

# Using possible alternatives in a Bayesian model of dialogue act recognition

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Universität Bielefeld, SFB 673: Alignment in Communication

# Objective

- Incremental model of dialogue act recognition
  - “Dialogue act” as in “speech act” or “illocutionary act” – *request, apology, greeting...*
  - “Dialogue” rather than “speech” as it could be performed multimodally (nodding head, gazing/pointing in appropriate way)
  - From a computational perspective, “dialogue act type”, as no semantic content (*request vs. request-drink-from-John*)

# Motivation

- Widespread ambiguity as to speaker intentions
- Hearers nevertheless solve this easily in general

Table 1: Examples of stimuli in Dutch and translations.

Condition	Context	Target Sentence
Answer	Hoe ga je voor het ticket betalen? <i>How are you going to pay for the ticket?</i>	Ik heb een creditcard. <i>I have a credit card.</i>
Declination	Ik kan je wat geld lenen voor het ticket. <i>I can lend you money for the ticket.</i>	Ik heb een creditcard. <i>I have a credit card.</i>
Pre-Offer	Ik heb geen geld om het ticket te betalen. <i>I don't have any money to pay for the ticket.</i>	Ik heb een creditcard. <i>I have a credit card.</i>

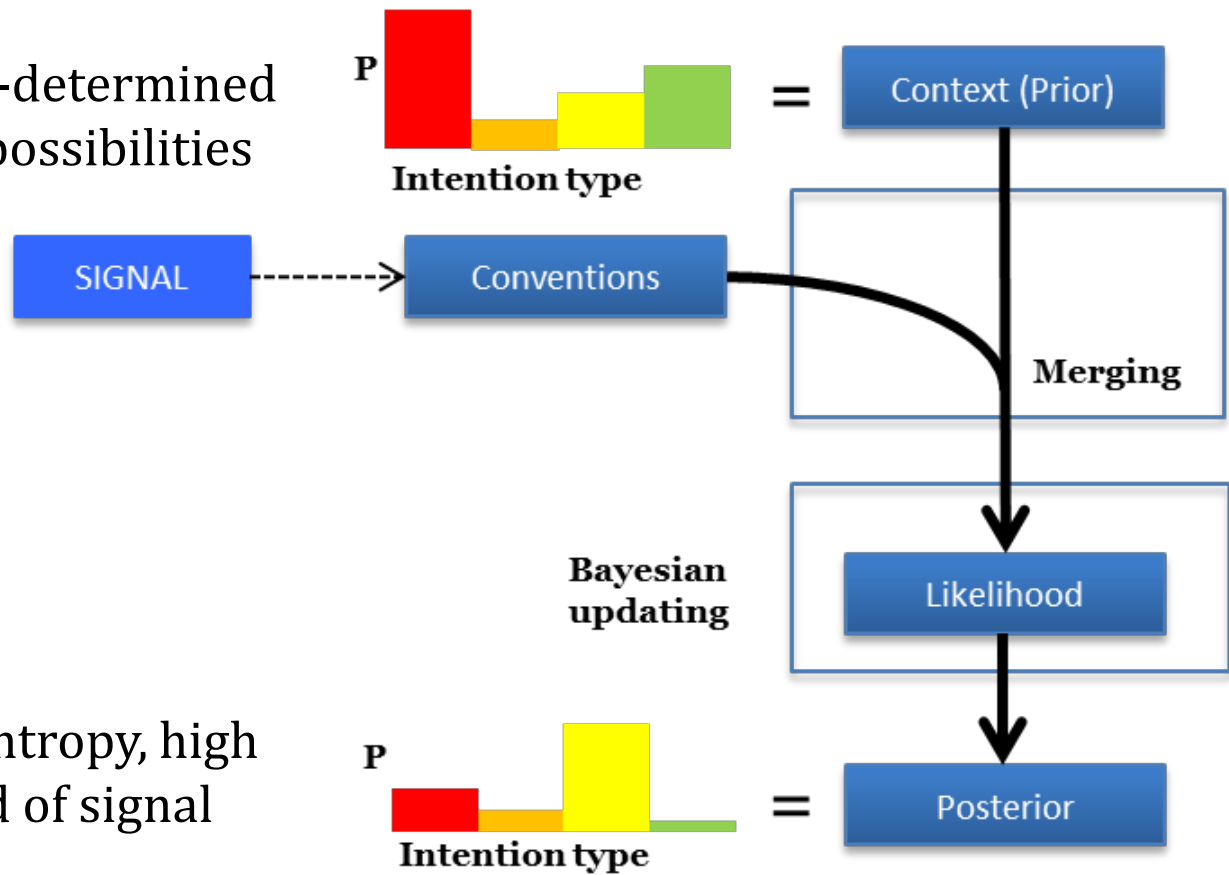
Gisladottir et al. (2012):  
people identify intended  
dialogue acts (off-line)

# Specific problem – on-line recognition

- Approaches to off-line recognition well-established
  - Gordon and Lakoff (1971): reanalyse and reinterpret if the surface meaning is contextually inappropriate
  - Searle (1975): assume that the surface meaning is relevant to the speaker and figure out why
- However, the possibility of rapid turn-taking suggests that we're typically identifying speech acts much sooner
  - Consider the dynamics of "Could you pass the salt?", etc.
  - Appropriate response relies on dialogue act recognition
  - Also need to extract the semantic content – but this too will be easier if you correctly identify the dialogue act

# Proposed model

Starts with contextually-determined prior distribution over possibilities



Terminates with low entropy, high relative entropy, or end of signal

# Pragmatic component

- Would also like to incorporate component to deal with dispreferred encoding of utterance types
  - Analogous case to markedness implicature from “John caused the sheriff to die”, etc. (Horn 1984, Levinson 2000)
  - Example: ‘weasel words’

*I regret that anyone was offended by my remarks*
  - Interpreted as doubtful apology, for instance on account of the lack of the word ‘sorry’

# Purpose of this component

- For any plausible intention:
  - look up (in some database) whether these would normally have been expressed in some other way
  - penalise intentions that would have been
  - thus bias the interpretation towards intentions that would be acceptably expressed by the words that were uttered

# Problems arising

- What could plausibly go in the database?
  - Many ways of expressing a given intention (depending on the semantics, which may vary from context to context)
  - Words (“sorry” for an apology) might sometimes be stable
  - Utterance-types (interrogative for a question) likewise
- When do we expect the preferred features to appear?
  - Need to constrain this: don’t expect an apology to take the form “sorry sorry sorry sorry...”



# Outlook

- Potential for a computational model of dialogue act recognition
  - Precise topic has been neglected somewhat by both sides
- Implementation of a pragmatic component of the type described here would also be useful
  - Perhaps improving performance, in some cases
  - Providing a useful insight into the possible generation of indirectness implicatures
- Most of the general problems have been solved, to some extent, for various systems and implementations
  - Pragmatic issue seems still to be open...

# References

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