Studies of Dialogs

Regina Barzilay

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Dialogs

What is a connection between the picture and our topic?

To see this image, go to
http://images.google.com/images?q=false_maria.jpg

Today

- Properties of human dialogs

- Formalization of these properties required for system building

  - Taxonomies of Speech Acts

What Makes Dialogue Different?

- Turn taking

- Grounding

- Conversational Implicature

Dialogue Example

C1: I need to travel in May.

A1: And, what day in May you want to travel?

C2: OK uh I need to be there from the 12th to the 15th

A2: And you're flying into what city?

C3: Seattle

A3: And what time would you like to leave Pittsburgh?

C4: Uh hmm I don't think there's many options for non-stop

A4: Right. There's three non-stops today.

C5: What are they?

Turn Taking

People can quickly figure out who should talk next, and when they should speak

- Little overlap (Levinson'1983 smaller than 5%)

- The amount of time between two turns is low (less than few hundred milliseconds)

Transition-taking Rules

Conversation Analysis (1974)

- If during this turn the current speaker has selected A as the next speaker then A must speak next

- If the current speaker does not select the next speaker, any other speaker may take the next turn

- If no one else takes a turn, the current speaker may take the next turn

Transition-taking Rules

Mechanisms for the next speaker selection:

- adjacency pairs (Schelgoff, 1968):
  GREETING → GREETING
  COMPLIMENT → DOWNPLAYER
  REQUEST → GRANT

- utterance boundaries

Transition-taking Rules

Silence Duration

A: Is there something bothering you or not?

(1.0)

A: Yes or no?

(1.5)

A: Eh?

B: No.

Utterance Segmentation

- Cue words (*well, and, so*)

- N-grams and POS sequences

- Prosody (pitch, accent, pause duration)

Grounding

The speaker and the hearer must establish common ground (Stalnaker, 1978)

> A: . . . returning on U.S. flight one one eight
>
> B: Mm hmm

Mm is a back-channel

Continuers

Devices the hearer uses to indicate that she believes she understands what the speaker means (Clark&Schaefer, 1989)

- **Continued attention**: B shows she is continuing to attend and therefore remains satisfied with A's presentation

- **Relevant next contribution**: B starts in on the next relevant contribution

- **Acknowledgment**: B nods or says a continuer like *uh-huh*, *yeah*, or an **assessment** like *that's great*

Continuers

- **Demonstration**: B demonstrates all or part of what she has understood A to mean, for example by paraphrasing or **reformulating** A's utterance, or by **collaboratively completing** A's utterance

> A: OK I'll take the 5ish flight on the night before on the 11th
>
> B: On the 11th?

- **Display**: B displays verbatim all or part of A's presentation

Grounding is expressed in different modalities
Note the impact of modality (face2face vs phone conversation)

Conversational Implicature

A1: And, what day in May did you want to travel?

C2: OK uh I need to be there for a meeting that's from the 12th to the 15th

A4: ...There's three non-stops today.

Conversational Implicature

- The interpretation of an utterance relies on more than just the literal meaning of the sentence

- The speaker seems to expect the hearer to draw certain inferences

Grice Maxims

- **Maxim of Quantity**: Be exactly as informative as required

  - Make your contribution as informative as required (for the current purposes of exchange)

  - Do not make your contribution more informative that is required

- **Maxim of Quality**: Try to make your contribution one that is true:

  - Do not say what you believe to be false

  - Do not say that for which you lack adequate evidence

Grice Maxims

- **Maxim of Relevance**: Be relevant

- **Maxim of Quality**: Be perspicuous

  - Avoid obscurity of expression

  - Avoid ambiguity

  - Be brief (avoid unnecessary prolixity)

  - Be orderly

Dialogue Acts

- Austin (1962): Utterance in a dialogue is a kind of **action** performed by the speaker

- Types of acts:

  - **locutionary act**: the utterance of a sentence with a particular meaning

  - **illocutionary act**: the act of asking, promising, etc., in uttering a sentence (*you can't do that!*)

  - **perlocutionary act**: the (often intentional) production of certain effects upon the feelings, thoughts, or actions of the addressee in uttering a sentence

Searle's Taxonomy

Searle (1975): Refined taxonomy of (illocutionary) speech acts

- **Assertive:** committing the speaker to somethings being the case (*suggesting, swearing, boasting, concluding*)

- **Directives:** attempts by the speaker to get the addressee to so something (*asking, ordering, requesting, inviting, begging*)

- **Commissives:** committing the speaker to some future course of actions (*promising, planning, vowing, betting, opposing*)

Searle's Taxonomy

- **Expressives:** expressing the psychological state of the speaker about a state of affairs (*thinking, apologizing, welcoming, deploring*)

- **Declarations:** bringing about a different state of the world via the utterance (*I resign, You're fired*)

Dialogue Act Markup

DAMSL (Dialogue Act Markup in Several Layers)
(Allen&Core'1997; Walker et al'1996; Carletta'1997)

- Driven by the needs of dialog system developers

- Contains several levels, including **forward looking function** and **backward Looking function**

- Hierarchical in structure

- Domain-independent, but tailored towards task-oriented dialogs

Forward-looking Functions

- STATEMENT: a claim made by a speaker

- INFO-REQUEST: a question by the speaker

- CHECK: question for confirming information

- OPENING: greeting

Backward-looking Functions

- ACCEPT: a claim made by a speaker

- ANSWER: answering a question

- UNDERSTANDING: whether speaker understands