Proseminar Computational Pragmatics: Introduction

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https://www.lsv.uni-saarland.de/upcoming-courses/proseminar-computational-pragmatics-winter-2020-2021/
Outline

▶ Course Structure: formalities (and informalities)
▶ Historical background
▶ Defining computational pragmatics
▶ Topics/Themen
Course Structure

Formalities

▶ Format:
  ▶ 02.11 (today): topics introduction (lecturer)
  ▶ 03.11-05.11: topics selection (doodle)
  ▶ 05.11 - 15.11: define research question, identify keywords, find background information & study papers, and refine your topic
  ▶ 16.11: Pitch your research topic (10 minutes)
  ▶ 23.11.2020 - 01.02.2021:
    1. present your research topic, based on a paper ‘situated’ in related work (30 minutes + 15 minutes discussion; 40% of the final scores);
    2. exercises, experiments and group assignments (20% of the final scores).

▶ Report: based on your research paper and related work, 10 pages, deadline: 31.03.2021 (40% of the final scores)

▶ Questions: E-Mail
Course Structure

Informalities

Please do:

- Ask when you have questions (in German or English)
- Say something right away if I’m speaking too quickly or if there are terms you don’t know or understand
- Be present when you are present
Course Structure
Basic reading


https://web.stanford.edu/~jurafsky/slp3/.
Situating Pragmatics

Linguistics =
Situating Pragmatics

Linguistics = Syntax +
Situated Pragmatics

Linguistics $= \text{Syntax} + \text{Semantics} +$
Linguistics = Syntax + Semantics + Pragmatics
Situating Pragmatics

Linguistics = Syntax + Semantics + Pragmatics

Linguistics is the study of correct use of language
1. Syntax: grammatical well-formedness.
   Me are still. =) ungrammatical — → syntactic problem
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   Me are still. =) ungrammatical \rightarrow \text{syntactic problem}

2. Semantics: meaningfulness.
   I don’t say anything. =) no sense \rightarrow \text{semantic problem}
1. Syntax: grammatical well-formedness.
   Me are still. =) ungrammatical \rightarrow syntaxic problem
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   Today is Friday but I don’t believe it. =) ‘infelicitous’ \rightarrow pragmatic problem
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2. Semantics: meaningfulness.
   I don’t say anything. =) no sense -> semantic problem

   Today is Friday but I don’t believe it. =) ‘infelicitous’ -> pragmatic problem

Pragmatics is the study of felicitous language use
Situating Pragmatics

Semantics is about **truth** conditions and is **compositional**
Situating Pragmatics

Semantics is about **truth** conditions and is **compositional**

Example:
“Alexander gave her a bouquet of red roses”
“You have a green light”
What then is pragmatics?

A. Broad sense of the term: the study of psycholinguistic and sociolinguistic phenomena in sign systems in general

B. Narrower sense of the term: since around 1960, narrowing in scope due to anglo-American analytic philosophers and linguists

- **syntax**: combinatorics of words and their parts
- **semantics**: meaning (traditionally: truth conditions)
- **pragmatics**: language usage, further interpretation of meaning in context
  - what speakers mean when they use linguistic expressions
  - what kind of reasoning is used by speakers and hearers to understand meaning in context
Situating Pragmatics

Pragmatics is the study of principles for the use and interpretation of utterances in context.
Situating Pragmatics

Pragmatics is the study of principles for the use and interpretation of utterances in context.

You have a green light.
Pragmatics is the study of principles for the use and interpretation of utterances in context

You have a green light

1. It could mean you are holding a green light bulb.
Pragmatics is the study of principles for the use and interpretation of *utterances in context*

You have a green light

1. It could mean you are holding a green light bulb.
2. Or that you have a green light to drive your car.
Pragmatics is the study of principles for the use and interpretation of utterances in context.

You have a green light

1. It could mean you are holding a green light bulb.
2. Or that you have a green light to drive your car.
3. Or it could be indicating that you can go ahead with the project.
Pragmatics is the study of principles for the use and interpretation of *utterances in context*

You have a green light

1. It could mean you are holding a green light bulb.
2. Or that you have a green light to drive your car.
3. Or it could be indicating that you can go ahead with the project.
4. Or that your body has a green glow
Situating Pragmatics

It’s raining
Do you know what time is it?
Go to hell!
I will bring it tomorrow.
Be careful.
Good morning.
Sorry.
Got a light?
Situating Pragmatics

It’s raining
Do you know what time is it?
Go to hell!
I will bring it tomorrow.
Be careful.
Good morning.
Sorry.
Got a light?

Pragmatics is the study of those aspects of meaning that semantics does not cover
Semantics is the study of **word-** and **sentence-** meaning
Situating Pragmatics

Semantics is the study of word- and sentence- meaning
Pragmatics is the study of utterance meaning
Semantics is the study of word- and sentence- meaning
Pragmatics is the study of utterance meaning
An ’utterance’ is a physical realization of a sentence (or phrase, or...) in a certain context
Situating Pragmatics

Semantics is the study of word- and sentence- meaning
Pragmatics is the study of utterance meaning
An ’utterance’ is a physical realization of a sentence (or phrase, or...) in a certain context
A sound, a writing on the wall, a black/white pattern of screen pixels,...
Context

What is context?
What is context?

all factors that influence interpretation
What is context?

all factors that influence interpretation

► providing semantic content - referential determination
What is context?

all factors that influence interpretation
- providing semantic content - referential determination
- resolution of ambiguities and vagueness
Context

What is context?

all factors that influence interpretation
► providing semantic content - referential determination
► resolution of ambiguities and vagueness

John and Mary are eating an ice cream.
... Are they sharing it?
The two man lifted the piano.
... That was part 1 of the strongest man competition.
Context: indexicals

interpretation of indexicals

▶ providing referents for anaphora
▶ providing deictic referents
Context: indexicals

interpretation of indexicals

▶ providing referents for anaphora
▶ providing deictic referents

Examples:
John gave Mary a present and she liked it
Context: indexicals

interpretation of indexicals

▶ providing referents for anaphora
▶ providing deictic referents

Examples:
John gave Mary a present and she liked it

John gave Martin a present and he liked it
Context: indexicals

interpretation of indexicals

▶ providing referents for anaphora
▶ providing deictic referents

Examples:
John gave Mary a present and she liked it
John gave Martin a present and he liked it

Be back in an hour
Context: indexicals

- Personal deictic expressions
Context: indexicals

- Personal deictic expressions
- Social deictic expression
Context: indexicals

- Personal deictic expressions
- Social deictic expression
- Deictic expressions of place
Context: indexicals

- Personal deictic expressions
- Social deictic expression
- Deictic expressions of place
- Temporal deictic expressions
Context: indexicals

- Personal deictic expressions
- Social deictic expression
- Deictic expressions of place
- Temporal deictic expressions
- Discourse deictic expressions
verification and accommodation of presuppositions
Context: presuppositions

verification and accommodation of presuppositions

an implicit assumption about the world or background belief relating to an utterance whose truth is taken for granted in discourse
Context: presuppositions

verification and accommodation of presuppositions

an implicit assumption about the world or background belief relating to an utterance whose truth is taken for granted in discourse

Examples:
Do you want to do it again?
Context: presuppositions

verification and accommodation of presuppositions

an implicit assumption about the world or background belief relating to an utterance whose truth is taken for granted in discourse

Examples:
Do you want to do it again?

Presupposition: that you have done it already, at least once
Context: presupposition

Exercise:
Context: presupposition

Exercise:

▶ John’s children speak French
Context: presupposition

Exercise:
- John’s children speak French
- Jane no longer writes fiction
Context: presupposition

Exercise:
- John’s children speak French
- Jane no longer writes fiction
- It was Henry that kissed Rosie
Context: presupposition

Exercise:

- John’s children speak French
- Jane no longer writes fiction
- It was Henry that kissed Rosie
- John didn’t manage to be on time
Exercise:

- John’s children speak French
- Jane no longer writes fiction
- It was Henry that kissed Rosie
- John didn’t manage to be on time
- While Chomsky was revolutionizing linguistics, the rest of social science was asleep
Example (Charniak 1972)

Jill wanted to get Bill a birthday present, so she went and found her piggy-bank (Sparschwein). She shook it, but there was so much noise. She would have to make Bill a present.

Understanding the story requires understanding several things about the world:
Pragmatics and world knowledge

Example (Charniak 1972)

Jill wanted to get Bill a birthday present, so she went and found her piggy-bank (Sparschwein). She shook it, but there was so noise. She would have to make Bill a present.

Understanding the story requires understanding several things about the world:

▶ normally gifts are bought with money
▶ piggy-banks can be used to hold money
▶ if you shake a piggy-bank with money in it, you hear a noise
▶ ...

Which are linguistically-relevant aspects of context? i.e. Which phenomena should be part of the study of pragmatics?
Context: communicative intentions

Understanding of communicative intentions
Context: communicative intentions

Understanding of communicative intentions

- allowing conversational implicatures
Context: communicative intentions

Understanding of communicative intentions

- allowing conversational implicatures

Example:
A: I haven’t seen John for ages
B: He bought a new house
Context: communicative intentions

Understanding of communicative intentions

- allowing conversational implicatures

Example:
A: I haven’t seen John for ages
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- providing motivation for saying something
Context: communicative intentions

Understanding of communicative intentions

► allowing conversational implicatures

Example:
A: I haven’t seen John for ages
B: He bought a new house

► providing motivation for saying something

Example:
A1: Why are you not on the beach?
A2: It’s so lovely weather outside
Context: communicative intentions

Understanding of communicative intentions

▶ allowing conversational implicatures

Example:
A: I haven’t seen John for ages
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Example:
A1: Why are you not on the beach?
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▶ Providing communicative act type
Context: communicative intentions

Understanding of communicative intentions

▶ allowing conversational implicatures

Example:
A: I haven’t seen John for ages
B: He bought a new house

▶ providing motivation for saying something

Example:
A1: Why are you not on the beach?
A2: It’s so lovely weather outside

▶ Providing communicative act type

Example:
A1: A question
A2: What’s wrong with my suggestion?
Summing up for now

A. Interpretation requires context
Summing up for now

A. Interpretation requires context
   ► for indexicals, definites, presuppositions
Summing up for now

A. Interpretation requires context
   ▶ for indexicals, definites, presuppositions
   ▶ for resolving ambiguity, vagueness
Summing up for now

A. Interpretation requires context
   ▶ for indexicals, definites, presuppositions
   ▶ for resolving ambiguity, vagueness
   ▶ for understanding speech acts: answers, advice, ...
Summing up for now

A. Interpretation requires context
   ▶ for indexicals, definites, presuppositions
   ▶ for resolving ambiguity, vagueness
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B. Interpretation creates context
Summing up for now

A. Interpretation requires context
   ▶ for indexicals, definites, presuppositions
   ▶ for resolving ambiguity, vagueness
   ▶ for understanding speech acts: answers, advice, ...

B. Interpretation creates context
   ▶ common ground (Clark)
Summing up for now

A. Interpretation requires context
   - for indexicals, definites, presuppositions
   - for resolving ambiguity, vagueness
   - for understanding speech acts: answers, advice, ...

B. Interpretation creates context
   - common ground (Clark)
   - introduces topics
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   ▶ focuses
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C. Context triggers utterances
Summing up for now

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C. Context triggers utterances
   ▶ acknowledgement, feedback
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   ▶ acknowledgement, feedback
   ▶ social communicative acts
Summing up for now

A. Interpretation requires context
   ▶ for indexicals, definites, presuppositions
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B. Interpretation creates context
   ▶ common ground (Clark)
   ▶ introduces topics
   ▶ focuses

C. Context triggers utterances
   ▶ acknowledgement, feedback
   ▶ social communicative acts
   ▶ questions, answers, informs, commands,...
Communicative meaning

What does it mean to understand an utterance?

Paul Grice (1957):

- To understand an utterance implies:
  - sentence meaning = semantic content (is compositional)
  - speaker-dependent meaning = pragmatic content (irony, metaphorical expressions, implicit communicative content)

- Propositional and speaker-dependent meaning can differ:
  - Mutter: Wie oft muss ich dir noch sagen, dass du das Zimmer aufraumen sollst?
  - Kind: Noch vier mal, bitte.

- What is actually meant:
  - Mutter: Raum endlich dein Zimmer auf.
  - Kind: Lass mich in Ruhe, ich will mein Zimmer nicht aufraumen.
Pragmatic inferences

- Speaker intentions go beyond semantic content of an utterance
- are more than just linguistic meaning
- Pragmatic inferences are based on the following mechanisms and phenomena:
  - Common Ground
  - Implicatures (conventional and conversational)
  - References
  - Discourse structures
  - Presuppositions
  - Information structure
  - Structure of conversation/dialogue
  - Dialogue acts

→ Topics in this seminar
But first...

What are the aims of this course?
But first...

What are the aims of this course?

- Understand how to compute pragmatic meaning
But first...

What are the aims of this course?

- Understand how to compute pragmatic meaning
- Study the mechanisms underlying the main *pragmatic inferences* and aspects of *pragmatic meaning*
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What are the aims of this course?

- Understand how to compute pragmatic meaning
- Study the mechanisms underlying the main pragmatic inferences and aspects of pragmatic meaning
- Discuss algorithms that enable the use of theoretical concepts in practical applications
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- Study the mechanisms underlying the main *pragmatic inferences* and aspects of *pragmatic meaning*
- Discuss algorithms that enable the use of theoretical concepts in practical applications

Learn how to perform research in computational pragmatics
What is Computational Pragmatics

Adapted from (Bunt & Black, 2000):
“Computational pragmatics studies, from an explicitly computational point of view, how relations between linguistic phenomena and their context of use govern speakers’ abilities to interpret and generate utterances in conversation”
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The key question: How to compute these relations in terms of explicit representations.
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The key question: How to compute these relations in terms of explicit representations.

▶ given a linguistic expressions, how to compute the relevant contextual properties
What is Computational Pragmatics

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“Computational pragmatics studies, from an explicitly computational point of view, how relations between linguistic phenomena and their context of use govern speakers’ abilities to interpret and generate utterances in conversation”

The key question: How to compute these relations in terms of explicit representations.

▷ given a linguistic expressions, how to compute the relevant contextual properties

▷ given a particular context, how to compute the relevant linguistic expression
We will target

the following key research questions:

▶ What is meaning in dialogue? What does it depend on?
▶ What mechanisms govern communicative behaviour in dialogue? How do dialogue participants transfer and process information?
▶ Why and how do they interpret, understand and react to each other's behaviour in the way they do?
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- Why and how do they interpret, understand and react to each others’ behaviour in the way they do?

Computational dialogue modelling analyses these and related questions with computational means, and aims to cast potential answers in the form of computational models.
What is Computational Pragmatics

Work on computational pragmatics often takes place within research on dialogue systems
What is Computational Pragmatics

Work on computational pragmatics often takes place within research on **dialogue systems**

The design of systems that are able to interact with human users in natural language forces one to make decisions on how to deal in an operational way with all phenomena related to language use.
And now ... TOPICS
23.11 - Conversational Analysis (CA)
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▶ Adjacency pairs
    American Anthropologist, 70:10751095
And now ... TOPICS
23.11 - Conversational Analysis (CA)

- Adjacency pairs

- Turn-taking behaviour
TOPICS

30.11 - Language as Action
TOPICS
30.11 - Language as Action

- Speech acts
TOPICS
30.11 - Language as Action

▶ Speech acts

▶ Activity-based approach
TOPICS

07.12 - Dialogue Acts and Context
TOPICS
07.12 - Dialogue Acts and Context

TOPICS
07.12 - Dialogue Acts and Context


TOPICS
14.12 - Feedback and Grounding
TOPICS
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TOPICS
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TOPICS
04.01 & 11.01- Computational Dialogue Models
TOPICS
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TOPICS

04.01 & 11.01- Computational Dialogue Models


TOPICS
04.01 & 11.01- Computational Dialogue Models


18.01- Resources for Data-Driven Dialogue Modelling


TOPICS
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TOPICS
25.01- Machine Learning in Dialogue Modelling: Dialogue Act Recognition

TOPICS
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TOPICS
01.02- Machine Learning in Dialogue Modelling: Statistical and Neural Models


TOPICS
01.02- Machine Learning in Dialogue Modelling: Statistical and Neural Models


Topic selection

Go through suggested papers. Choose a topic that interests you and will hold your attention. If you do, the research will be more enjoyable!

Vote in doodle 'yes', 'no' and 'if maybe' selecting the topic: https://doodle.com/poll/f52aawvnup5w7ybp

Write down what you already know or don’t know about the topic

Do background research
▶ Start with papers cited by the authors of the suggested paper(-s)
▶ Identify keywords related to your topic
▶ Search Google Scholar, core conferences. Hint: good conferences are ACL, EACL, NAACL, EMNLP, AAAI, SIGdial, LREC; workshops: SemDial and IWSDS

Prepare presentation (30 minutes = 30 slides)
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