One Step Ahead: Dialog Support for More Cooperative Conversations

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Anticipation

• People behave like speech systems
  – Let’s not punish them for it!
• Cooperation & anticipation in dialog
• Infrastructure & technology needs
• Impact on design
• Cooperation begets cooperation
Speech Systems

• All speech systems share the same architecture
  – Say something and activate a grammar
  – Grammar was defined in advance
• We are always predicting what our partner will say next
• And callers do the same thing!
Paul Grice’s Co-operative 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.*

- Grice, Paul (1975) in Syntax and Semantics, 3: Speech Acts, as quoted on wikipedia

- People instinctively cooperate in conversation,
  – expect their partner to do so,
  – and expect their partner to expect that they will do so

- Result: callers anticipate questions and provide answers before they are asked

- Example: anticipating the waitress
People expect cooperation

• Dummy nouns* (“thingamabob”, “whatchamacallit”, etc.) take advantage of an addressee’s inclination to be cooperative

• Exception that proves the rule:
  – Person A: “How did the talk go?”
  – Person B: “So, how about them Mets?”
  – Person A: “That bad, huh?”

* - Clark & Wilkes-Gibbs, 1986
Callers Cooperating

• “I think you said Marriott Albuquerque, is that right?”
• “No….”
• “…Marriott Marquis.”
• “Please say yes or no – did you say…”

• “Marriott Marquis.”
• “Okay, the Marriott Albuquerque, checking in when?”
• “No, the Marriott Marquis, in New York.”
Terminology Corner

• Explicit confirmation:
  – “I think you said …, is that right?”

• Implicit confirmation:
  – “Okay, <you wanted X>, and the next thing?”

• One-Step Correction (OSC):
  – “No, the Marriott Marquis”

• Explicit confirmation with OSC
• Implicit confirmation with OSC
Technology to support confirmation with OSC

- **Grammars**
  - "No, I said < X’ >" and equivalents
  - "< X’ >" should exclude the original hypothesis
  - Correction & collection grammars must run in parallel

- **Callflow**
  - Minimize cases where correction & collection grammars overlap

- **Pragmatics**
  - Callers don’t always flag their corrections

“*It’s Visa number 4122…*”  “*…3159…*”  “*…3159…*”

“*…4122…*”  “*…3199…*”
Technology required (cont’d)

• Tuning parameters
  – Dynamic semantic grammars: how likely is a correction?
  – What predicts the likelihood of a correction?

• Cost/benefit of success vs. error
  – …re recognition/automation rates?
  – …re caller satisfaction rate?
Impact on design: prompt wording loosens up 😊

- Farewell to: “please say yes or no.”
- Farewell to: monolithic “I think you said ‘3199’, is that correct?”
  - “Was that ‘3199’?”
  - “Sorry, did you say ‘3199’?”
  - “3199.”
- Hello to: dynamically change a confirmation from explicit to implicit
  - Can save several turns over the course of a call
  - Better matches human behavior
  - More caller utterances produce “progress”
Impact on design: conversation is more natural 😊

- Freedom to vary prompting
  - Mirrors how people talk
  - Avoids exposing the “robot” beneath the skin

- Why “risk it”? Why try to be natural?
  - We’re not trying to fool anyone
  - But to leverage callers’ “language instinct”
  - If callers are talking “this way” anyway, *natural → more success*
  - *Truly natural → easier*
    - easier → *higher caller satisfaction*
    - easier → *less likelihood to opt out*
Impact on design: cooperation begets cooperation 😊

- OSC is only 1 type of anticipation; consider others

- Very likely:
  - House number + street name
  - Car make + car model
  - Date + time
  - “It’s a MasterCard” + credit card #
  - Number of tickets + type of tickets

- Reasonably likely:
  - Yes/no follow-ons (26% of answers to “Do you know the train #?” include #s)
  - Credit card # + expiration
  - Any frequently encountered sequence of related questions
Impact on design: we can’t handle everything 😞

• There are lots of other ways to anticipate
  – Mis-anticipation: “yes, a no-smoking room, with down comforters”
  – Reporting “extraneous” information: “no, not now, I’m at work”

• There are lots of other ways to cooperate
  – Let your partner decide: “I have my green card – does that count?”
  – Assume too much language sophistication: “Why not?”
  – Assume too much application sophistication: “[No, but ] can you hold my order till I call back with a credit card?”
  – Assume too much real-world knowledge: “[No, ] I’m from Bora Bora.”
Summary

• Callers will anticipate questions and “cooperate” by going “out of grammar”
• We have the technology to deal with the most common cases of this
• But do we have the resolve?
• Technology enables design freedom
• Design freedom will simultaneously:
  – make systems more natural / better / successful
  – introduce new caller behaviors that could jeopardize that success
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Thank You