Studies of Dialogs

Regina Barzilay

March 31, 2004
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 $\rightarrow$ GREETING
  COMPLIMENT $\rightarrow$ DOWNPLAYER
  REQUEST $\rightarrow$ 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)
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 than 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 do 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