❖ User’s expectation towards AI agent
 - ❖ Build relationship: initiation → maintaining → develop
 - ❖ Conversation manner: (who) initiation, turn-taking, dominance, leave-taking
 - ❖ Intimacy: how do we disclosure ourselves to AI agent vs. how do AI agent disclosure themselves to user
 - ❖ Mutual understanding: what kind of information does AI agent has to remember, vice versa

Workshop Process

- ❖ Step 1: Discuss what tasks do users conduct with conversational news service. Write down 2-3 tasks.
- ❖ Step 2: Develop dialog for the tasks by applying theories we learn today.

Example Dialog

- ❖ **TASK1: Ordering Pizza**
 - ❖ Salesperson: What can I help you?
Customer: I would like to order a pizza.
Salesperson: What kind of pizza would you like?
Customer: Pepperoni, large size for to go.
Salesperson: 10 dollars, Thanks.
 - ❖ A very simple (and dry) conversation. How do you change the dialog?
 - ❖ What is user's expectation from this conversation?
 - ❖ Discuss what theory will make the conversation exciting.

Questions...?
