

Week 07

## Conversational UIs: Underlying Theories

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HCI 이론 및 실습 2019 Spring

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## Premise of HCI/HRI Research

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# 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

- ♦ 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

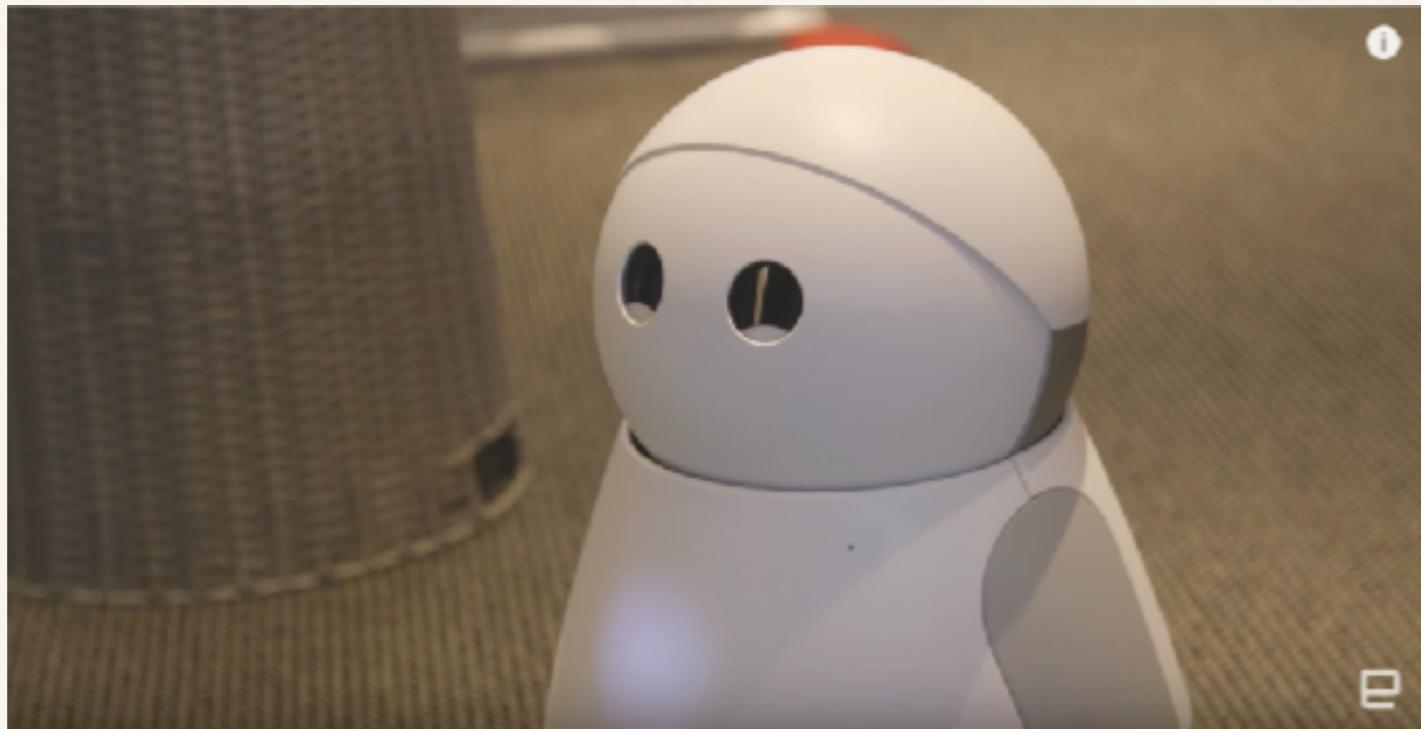
# Common Ground / Mental Model



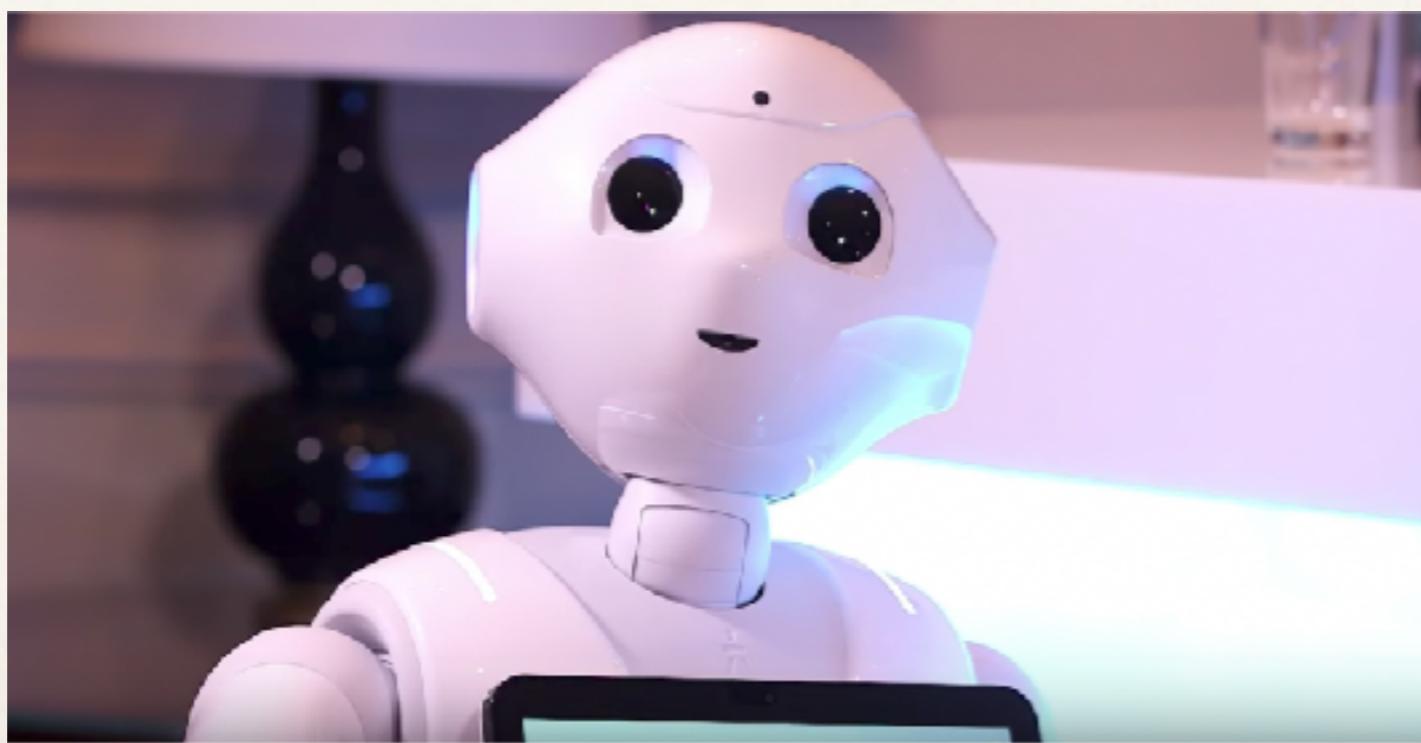
# Common Ground / Mental Model

- ♦ 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

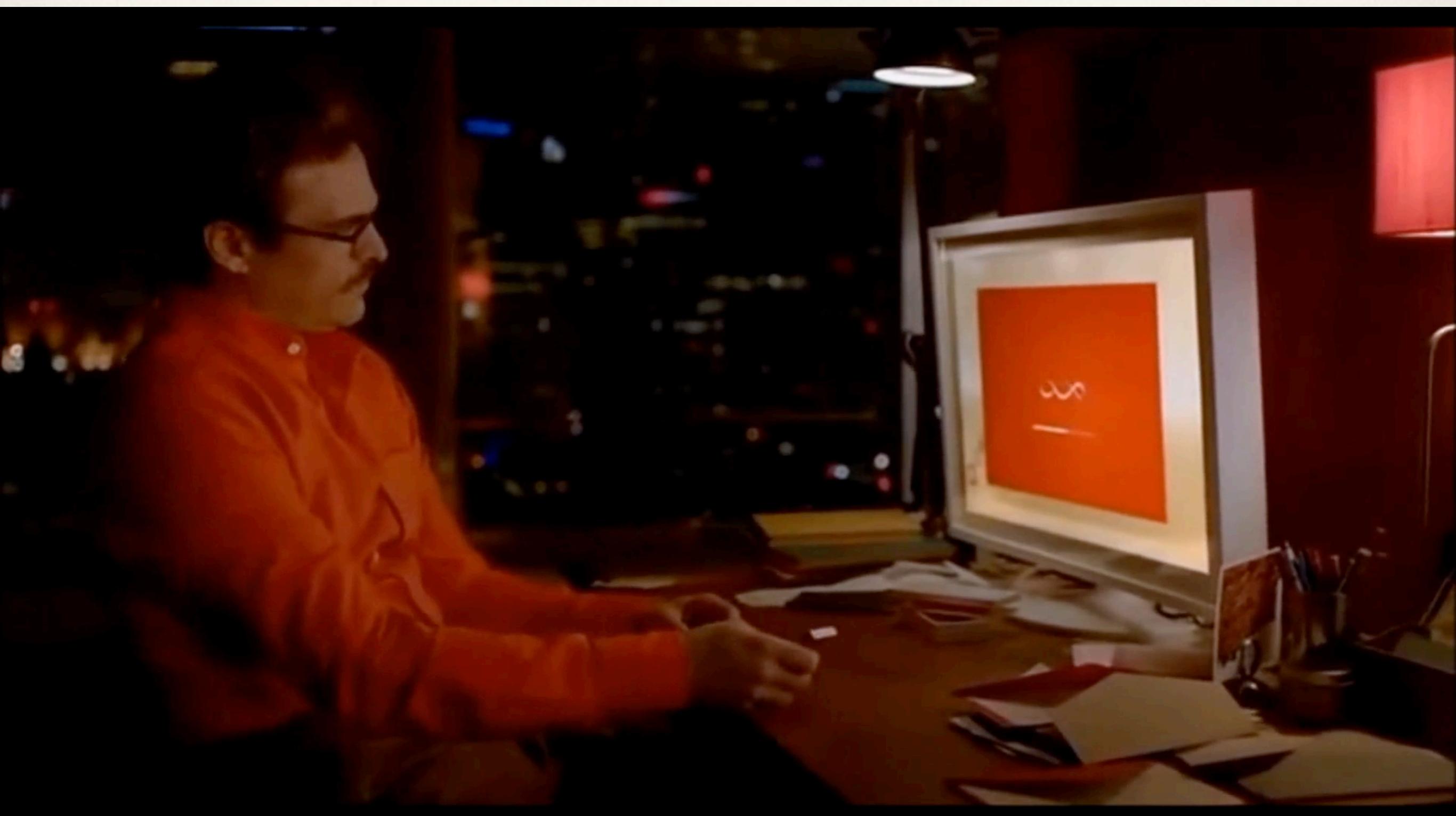
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# Expectancy Violations Theory

- ❖ **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.

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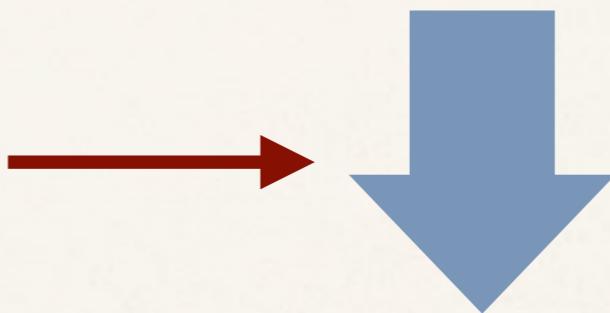
## Movie “Her”



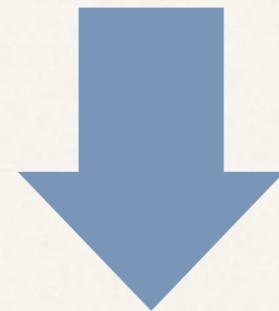
# Expectancy Violations Theory

## 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

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## 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

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# 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...?

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