



Coffee or tea? Yes

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Introduction

Get able to quantify the amount of logical inconsistencies inside a dialogue?

A₁ *Do you want coffee or tea?*
B₂ *Yes*

- **Incomprehension in dialogue:** question/answer relationship, correspondence (span of an answer? logical coherence?)
- Real-life phenomena (corpus-observed)

Possible applications:

- Chatbot programming: fluid automatic answers generation
- Human-human interaction: further study of specific human dialogues (children, psychiatry)
- Improvement of learning algorithms: identification of difficult cases

Objectives

Model dialogue in a dynamic and compositional way, automatically identifying incomprehension.

- Produce logical representations of questions and answers in dialogue
- Find logical incoherences in speech acts combinations

Negotiation Phases

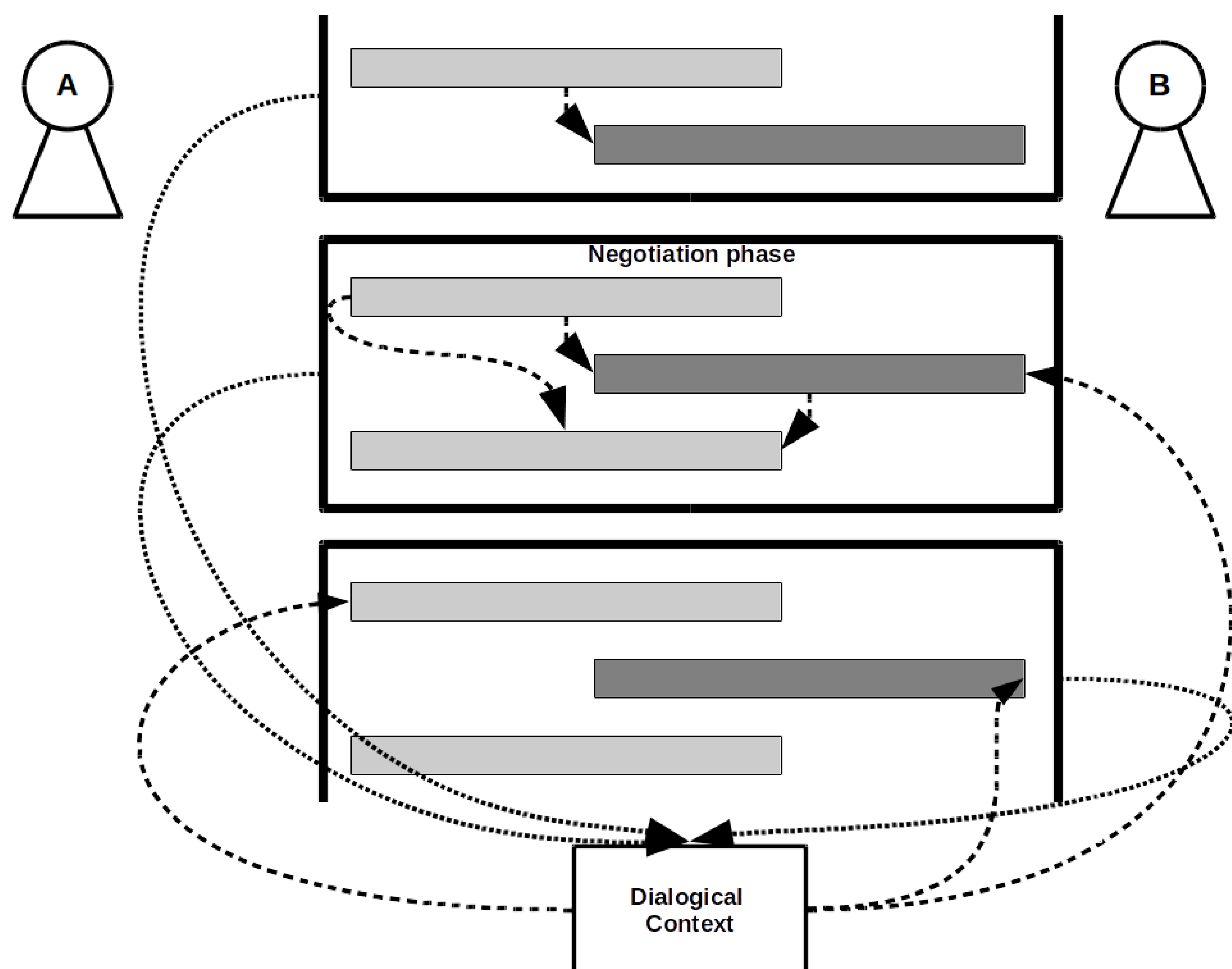


Figure 1: A dialogue is composed of several negotiation phases.

A speaks in light grey, **B** in dark grey. The dialogue is split in several *negotiation phases* (bold black boxes). When one of them ends, its representation is computed and stored in the dialogue context. Utterances inside negotiation phases are built both using previous utterances and information coming from the dialogue context storage.

Inquisitive Semantics [1]

A₁ *Do you want sugar or stevia in your coffee?*
B₂ *Neither.*
B₂' *#Both.*

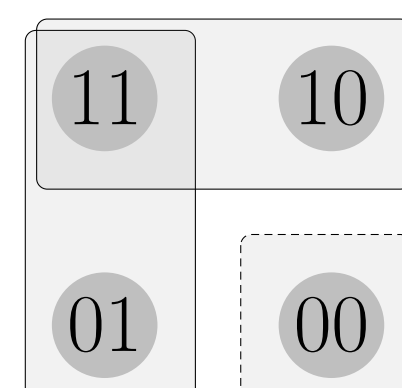


Figure 2: OR and XOR.

A₁ *Do you want sugar or milk in your coffee?*
B₂ *Neither.*
B₂' *Both.*

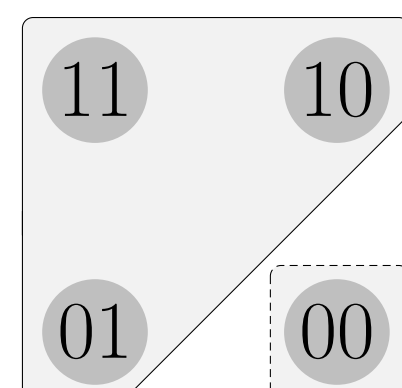


Figure 3: Classical OR.

Goal: implement a compositional mapping from Natural Language to Inquisitive Logic. Yet:

- No systematic way of representing natural language utterances
- Not specifically developed for Natural Language applications (compositionality?)

Our project

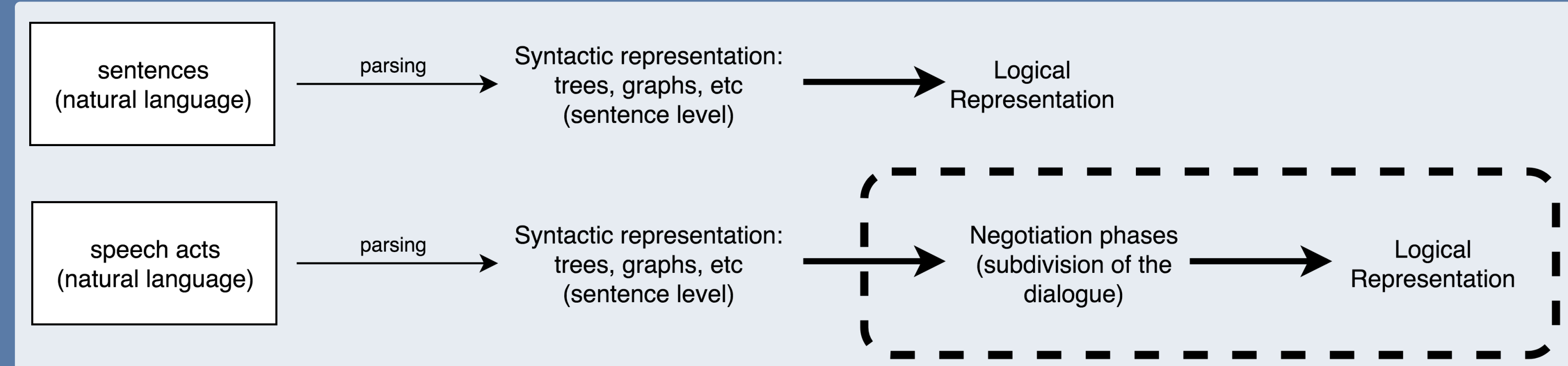


Figure 4: Architecture of the process.

- **We have:** Type Theoretical Dynamic Logic [2] representation obtained using the Abstract Categorical Grammar [3] toolkit (upper process Fig 4)
- **Currently:** working on logical representation of speech acts and negotiation phases (self-contained sub-dialogues according to the discussed topic)
- Same parsing, different logical representations

Corpora

UniC - Unicorn Corpus

Toy handmade corpus in English and French, composed of 18 sentences in each language, 9 questions (1 polar + 8, one per wh-word) and 9 corresponding assertions.

Where-question

Where is the unicorn?
Où est la licorne ?

Where-answer

The unicorn is at home.
La licorne est à la maison.



Figure 5: Charly is a free unicorn.



Figure 6: Settlers of Catan.

DinG - Dialogues in Games

Corpus collection in progress: real-life dialogues among french-speaking players of Settlers of Catan, a board game where bargaining over resources is a major part of the gameplay. [4]

A₁ *Est-ce que quelqu'un a de l'argile ?*
B₂ *Oui*
A₃ *Contre du bois ?*
B₂ *Non*

A₁ *Does anyone have clay?*
B₂ *Yes*
A₃ *To trade for wood?*
B₂ *No*

Conclusion

We focus our work on the question-answer relationship in dialogue as we think it will give us an entering point for our studies on incomprehension in dialogue, towards a method that will allow us to quantify this type of phenomena in conversations.

- Articulation of several logical frameworks
- Testing of the models on different corpora
- Collection of the DinG corpus

References

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- [5] Jonathan Ginzburg and Ivan Sag. *Interrogative investigations*. Stanford: CSLI publications, 2000.