

Social context of language technology use

Linguistics 384
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Social context of language technology use

For this unit, we will ask more questions than we will provide answers.

- How do we react to computers that make use of language?
- What does it mean for the way we see ourselves?
- What assumptions do we make about every user of language, be it a human or a machine?
- Are there ethical issues to consider in using computers to emulate language?

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Some recommended reading

Sherry Turkle: *Life on the Screen: Identity in the Age of the Internet*

Terry Winograd and Fernando Flores (1986): *Understanding Computers and Cognition*

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Reacting to computers making use of language

How/What do we think about a computer which can speak or which understands the fundamentals of language?

- Do we treat it like a computer? Think about:
 - The way we talk to dialogue systems
 - Our reactions to spell checkers
 - Our use of pronouns: ELIZA as *it* vs. ELIZA as *she*
 - Providing psychological attributes/personality characteristics to computers:
This stupid machine ...
 - etc.
- Should we treat it like a computer?
 - Will treating a computer like a human cause problems?

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Is the computer an economic threat?

- Will computers take away our jobs?
 - MT will eliminate (some/different) translators?
 - Corpora supplant the need for dictionaries?
- How are computers changing our jobs?
 - People will have to learn new skills? (and forget old ones?)
 - More clerical work?

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Deskilling of jobs?

Deskilling: “New subdivisions of work tasks means that workers need fewer skills to complete a job, thereby allowing employers to offer workers who have fewer skills lower wages to perform subsets of these work tasks.”

Upskilling: “Reorganization of work around mechanization means that workers acquire new skills to use such machines as computers and are freed to spend greater amounts of time on problem solving instead of information gathering and processing.”

(Quotes taken from <http://www.slis.ualberta.ca/cais2000/fulton.htm>)

What does language technology do in terms of changing people’s jobs?

- Have spell checkers reduced the need for copy editors?
- Do foreign language teachers have less to do in class thanks to CALL systems?

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Up/Deskilling case study 1: MT

METEO weather translation system.

Doug Arnold: “[T]he job satisfaction of the human translators in the Canadian Meteorological Center improved when METEO was installed, and their job became one of checking and trying to find ways to improve the system output, rather than translating the weather bulletins by hand (the concrete effect of this was a greatly reduced turnover in translation staff at the Center.)”

- Happier workers ...
- ... but different workers.

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Up/Deskilling case study 2: Web searching

Librarians spend years learning to categorize knowledge (Dewey decimal system), allowing for very precise searches. But a user who wants to search through this:

- needs to know the library terminology
- needs to sift through various databases

Web search engines fly in the face of this: they use no proper categories, but they are very user-friendly.

Metasearches: search through all the databases at once, and rank the results in a google-esque way (unlike simple reverse chronological order)

<http://www.libraryjournal.com/article/CA322627>

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Conflicting tensions

- Are computational linguists to bend to the will of industrial needs or should a “higher” goal of science be kept in mind?
 - Should we focus on tasks that make life more convenient or on tasks that are “interesting”?
 - Is it better to focus on getting the job done, or on doing things “right”? e.g. A spell checker can just store every single possible word (do the job), or it could store base forms and suffixes and prefixes (the way language works)
- To what extent is language taken into account?
 - If you do something statistically, is that not taking language into account?
 - If you ignore language, will you be able to scale up?

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How do we see ourselves?

How does language technology make us see ourselves differently?

- Is there a danger in humanizing computers?
 - Do we then computerize humans?
 - Does that change the way we view the human brain?
- Do we feel less human?
 - Are our capabilities less worthwhile if we can get a stupid machine to emulate them?
 - Does the fact that a computer can emulate speech make it feel like less of a human task?
 - Can you share your feelings more with ELIZA than with another human being?

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How do we see ourselves?

- Turkle argues that humans are seeing themselves as more fractured due to the many lives they can have on the internet.
 - Is this fracturedness exhibited with language technology?
 - This is how I talk to a dialogue system; this is how I converse over e-mail; this is how I interact with a search engine
- Does modularity make us think that that must be the way the human mind is organized?

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How do we see ourselves?

- Do we feel less capable of doing things on our own?
 - Google does a better job of searching than I could at a library.
 - I only know so much about spam.
- Do we assume the computer is always right?
 - Do we trust our intuitions, or do we need to check with the computer first?
 - Is the spell checker the ultimate authority on language?
 - If the CALL system conflicts with the language instructor, who's right?

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Assumptions about language users (human or machine)

- Who are the users of language technology? And why do they want to use this technology?
- Do we care who's going to use a particular language technology?
 - Should some people not be allowed?
 - Conversely, should we make these technologies user-friendly?
- Do humans and computers have to share the same assumptions about language?
 - ⇒ We speak language naturally, but we have to break it down into rules in order for a computer to know it. Are we modeling what happens in our minds? Do we need to?

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Assumptions about language

Typical assumptions about language (Winograd & Flores, p. 19), some of which we have only touched on this quarter.

- There is a system of rules by which natural language sentences can be converted into meanings: syntax, morphology, etc.
 - Do we think of language as simply a system of rules? And is this the right way to view it?
- Sentences say things about the world and can be either true or false.
 - i.e. In figuring out a sentence, the important question is: is it true or false? Is this appropriate?

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Assumptions about language (cont.)

- There are systematic rules of logic, from which we can draw inferences about the way the world is, and what a user might have meant.
- Meaning (or some amount of meaning) can be determined without taking context into account.

Think about how ELIZA works.

Are we using how a computer works to influence how we think language works? Vice versa? Does it matter?

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Artificial intelligence

The field of **artificial intelligence** seeks to endow computers with humanlike intelligence.

This can be anything from detecting faces in a picture to a full-blown robot waiter (yet to be designed).

Dialogue systems, machine translation, and so on appear to have some intelligence, but the important questions are:

- what is (human) intelligence?
- will we ever (logically) be able to make computers smart?
 - Antonio Damasio, *Descartes' Error*: we need emotions in order to have cognition.

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What does it mean to understand?

Winograd & Flores, section 9.4

- Program 1: prints out the time of day when it sees “What time is it?” and has no response for anything else.
- Program 2: answers “What ... is it?” (time, day, month, year) by typing out appropriate response
- Program 3: collection of patterns matched against the input (ELIZA)
“Another widespread, and to me surprising, reaction to the ELIZA program was the spread of a belief that it demonstrated a general solution to the problem of computer understanding of natural language.” (Weizenbaum, *Computer Power and Human Reason*, p. 6)
- Program 4: collection of scripts for various scenarios; matches patterns based on each scenario

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Understanding

So, which of these programs has *understanding*?

Can we prove that humans have any greater level of understanding than program 4 does?

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Ethical issues

Are there ethical issues to consider in using computers to emulate language?

- When to use such systems? Should everyone have access to these different systems?
- Privacy issues: CALL systems keep track of user models; spammers feel it's their right to send you e-mails.
- Will these systems lead us to some disaster in the future?
e.g. HAL in *2001*, spell checkers from hell, etc.
- If computers are capable of some understanding, does that mean we should abandon efforts to program them? Is it a strictly human right?

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