Linguistics 384: Language and Computers

Topic 6: Social context of (language) technology use

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Outline

Nature of the topic

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?
- What effects does the use of (language) technology have on our jobs, on our life?
- ...

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*. Addison Wesley.

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? Are we able to?

Impact of computers on society

- 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?
  - Will old skills die out?
  - More clerical work?
  - What happens to the social interaction traditionally involved in holding a job?
- How are computers changing learning?
  - Does this lead to a democratization of knowledge?
  - What happens to the social interaction traditionally involved in learning?
- How does language technology change 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?

How do jobs change?

- **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."
(quoted from http://www.slis.ualberta.ca/cais2000/fulton.htm)

Up/Deskilling

Example 1: MT in the METEO weather translation system

> *"[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.)" (Doug Arnold, Essex)*

So basically:

- Happier workers ...
- ... but different work/workers.

Up/Deskilling

Example 2: Library cataloging

- 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 scientific categories and do not guarantee exact, repeatable retrieval of every item, 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)
(cf. http://www.libraryjournal.com/article/CA322627)

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?

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?

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 little about spam; it’s not my job to block it.
- 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?
- How can users decide whether the answer of an expert system is correct? If they always could, why would expert systems be needed?

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?

What does it mean to understand?

Which of these programs has *understanding* (Winograd & Flores, sec. 9.4):

- Program 1: prints out the time of day when it sees “What time is it?”; 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 input “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

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.

Ethical issues

Are there ethical issues to consider in using (language) technology?

- Should everyone have access to these different systems?
- Privacy issues:
  - Computer systems keep track of user properties and behavior
  - CALL systems keep track of user models
  - Spammers feel it’s their right to send you e-mails.
- Are there situations in which computer use is not responsible?
  - e.g., A patient visiting the emergency room is sent home since the expert system concluded he didn’t have a heart attack.