

# **Properties of Human-Human Conversation**

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# Properties of Human Conversation

- **Turns:** Individual contributions to the dialogue
  - Typically a sentence, but may be shorter (e.g., a single word) or longer (e.g., multiple sentences)



# Properties of Human Conversation

- Understanding turn structure is very important for spoken dialogue systems!
- Systems must know:
  - When to stop talking
    - Dealing with interruptions
  - When to start talking
    - Detecting when the human user has finished speaking
- Detecting when a user has finished speaking is called **endpoint detection**
  - Challenging due to noise and speech pauses



# Properties of Human Conversation

- **Speech Acts:** Types of actions performed by the speaker
  - Also referred to as **dialogue acts**
- Major dialogue act groups:
  - **Constatives**
  - **Directives**
  - **Commissives**
  - **Acknowledgments**

**Natalie:** Hi, I would like to order thirteen buckets of cheesy popcorn.

**Salesperson:** Um okay when do you need those?

**Natalie:** I want to bring them to a party on Saturday.

**Salesperson:** And what size buckets would you like?

**Natalie:** Extra large.

**Salesperson:** Okay, our cheesy popcorn is really popular. Would you be okay with six buckets of cheesy popcorn and seven buckets of caramel popcorn?

**Natalie:** No.

**Salesperson:** Okay, what about some of our other flavors? We have ranch-flavored popcorn--

**Natalie:** I'll take that. Eight buckets of ranch-flavored popcorn and five buckets of cheesy popcorn.

**Salesperson:** Okay.

**Natalie:** Actually, wait. Seven buckets of ranch and six buckets of cheesy popcorn, still all in extra large.

**Salesperson:** Okay, we will have seven extra-large buckets of ranch-flavored popcorn and six extra-large buckets of cheesy popcorn ready for you to pick up on Friday.

# Properties of Human Conversation

- **Constatives:** Making a statement
  - Answering
  - Claiming
  - Confirming
  - Denying
  - Disagreeing
  - Stating

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# Properties of Human Conversation

- **Directives:** Attempting to get the addressee to do something

- Advising
- Asking
- Forbidding
- Inviting
- Ordering
- Requesting

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# Properties of Human Conversation

- **Commissives:** Committing the speaker to a future action
    - Promising
    - Planning
    - Vowing
    - Betting
    - Opposing
- 

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# Properties of Human Conversation

- **Acknowledgements:** Expressing the speaker's attitude regarding some social action
  - Apologizing
  - Greeting
  - Thanking
  - Accepting

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# Properties of Human Conversation

- **Grounding:** Establishing common ground by acknowledging that the speaker has been heard and/or understood
  - Saying “okay”
  - Repeating what the other speaker said
  - Using implicit signals of understanding like “and” at the beginning of an utterance

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**Salesperson:** ...

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# Properties of Human Conversation

- Conversations have structure
  - Questions set up an expectation for an answer
  - Proposals set up an expectation for an acceptance or rejection
- These dialogue act pairs are called **adjacency pairs**
  - First pair part: Question
  - Second pair part: Answer

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# Properties of Human Conversation

- However, two dialogue acts in an adjacency pair don't always immediately follow one another!
- Adjacency pairs can be separated by **side sequences** or **subdialogues**
  - Interruptions
  - Clarifying questions
  - Corrections
- Some adjacency pairs also have **presequences**
  - Requests may be preceded by questions about a system's capabilities

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# Properties of Human Conversation

- **Initiative:** Conversational control
- Generally, the speaker asking questions has the **conversational initiative**
- In everyday dialogue, most interactions are **mixed-initiative**
  - Participants sometimes ask questions, and sometimes answer them

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# Properties of Human Conversation

- Although normal in human-human conversations, mixed-initiative dialogue is very difficult for dialogue systems to achieve!
- In question-answering systems (e.g., “Alexa, what’s the weather like right now?”) the initiative lies entirely with the user
  - Systems such as these are called **user-initiative** systems
- Opposite of user-initiative system: **system-initiative** system
  - Can be very frustrating!
    - Salesperson:** Which variety of caramel popcorn would you like?
    - Natalie:** I don’t want caramel popcorn.
    - Salesperson:** Which variety of caramel popcorn would you like?
    - Natalie:** Can I quit?
    - Salesperson:** Which variety of caramel popcorn would you like?
    - Natalie:** Um, regular.

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# Properties of Human Conversation

- **Inference:** Drawing conclusions based on more information than is present in the uttered words
- **Implicature:** The act of implying meaning beyond what is directly communicated

Mentioning the party on Saturday (especially in response to the salesperson's question!) implies that the popcorn will be needed by that time

The salesperson infers that the popcorn should be ready for pickup by Friday

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# Summary: Properties of Human-Human Conversation

Turns

Turn-Taking

Speech Acts

Grounding

Adjacency Pairs

Implicature

Initiative

Inference