

Notes for discussion of information & cognitive science

i218: Concepts of Information, 3/10/09

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1. Information and “Formal Symbol Manipulation”

The Turing Test

An operational test for “thinking” -- finesses prob of definition

Cf Descartes’ letter to the Marquess of Newcastle:

...none of our external actions can show anyone who examines them that our body is not just a self-moving machine but contains a soul with thoughts, with the exception of words, or other signs that are relevant to particular topics without expressing any passion. ... I add also that these words or signs must not express any passion, to rule out not only cries of joy or sadness and the like, but also whatever can be taught by training to animals. If you teach a magpie to say good-day to its mistress, when it sees her approach, this can only be by making the utterance of this word the expression of one of its passions. For instance it will be an expression of the hope of eating, if it has always been given a tidbit when it says it. ...Now it seems to me very striking that the use of words, so defined, is something peculiar to human beings.

Responses to Turing’s argument

Test is too hard (what if machine lacks cultural knowledge?)

Could a Martian pass the test? A seven-year old? A Uighar?
How could you skunk out the machine?

What Computers can’t do...

Robert French: computers can’t duplicate subcognition

flugblog as name of a breakfast cereal, a computer company, etc.
"Rate dry leaves as a hiding place"/"Rate these jokes for funniness..."
?= Turing’s “argument from informality of behaviour”?

Emotions/consciousness:

G. Jefferson, Lister Oration: "No machine could feel (and not merely artificially signal, an easy contrivance) pleasure at its successes, grief when its valves fuse, be warmed by flattery, be made miserable by its mistakes.... be angry or depressed when it cannot get what it wants."
But if the machine can seem to have emotions...: "an easy contrivance"?
But how does one tell?

Creativity:

Does the Turing test tell us how human machines can be, or how mechanical humans can be?: the case of Eliza

<http://www.chayden.net/eliza/Eliza.html>

Intentionality: Searle’s Chinese Room

Suppose that I’m locked in a room and given a large batch of Chinese writing. Suppose furthermore (as is indeed the case) that I know no Chinese, either written or spoken, and that ...To me, Chinese writing is just so many meaningless squiggles.

Now suppose further that after this first batch of Chinese writing I am given a second batch of Chinese script together with a set of rules for correlating the second batch with the first batch. The rules are in English, and I understand these rules as well as any other native speaker of English. They enable me to

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correlate one set of formal symbols with another set of formal symbols, and all that 'formal' means here is that I can identify the symbols entirely by their shapes. Now suppose also that I am given a third batch of Chinese symbols together with some instructions, again in English, that enable me to correlate elements of this third batch with the first two batches, and these rules instruct me how to give back certain Chinese symbols with certain sorts of shapes in response to certain sorts of shapes given me in the third batch. Unknown to me, the people who are giving me all of these symbols call the first batch "a script," they call the second batch a "story." and they call the third batch "questions." Furthermore, they call the symbols I give them back in response to the third batch "answers to the questions." and the set of rules in English that they gave me, they call "the program."

Suppose also that after a while I get so good at following the instructions for manipulating the Chinese symbols and the programmers get so good at writing the programs that from the external point of view that is, from the point of view of somebody outside the room in which I am locked -- my answers to the questions are absolutely indistinguishable from those of native Chinese speakers. Nobody just looking at my answers can tell that I don't speak a word of Chinese.

On “Formal Symbol Manipulation”

Thought as FSM. Device manipulates symbols purely on basis of shape; computers as “numeral crunchers.” Alignment of physical and semantical boundaries, mediated by transducers.

Minds as information processing systems

Simon: “Thinking is carried out by the brain using the same basic symbol-manipulating processes that are used by computers: reading symbols writing them, storing them in memory, copying them, comparing them for equality or inequality.... The availability of these processes provides the necessary and sufficient conditions for a system to exhibit intelligence.

Cf Miller, ‘The magic number seven, plus or minus two’.

My problem is that I have been persecuted by an integer. For seven years this number has followed me around, has intruded in my most private data, and has assaulted me from the pages of our most public journals. This number assumes a variety of disguises, being sometimes a little larger and sometimes a little smaller than usual, but never changing so much as to be unrecognizable. The persistence with which this number plagues me is far more than a random accident. There is, to quote a famous senator, a design behind it, some pattern governing its appearances...

I shall begin my case history by telling you about some experiments that tested how accurately people can assign numbers to the magnitudes of various aspects of a stimulus. In the traditional language of psychology these would be called experiments in absolute judgment. Historical accident, however, has decreed that they should have another name. We now call them experiments on the capacity of people to transmit information.

The Paradigmatic Case of Language

The dream of machine translation.

Bar Hillel: the box is in the pen

Mettons marie Dans la chaise/le fauteuil Fenetre/vitrine

Pronoun resolution

The police banned the demonstration of the suffragettes. They were afraid of violence.

Since the dictionary is constructed on the basis of the text that is being processed, *it* need refer to only a small amount of context to resolve ambiguities.

Since the dictionary is constructed by a native speaker of the language, *he* need refer to only a small amount of context to resolve ambiguities.

The man looked at the girl with the telescope. [penetrating eyes

Linguistics: the Chomskyan revolution and the autonomy of syntax