Dialogue Semantics and Pragmatics

A Tutorial at the ESSENCE Fall School 2014

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Overview

Part I: Foundations

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- coordination, convention
- communicative intentions
- non-conventional meaning
- grounding
- turn-taking
- disfluencies

- Part II: Computational Models
 - approaches to dialogue modelling
 - incremental processing, turn-taking
 - an example: grounded semantics















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coordination problem

- a coordination problem is one where
 - everyone's payoff (outcome of situation) depends on everybody's actions (*interdependent decisions*),
 - interests coincide, and
 - there are two or more equally good alternatives for how everyone could act
- a game of pure coordination is one where payoffs are equal in every cell

how to solve coordination problems?

- Take out something to write. You will be asked to write something down, without making any kind of contact to your neighbour, before or after writing it down.
- "Let's stop now. We will meet again tomorrow at 9am. If we are not all in the same place then, the school is over." Write down where you would go.
- "We're under attack. Everybody run away. We will meet tomorrow in Naples." Write down where you would (try to) go, and when you would try to be there.

how to solve coordination problems?

- Take out something to write. You will be asked to write something down, without making any kind of contact to your neighbour, before or after writing it down.
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how to solve coordination problems?

- A: I will do (= choose alternative) what I think B will do.
- B: I will do what I think A will do.
- A: I will do what I think B think I will do.
- B: I will do what I think A thinks I will do.
- A: I will do what I think B thinks I think B will do.
- B: I will do what I think A thinks I think A will do.

coordination devices

- precedence
- salience
- explicit agreement
- convention

convention

(Lewis 1969)

- A regularity R in the behavior of members of a population P when they are agents in a recurrent situation S is a convention if and only if it is true that, and it is common knowledge in P that, in any instance of S among members of P,
 - 1. everyone conforms to R;
 - 2. everyone expects everyone else to conform to R;
 - 3. everyone has approximately the same preferences regarding all possible combinations of actions;
 - 4. everyone prefers that everyone conform to R, on condition that at least all but one conform to R;
 - 5. everyone would prefer that everyone conform to R', on condition that at least all but one conform to R',
- where R' is some possible regularity in the behavior of members of P in S, such that no one in any instance of S among members of P could conform both to R' and to R.



where are we?

- we have notion of *conventional meaning*
- part of the story is that words (and utterances) have conventional meanings
- is that the end of the story?







WHAT THEY TEACH YOU AT HARVARD BUSINESS SCHOOL PHILIP DELVES BROUGHTON NEW YORK TIMES BESTSELLER

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'Witty and revealing ... For anyone thinking of doing an MBA, this is a must read' Luke Johnson, entrepreneur and *Financial Times* columnist



about

business

about business



- A intends (to achieve that) B believes that p
- ... by B recognising that this is A's intention behind the utterance.











the role of context / non-conventional meaning

- "this bush", "I saw", ... indexicals
- "everyone was there", ... domain of quantification
- "what did you see?" "a tiger" ... non-sentential utterances (Schlangen 2003, Fernández 2006) question / answer pairs (Asher & Lascarides 2003; Ginzburg 2012)
- "looked a bit like a tiger" (= not a tiger) ... conversational maxims, cooperativity principle (Grice 1975)

where are we?

- conventional meaning
- communicative intentions
- non-conventional meaning, by thinking about likely intentions / intended function of utterance

where are we?

- A has a job, namely to do something to make her intention recognisable,
- and B has a job, namely to recognise the intention
- is that all?










She is getting the elevator to come

She is calling the elevator

- She is activating the "up" button
- She is pressing the "up" button
- She is pressing her finger against the "up" button



She is getting the elevator to come

She is calling the elevator

She "Upwards Completion: In a ladder of actions, it is only possible to complete an action from the bottom level up through any level in butto the ladder."

She "Downward evidence: In a ladder of actions, evidence that one butto level is complete is also evidence that all levels below it are complete."

She is pressing her tinger against the call button

H. Clark's Grounding Model



(Clark 1996; Clark & Wilkes-Gibbs 1986)





execute behaviour attend to behaviour





signal *p* recognize *p*



H. Clark's Grounding Model

"Upwards Completion: In a ladder of actions, it is only possible to complete an action from the bottom level up through any level in the ladder."

"Downward evidence: In a ladder of actions, evidence that one level is complete is also evidence that all levels below it are complete."

signal p recognize p

"Holistic evidence: Evidence that an agent has succeeded on a whole action is also evidence that the agent has succeeded on each of its parts."

"Principle of joint closure: The participants in a joint action try to establish the mutual belief that they have succeeded well enough for current purposes."



Track 2 metacommunicative acts



is about

is about

"official business" of dialogue

Track 2

Track 1 until you're at the le-

"official business" of dialogue

Track 1 until you're at the le-

Track 2

"official business" of dialogue

I mean



evidence of success

"I saw a tiger."

"Ok [, you saw a tiger.]" "Ok [, you understood that I saw a tiger.]" "Ok [, you understood that I understood that you

"Ok [, lorem ipsum solor sit amet or something like this I'm just typing words now]"

Saw a tiger.]" "Ok [, you understood that I understood that you understood that." " "Ok [, you understood that I understood for current purposes!" "Ok [, you understood that I understood t god is

where are we?

- conventional meaning
- communicative intentions
- non-conventional meaning, by thinking about likely intentions / intended function of utterance
- joint actions; need to actively establish mutual understanding



H. Clark's Grounding Model



(Clark 1996; Clark & Wilkes-Gibbs 1986)



what needs to be coordinated here?
beginning / entry, main part, end / exit







shaking hands







- what needs to be coordinated, and how?
 - beginng / entry:
 - as successor of previous action sequence
 - main part
 - who's doing what?
 - end / exit: when to stop



- coordination devices:
 - one party leads (e.g., dancing)
 - external beat (e.g., dancing, playing music)
 - convention (e.g., shaking hands)
 - predictability (e.g., language?)

turn-taking, patterns



turn-taking

- how do participants in a dialogue organise distribution of right to speak?
- = how do they coordinate the process of conversation?

turn-taking; reactive model

- addressee waits until current speaker has stopped, only then starts to speak
- not good fit to observations:
 - silences often very short (< 200ms)
 - equally often, short overlaps
- better model: turn-taking is predictive

• play Müller Zwo video

taking stock

- to be able to create shared understanding..
 - having conventional meaning at disposal is useful
 - but need to reason about communicative intentions
 - monitor for understanding / signal understanding
 - need to manage the process

dialogue agents






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