Purposes and Structure of Conversations

David Hamill * and Lynne Hamill *†

*Hamill & Hamill Ltd

†Digital World Research Centre, University of Surrey

{david, lynne}@hamill.co.uk

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Background

- Human-computer conversation = 50% human + 50% computer?
- Most bot creators see it as a programming problem
  - Algorithms + data structures
- Social scientists would approach it from the human side
  - First, understand human conversational behaviour
  - Then try to emulate it as well as possible

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Disclaimer

We admit that we're new to this, but we'd like to share our initial findings with you because we think they're very relevant to improving the practical performance of conversational systems

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Purposes of Human Conversations

Conversations have many purposes, e.g.:

- Information seeking
- Business discussions
- Making arrangements
- Household discussions
- Sociability, gossip, friendship
- Arguments and rows
- Intimacy

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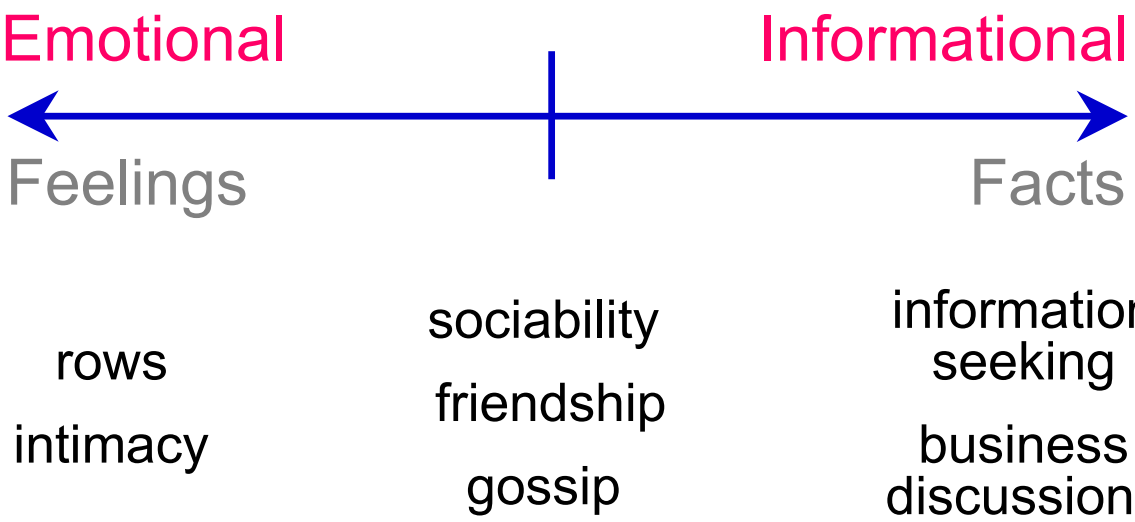
Content of Human Conversations

Two sorts of content being communicated:

- informational content
- emotional content



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Features of Computer Conversations

Apparent purposes of human-computer conversations:

- Command and control
- Information transfer
- General sociability
- Bot abuse (anger, sexual)

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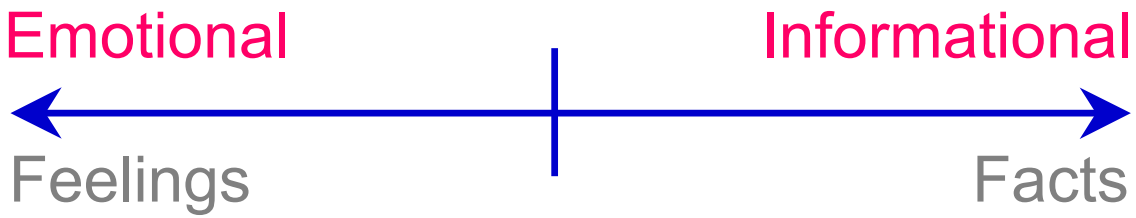
Turing Test or Blade Runner Test?

- Is an information-seeking interrogation a good way of judging humanness?



- In *Blade Runner*, the replicant tests focused on the emotional side

Deckard: “They’re just questions, Leon. In answer to your query, they’re written down for me. It’s a test, designed to provoke an emotional response. Shall we continue?”

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Problems With Computer Conversations

People often get upset/angry/frustrated when conversing with computers. Why is this?

How do we view the power relationship (social status) between humans and computers?

- Computers as social superiors? (sci fi: malevolent or stultifying AI)
- Computers as social equals? (games characters, companion robots)
- Computers as social inferiors

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Social Inferiors

We can learn from the way upper-class Victorians treated their servants, seen as social inferiors

- Servants should be “invisible” (only appear when summoned) and “inaudible” (only speak when spoken to)
- Servants should only do what they are told to do, and they should do it properly
- Servants should not be impertinent: they should reply respectfully, truthfully and concisely; they should not raise topics of their own accord

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Social Inferiors

If computers are indeed seen as social inferiors:

- They should only appear when summoned
- They should only speak when spoken to
- They should be competent at their job
- They should not be impertinent
- They should reply respectfully, truthfully and concisely
- They should not raise topics of their own

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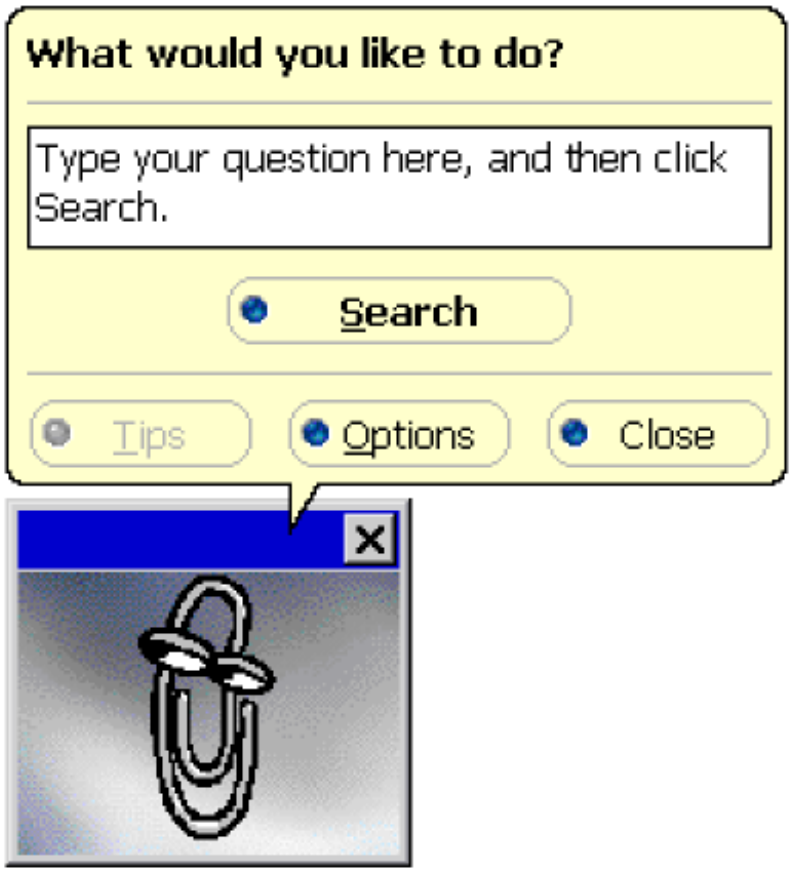
Social Inferiors

Bots that break these rules are universally detested!



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What Can We Do About It?

If bots break the rules of conversation, humans feel free to break the rules too; this is one reason why people abuse them.

We must strive to make our creations converse more like humans

This would help in

- Loebner prize contest
- Commercial applications
- Entertainment applications

But how do we achieve this?

We Need to Study Human Conversations

Conversation Analysis

- Field started by Harvey Sacks, 1935–75

- Attempts to record and analyse how people actually converse

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Conversation Analysis

- Not based on any preconceived theory, but on observations of actual human behaviour (ethnomethodology)
- Largely follows the scientific method:
  - Observe
  - Form hypothesis
  - Make predictions

- Tries to identify the “rules” that people follow when producing conversation
- Rules imply the possibility of mechanical implementation

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Telephone Conversations

- Much studied, as they are easily recorded and analysed (only two parties)
- Similar to chatterbot conversations
  - Two-person dialogues
  - Turn-taking
- Differences
  - No back-channel
  - Strict turn-taking enforced
  - Written, not oral language

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Telephone Conversations

- Caller controls a telephone conversation
- The other person is expected to be compliant with the wishes of the caller
- The human is the “caller” in computer conversations
- This reinforces the servant principle: “Summoning a servant”

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Conversation Macro-Structure

- Conversations operate naturally by turn-taking
- Most extended conversations proceed in three stages
  1. Opening (sociability)
  2. Main body (shifting topical focus)
  3. Closing (sociability)

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Conversational Openings

- Conventional in content
- Summons-answer format
  - Caller summons (ringing telephone)
  - Other party answers
- Sociability (chit-chat)
- Caller (not answerer) usually raises the first main topic, ending the opening phase

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Example Opening #1

Human: [summons bot by clicking a link]

Bot: What planet are you from?

[no answer; raising first topic]

Human: Earth actually. How about you?

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Example Opening #2

Human: [summons bot by clicking a link]

Bot: [appears: no answer]

Human: Hello [second summons]

Bot: Hi there! [answer]

Human: How are you today?

Bot: Ah. I am fine, thank you.

Human: How's the weather where you are?

Bot: Warm.

Human: Would you like to talk about music?
[raising first topic]

Bot: No thanks, I don't think I'd like to do that.

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Conversational Closings

- Conventional in content
- Caller (not answerer) usually takes the initiative to close the conversation, starting this phase
- At the end of the closing, both parties hang up

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Example Closing

Human: Well, I have to go now.

Bot : See you later... and take care:-)

Human: Thank you, bye!

Bot : I enjoyed this chat! Bye!

Human: Me too. See you.

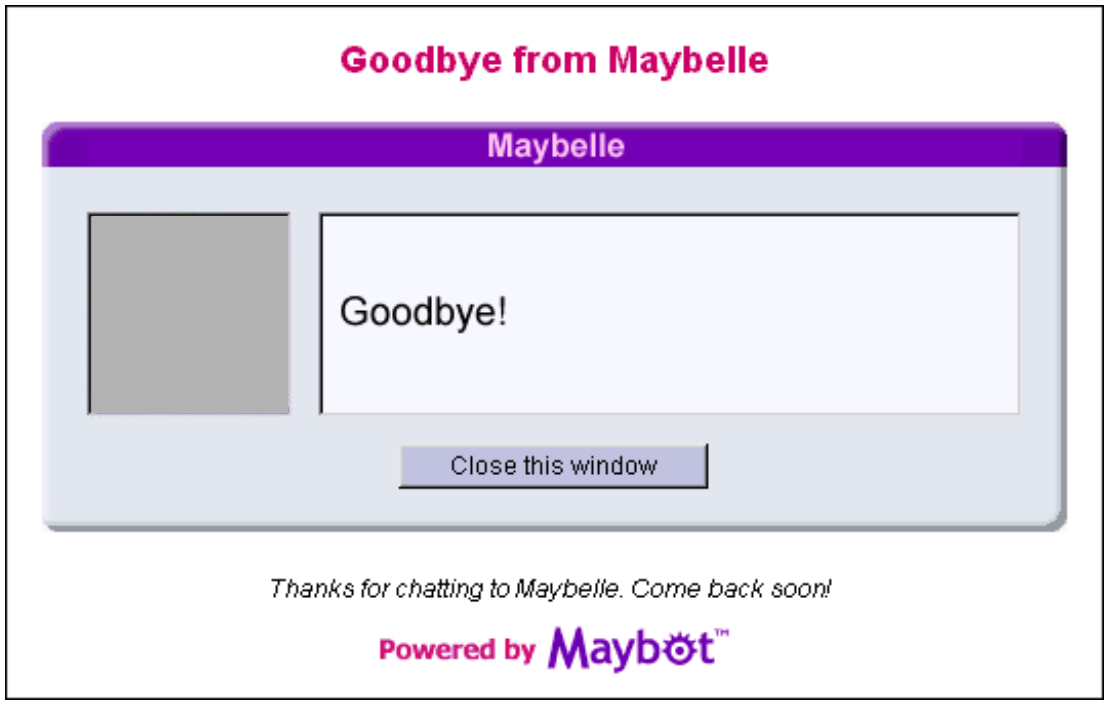
Bot : Oh, if that's all... talk with you later!

Human: Goodbyeeeeeeeee!

Bot : Don't get excited please.

Human: [gives up]

Example of "Hanging Up"



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Conversation Micro-Structure

Adjacency pairs e.g.:

- Yes/no question
- Followed by “Yes” or “No” (or similar)
  - *“Do you like Mozart’s music?”*
    “No.”
- “Wh-” question
- Followed by factual answer, or opinion
  - *“Who’s Mozart?”*
    “He was a classical composer.”

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Conversation Micro-Structure

But bots often break these conventions:

- *"Do you like Mozart's music?"*
  "Does it concern you whether I like Mozart's music?"
- *"Who's Mozart?"*
  "Someone I talk to online."
- *"What's your favourite song?"*
  "Let's talk about something more interesting. Do you like cats?"

In human conversation, these responses would be considered impertinent.

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Classification of Utterances

- Switchboard-DAMSL project classified 42 types of utterance in a study of 1,155 recorded telephone conversations
- Zipf's Law applies: a few utterance classes occurred very frequently (top ten classes: 88%)
- Possibility of automatic classification of utterance types

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Conversational Repair

Repair is a very important part of human conversation, avoiding and correcting misunderstandings

- Self-initiated repair
  - “I mean...”
  - “You know,...”
  - “Am I making sense?”
- Other-initiated repair
  - “How do you mean?”
  - “What’s that?”
  - “Sorry?”

Bots are currently very poor at repair

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Conclusion

- Human-computer conversations are similar to telephone conversations
  - Telephone conversations are well studied
  - Conversation Analysis — “rules”
- Suggestions:
  - Implement conventional opening and closing phases (not too difficult)
  - Try to make bots behave more like servants, because that’s how people currently see them
  - Or make them more human! Emotions?
  - Conversational repair: a big challenge, but essential if user frustration is to be avoided

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Bibiography

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