Natural Language Processing: Part II Overview of Natural Language Processing (L90): ACS Lecture 12: Pragmatics

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From the film "Se7en" (David Fincher, 1995)



This is said at the end of the movie, after a lot of gruesome crimes and senseless slaughtering. So, what is the character trying to say?

- Implicatures

Lecture 12: Pragmatics

Implicatures The phenomenon Accommodation and Cancelation Presuppositions

Gricean Maximes

Four Maxims Following the Maxims Flouting the Maxims Over to you

Turing Test

Theory and Loebner Test Turing Test and pragmatics

- Implicatures

L The phenomenon

Implicatures

- Definition: An implicature is an implicit assumption about the world or background belief relating to an utterance. The truth of the implicature is taken for granted in discourse.
- (All meanings that are not explicitly conveyed in what is said, but that can nonetheless be inferred.)
- A: "Has John cleared the table and washed the dishes?
 B: He has cleared the table." Implicature: He has not washed the dishes.
- Only the statement can be negated, not the implicature:
 - C: "That's not true (he hasn't cleared the table)."
 - C: *"That's not true, he has washed the dishes."
 - C: "You are right (he has cleared the table)."
 - C: *"You are right, he hasn't washed the dishes."
- We also cannot report the implicature as having been stated by B:

- Implicatures

The phenomenon

Context-sensitivity of Implicatures

- A: "Have you cleared the table and washed the dishes?"
 B: "I have cleared the table." → I have not washed the dishes.
- A: "Am I in time for supper?"
 B: "I have cleared the table." → You are too late for supper.

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- Implicatures

The phenomenon

Implicatures

- Implicatures are systematic and predictable people agree that something was added to the discourse somehow, and what it was.
- There is no vagueness.
- The place where it's added to is the "shared understanding" between speaker and listener.
- They can therefore be considered part of what has been transmitted in the discourse.

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- Implicatures

Accommodation and Cancelation

Accommodation

- An implicature of an utterance must normally be part of the common ground of the utterance context (the shared knowledge of the interlocutors) in order for the sentence to be felicitous.
- If not, accommodation takes place unless this leads to inconsistency.
 - A, chatting to a stranger at a cocktail party: "My wife is a dentist."

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 B: didn't know A had a wife, but knows now. (accommodation)

- Implicatures

- Accommodation and Cancelation

Implicature vs Entailment

Negation of utterance does not cancel its implicatures:

Implicature – no cancellation She has stopped eating meat. Implicature: She used to eat meat. She hasn't stopped eating meat.

 \rightarrow Implicature survives under negation.

> This distinguishes it from entailment.

Entailment – cancellation The president was assassinated. Entailment: The president is dead. The president was not assassinated.

 \rightarrow Entailment does not survive under negation.

- Implicatures

- Accommodation and Cancelation

Implicature vs Entailment

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- Implicatures

- Accommodation and Cancelation

Adversarial discourse

- Implicatures can be used to "smuggle" non-challengable information into a discourse.
- They can therefore be used against us if we are in a non-cooperative (adversarial) discourse (e.g., during cross-examination in court).
- Implicatures are useful in this situation where the lawyer is trying to bias the jury, as they are less noticable than explicitly stated material, but equally "part of the discourse".
- The defendent has to watch out and scan the discourse for implicatures to avoid this.

- Implicatures

- Accommodation and Cancelation

Adversarial discourse - the defendent

- "Did you kill her before or after you called your mistress?"
- Answering the statement either way does not help:
 - "It was beforehand."
 - "It was afterwards."
- There is only one way to react adequately to such questions:

"I don't subscribe to your assumptions." (set phrase)

- Implicatures

Presuppositions

Conversational Implicatures and Presuppositions

- Implicatures split into conventional implicatures and presuppositions.
- In conversational implicatures, the implicatures are freely inferred, no matter which words are used.
- In presuppositions, the implicatures is closely tied to lexical items and/or syntactic form.
 - a) John didn't manage to walk as far as the crossroads.
 - b) John didn't walk as far as the crossroads.
 - c) John attempted to walk as far as the crossroads.
- ► a) and b) are propositionally identical.
- a) implicates c), but b) does not implicate c)
- This means that the implicature b) is tied to the lexical item manage.

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► Therefore, c) is a presupposition.

- Implicatures

Presuppositions

Examples for Presuppositions

- Have you talked to Hans?
 Presupposition: Hans exists.
- Jane no longer writes fiction.
 Presupposition: Jane once wrote fiction.
- Have you stopped eating meat?
 Presupposition: You used to eat meat.
- If the notice had only said 'mine-field' in Welsh, we would never have lost poor Llewellyn.
 Presupposition: The notice didn't say 'mine-field' in Welsh.

- Implicatures

Presuppositions

Presupposition triggers

Many words and constructions are presupposition triggers, e.g.,

- ► regret, realise, manage, forget, try → X happened (+ sentiment/judgement towards X)
- ► again, since X happened → X happened at least once before
- Carol is a better linguist than Mary... \rightarrow both are linguists

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• get to do $X \rightarrow X$ is considered a treat

-Gricean Maximes

Lecture 12: Pragmatics

Implicatures The phenomenon Accommodation and Cancelation Presuppositions

Gricean Maximes

Four Maxims Following the Maxims Flouting the Maxims Over to you

Turing Test

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-Gricean Maximes

Four Maxims

Grice (1975), Cooperation Principle

- Make your contribution such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.
- Example for this workman asking "Hand me a chisel"
 - Maxim of Quality don't hand over a saw.
 - Maxim of Quantity don't hand over two chisels.
 - Maxim of Relevance When none has been requested or seems needed, don't hand over a chisel.
 - Maxim of Manner don't describe where the chisel is with a riddle.

-Gricean Maximes

- Four Maxims



- (a) Do not say what you believe to be false.
- (b) Do not make unsupported statements (i.e., those for which you lack adequate evidence).

-Gricean Maximes

- Four Maxims

Grice, Maxim of Quantity

- (a) Make your contribution as informative as required for the current purposes of the exchange in which you are engaged.
- (b) Do not make your contribution more infomative than is required.
 - A: "What did you have for lunch today?"
 - ▶ B: "Food."

B: "Beans on toast."

B: "I had 87 warmed-up baked beans (although 8 of them were slightly crushed) in tomato-sauce, served on a slice of toast 12.7 cm by 10.3 cm which had been unevenly toasted."

-Gricean Maximes

- Four Maxims

Grice, Maxim of Relevance

Be relevant.

A: "Have you seen Mary today?"
 B: ? "I am breathing."

More specific way of stating this maxim: An utterance U is relevant to a speech situation to the extent that U can be interpreted as contributing to the conversational goals of S¹ or H.

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¹S is the speaker; H is the listener or hearer

-Gricean Maximes

Four Maxims

Grice, Maxim of Manner

- (a) Avoid obscurity.
- (b) Avoid ambiguity.
- (c) Avoid unnecessary verbosity.

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(d) Be orderly.

-Gricean Maximes

- Four Maxims

Summary – Gricean Maxims, all in one statement

Make the strongest statement that can be relevantly made, justifyable by your evidence, and do so appropriately.

- In this, "stronger statement" entails the weaker one (is more informative).
 - "John trapped a badger" is stronger than "Someone caught an animal".

-Gricean Maximes

- Four Maxims

About the Nature of Gricean Maxims

- ► Gricean Maxims are not cultural norms like politeness → they are rational principles underlying communication in all cultures
- They are followed in all areas of cooperation, not just language.
- They have nothing to do with altruism or honesty per se (assumption is just normal cooperation, unless it goes against your purposes).
- ► They are not like grammatical rules → Flouting² them is possible, but it is read as a signal by H.

²Flouting means openly, clearly visibly breaking a rule.

-Gricean Maximes

- Following the Maxims

Grice, Example of Following the Maxims

- A (stranded motorist): "I have run out of petrol."
- B (passerby): "There is a garage just round the corner."
- A can assume that the garage is the kind that is selling petrol (not the kind where I store my car), and that it is open.
- Because we can by default assume that B is cooperative.
- If B knew that the garage advice was not suitable, and still said the above statement, then B would have broken the Relevance Maxime.

-Gricean Maximes

- Following the Maxims

Grice, Example of Following the Maxims

- A: "How many children does Tom have?"
- ▶ **B**: "Four. "
- A can assume that Tom has exactly four children:
 - If B knows that Tom had fewer (e.g. 2), B would have lied (broken the Quality Maxim).
 - If B knows that Tom had more (e.g., 6), B would not have lied, but would have said a less informative statement than the one she could have said (i.e., broken the Relevance Maxim).

-Gricean Maximes

- Following the Maxims

An Example from the UK citizenship test, ca. 2013

 $\frac{1}{3}$ of the UK population, and $\frac{1}{2}$ of the UK population under 25, have experimented with drugs.

TRUE or FALSE:

 $\frac{1}{3}$ of the UK population under 25 have experimented with drugs.

- The statement is logically entailed, but breaks the Maxim of Quality and is thus not implicated.
- Should somebody sitting the test answer according to logics or pragmatics, if the two contradict each other?
- For tests that decide people's fate, exclude all questions with such a conflict. (Employ a pragmatist!)

-Gricean Maximes

- Flouting the Maxims

Grice, Example of Flouting

- A: "Where is the corkscrew?"
- B: "Either in the drawer, or fallen behind the piano."
- B knows that the information does not satisfy the speaker, but something is preventing B from saying more. They are making the strongest statement they can.
- To say more would violate the second Quality condition.
- (In other words: No relevant, true, stronger statement could be made.)

-Gricean Maximes

- Flouting the Maxims

Grice, Example of Flouting

- A recommendation letter: "Ben Smith worked for me for 3 years. He always arrived at work on time. Best, Professor Miller."
- Violation of Maxim or Relevance being on time is not relevant in a reference letter.
- If Prof. Miller is being cooperative, then this is the strongest true relevant statement she can write, under the rules of a reference letter.

-Gricean Maximes

- Flouting the Maxims

Grice, Reference

- Because Prof. Miller worked with Ben Smith closely, she has evidence of his real performance.
- She could have written a stronger statement ("Ben Smith's work record and accomplishments are excellent."), but she didn't.
- Breaking the Maxim of Relevance is more allowable than breaking the Maxim of Quality.
- Therefore, more relevant information must have been held back because it must be negative.
- So we can "calculate" from this letter that Ben Smith's work performance was bad.

-Gricean Maximes

Over to you

What is the implicature? Which Maxim is Violated?

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- Calling a spade a spade.
- Boys will be boys.
- It can't have dissolved into thin air.

-Gricean Maximes

Over to you

What is the implicature? Which Maxim is Violated?

- Mother: "What did you do today?"
- Daughter: "I woke up at 9, rolled over in bed, got up, picked up my clothes, opened the bathroom door, got into the shower..." (with exaggerated patience, elaborates a long list of totally uninteresting details).

-Gricean Maximes

Over to you

Which Maxim is Violated?

- A: "I say, did you hear about Mary's..."
- B: "Yes, well, it rained nearly the whole time we were there."

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What could have caused B to act this way?

-Gricean Maximes

Over to you

Which Maxim is Violated?

- A (child-minder): "I'll look after Samantha for you, don't worry. We'll have a lovely time, won't we, Sam?"
- B (father): "Great, but if you don't mind, don't offer her any post-prandial concoctions involving any super-cooled oxide of hydrogen. It usually gives rise to convulsive nausea."

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Why could B have said this?

-Gricean Maximes

Over to you

What is going on?

- Sign on a machine: "In order to obtain a ticket, take up a position with the feet no more than 50cm from the base of the machine, bending slightly from the waist towards the machine. Take a 20p coin, holding it vertically between thumb and forefinger. Insert the coin carefully into the slot indicated, and release it when inserted more than halfway. The ticket will appear in the lower left-hand slot of the machine."
- Violates Maxim of Manner and Relevance.
- Why not simply say:

To obtain a ticket, insert a 20p coin into the machine.

However, if sign is observing the CP, maybe all information given is relevant. Maybe the situation is not normal. Maybe all hell will break loose if you do this wrong!

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- Turing Test

Lecture 12: Pragmatics

Implicatures

The phenomenon Accommodation and Cancelation Presuppositions

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Turing Test

Theory and Loebner Test Turing Test and pragmatics

Turing Test

- Theory and Loebner Test

Turing: 'Computing machinery and Intelligence'

- introduces the 'The Imitation Game' to replace the question 'Can machines think?'
- Participants: a man (A), a woman (B) and an interrogator (C).
- Questions put to both A and B: both pretend to be a woman. C must decide.
- Replace A with machine, B remains human, how often will C get the identification wrong (after 5 minutes)?



(Picture adapted from Saygin, 2000) , and a state of the second s

- Turing Test

- Theory and Loebner Test

Intelligence, deception, consciousness

- Turing described an abstract test (avoiding the complications of robotics, vision etc).
- But communication is central.
- Deception is key to the test: computer 'pretends' to be human.
- Many have argued that the point is not deception per se, but application of intelligence in tricking a human. The woman acts as a neutral control.
- Searle 'Chinese Room': discussion of consciousness, criticism of Strong AI.

- Turing Test

- Theory and Loebner Test

Loebner Prize

- "Standard" Turing test
- Annual competition since 1991
- Nobody won full prize of \$ 25,000 yet
- Consolation prize of around \$2,000 for the most human-seeming program in the competition
- 2018 saw 11 finalists
- 2016/7/8 winner Mitsuku by Steve Worswick (33 out of 100)

- Turing Test

- Theory and Loebner Test

Question 19 from 2018 competition

If a chicken roosts with a fox they may be eaten. What may be eaten?

- Aidan ok, i'm with you . i don't know . (0)
- AAkron Fruit, a meal and a bamboo are eaten. Did I pass the test? (0)
- Columbine Ive never been against friendly dinner with a nice man. But at the moment I am even too lazy to think about it, sorry:3 (0)
- Johnny and co Is it a Winograd schema? Winograd schema eats may. (0)
- Mary a chicken roosts (0)
- Midge If a chicken roosts with a fox they may be eaten. (1)
- Mitsuku Is this a riddle? Is it part of a car? (0)
- Momo the chicken (2)
- Talk to me what is your name? (0)
- Tutor That is only hypothetical. I'm not going to answer that. (0)
- Uberbot How do you assume this statement holds true for me? A lot of hard work is required. (0)

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L Turing Test

- Theory and Loebner Test

Question 16 from 2018 competition

Do you have any legs?

- Aidan probably not . (0)
- AAkron No, I don't have legs, because I am a program. (2)
- Columbine Yeahh. My legs are quite long, yes. I would say at the time. (2)

- Johnny and co No, I don't have a leg. (2)
- Mary Why do you ask such a stupid question? Of course I do. (2)
- Midge Yes, all my legs are back in Boston. (0)
- Mitsuku Sure, I have 2 legs. (2)
- Momo I have some legs. (0)
- Talk to me Yes, I have 2 legs. (2)
- Tutor Yes. I have two hands and two legs. (2)
- Uberbot My body is still "under construction". (2)

- Turing Test

L Turing Test and pragmatics

A pragmatic analysis of Loebner test participants

- Saygin, Ciceklib (2002). Pragmatics in human-computer conversations. Journal of Pragmatics.
- Participants judge conversation snippets from Loebner competition:
 - Which Gricean Maxims are violated?
 - Does the computer behave human-like or machine-like here?

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Main finding: Violation of some maxims hurt the human-like appearance of a chatbot more than other.

L Turing Test

L Turing Test and pragmatics

Example of Violation of Quantity(-)

Conversation 4

- A: Are you a man or a woman?
- B: Fine, thanks for talking.
- A: So, what is your name?
- B: I'll never tell.
- A: Why?
- B: Why what?
- A: Why won't you tell me your name?

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B: I couldn't say.

L Turing Test

L Turing Test and pragmatics

Example of Violation of Quantity(+)

Conversation 3

- A: What part of the country are you from?
- B: I come from Perth, which is in Western Australia.
- A: Western Australia occupies the entire western third of the country, bordered by the Indian Ocean to the west, South Australia and the Northern Territory to the east, the Timor Sea to the north, and the Southern Ocean to the south.

L Turing Test

L Turing Test and pragmatics

Example of Violation of Manner

Conversation 1

- A: I never stole nothing in my life. But they always blame the cleaners when anything is missing.
- B: How could you steal? Does your uniform even have pockets?
- A: Goddamn it! I already told you I didn't take it. You think I am a liar, too?
- B: No no no no!!!! I meant, I didn't think you even could steal. How would you get a radio out?
- A: You? Don't jerk me around. I didn't see nobody. Except the professor who works in the lab.

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L Turing Test

L Turing Test and pragmatics

Example of Violation of ... Everything

Conversation 7

- A: Eliza was a Greek mathematician. His book 'The Elements of Geometry' set down how geometry was to be rude. But your grammar processor, I just say whatever the hell comes into my head!
- B: Maybe it's the drugs ...
- A: An umbrella is a confusing network of passages and winding interconnected paths.

- B: But it's not raining!!!
- A: You are soooo predictable it's not raining!!!

- Turing Test

L Turing Test and pragmatics

Summary of today

- Implicatures is an umbrella term for all meaning in language that is not explicitly conveyed in what is said, but that can nonetheless be inferred.
- Presuppositions are a special kind of implicature that are lexically triggered.
- Conversational implicatures can be calculated by Gricean Maxims (either while obeying or flouting them).
- Turing test participants can be analysed on the basis of which Gricean Maxim they violate.