

LCC 6310
The Computer as an
Expressive Medium

Lecture 20

Overview

Project 4 questions?

Discuss readings

Readings for next week

Project 4

Due: Friday November 2

Making sense of the world is not just a matter of structure, but of process, of the dynamic construction of meaning. And as we've been discovering together, computation is fundamentally a process medium. What would you do to the web? Create an applet that dynamically does something to one or more web pages (e.g. collage, systematic distortion, re-layout, ironic superposition, etc.).

Readings

Summary presentations & questions for discussion

Process Intensity - Chris Crawford & *Interactivity, Process Intensity, and Instantial Assets* - Greg Costikyan (linked from class page, for Costikyan scroll down to Tues, May 20, 2003)

Semiotic Considerations - Michael Mateas (linked from class page)

Computing Machinery and Human Intelligence - Alan Turing (NMR pp.49-64)

From *Computing Power and Human Reason* - Joseph Weizenbaum (NMR pp.367-375)

Chris Crawford on Process Intensity

"Process intensity is the degree to which a program emphasizes processes instead of data. All programs use a mix of process and data. Process is reflected in algorithms equations, and branches. Data is reflected in data tables, images, sounds, and text. A process-intensive program spends a lot of time crunching numbers; a data-intensive program spends a lot of time moving bytes around."

Chris Crawford

Greg Costikyan on Process Intensity

"To put it another way, we've been doing precious little actual game design; we've mostly been implementing new versions of existing game styles, but with prettier graphics. But as I've argued, we've come to the point of diminishing returns along that road. In future, we have to do something else. And the something else we have to do is to start thinking about process--about how different algorithms can be combined to create challenges and gameplay that people haven't seen before; about experimenting with different approaches to gameplay; about how rules shape player behavior."

[Sat, 2006-10-07 18:39 @ Manifesto Games](#)

Semiotic Considerations

in an Artificial Intelligence-Based Art Practice

Michael Mateas, 2003



Expressive AI - hybrid practice of art making and AI research

"AI consists of coupled rhetorical and technical strategies for structuring computational processes. Artists can consciously manipulate these rhetorical and technical strategies so as to build machines with powerful authorial affordances for crafting audience experiences."

Semiotics framework

Semiotics can assist with what is often described as the **knowledge representation problem**

i.e. the task of defining the structures and processes that are amenable to computation while at the same time being meaningful to the user

Semiotics can provide a tool for analyzing the relationship between both sides of this problem by considering them both as instances of sign systems

i.e. the sign system of code ('code machine') and the sign system used to talk about the code ('rhetorical machine')

Alan Turing



English mathematician, logician, and cryptographer who is often considered to be the father of modern computer science and AI
During WWII, Turing worked at Bletchley Park, Britain's codebreaking centre, designing the Bombe electromechanical machine to decipher messages encoded with the German Enigma machine.

Computing Machinery and Human Intelligence

"I propose to consider the question, 'Can machines think?'" (1950)

Operational test for intelligent behavior: the Imitation Game

Transforms the question

"Can machines think?" → "Can machines behave intelligently?"

Description of machines and universality of digital computers

Anticipated the major arguments against AI in following 50 years

Theological, mathematical, arguments from consciousness, originality, etc.

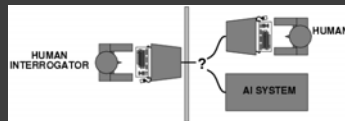
Suggested major components of AI:

Knowledge, reasoning, language understanding, learning

Turing Test

"Can machines think?" → "Can machines behave intelligently?"

Operational test for intelligent behavior: the Imitation Game



Separate rooms contain a person, a computer, and an interrogator. The interrogator can communicate with the other two by teleprinter. The interrogator tries to determine which is the person and which is the machine.

The machine tries to fool the interrogator into believing that it is the person. If it succeeds, then we conclude that the machine can think.

Predictions

In 1950, Turing predicted that by 2000 a machine might have a 30% chance of fooling a lay person for 5 minutes.

It will be natural to speak of computers 'thinking'

"[The machine] may be used to help in making up its own programmes, or to predict the effect of alterations in its own structure."

"We may hope that machines will eventually compete with men in all purely intellectual fields."

Some objections

Theological objection: Thinking is part of humans' souls, and so animals/machines can't think.

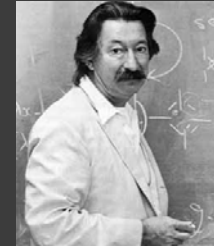
Head-in-the-sand objection: Consequences of thinking machines are dreadful, so let's hope it's not possible.

Futuristic movies and books build upon this fear.

Machines will never be able to do X.

X = { be kind, friendly, have sense of humor, fall in love, etc. }

Joseph Weizenbaum



Professor emeritus of computer science at MIT.

In his 1976 book "Computer Power and Human Reason", he explores his misgivings about technology and AI that were prompted by effects he observed his ELIZA program had on people.

Computer Power and Human Reason

Weizenbaum demands that the community consider ethical and moral issues associated with the development of machines that can imitate human behavior.

The real question for the Artificial Intelligence, he says, is not what computers will be able to do, but what we should allow them to do.

ELIZA

ELIZA: program that simulated a Rogerian psychotherapist interacting with a patient.

Coded at MIT during 1964-1966 by Joseph Weizenbaum

The script was a simple collection of syntactic patterns

Each pattern had an associated reply which might include bits of the input after simple transformations (my → your)

Weizenbaum was shocked at the reactions:

Psychiatrists thought it had potential

People anthropomorphized

Many thought it solved the natural language problem

Did it pass the Turing Test?

A funny ELIZA story

Soon after ELIZA's invention, copies of Weizenbaum's program were running on many computer systems.

Weizenbaum's former colleague at MIT, Daniel Bobrow, told the following story at a conference in 1969...

(At the time of the story Bobrow was across town from MIT at a company called BBN)

"One Saturday morning about 9 a.m., a BBN Vice President in charge of selling our Telcomp commercial service arrived at our PDP-1 Computer Room hoping to be able to use the computer for a demonstration.

He found a note on the PDP-1 teletype that read: "TYPE ALL MESSAGES INTO THIS TELETYPE, AND END THEM WITH A PERIOD." This note was left there by one of the programming bums who had just succeeded in making run a LISP version of the DOCTOR program (based on ELIZA as developed by Weizenbaum).

However, the VP thought that this note indicated that this teletype was linked with the one in my home, since I often used the computer all night. Therefore, he started typing to "me", but in fact was typing to this version of the DOCTOR program. The following conversation ensued:"

VP: Do you think that I can use the computer this morning?

D: WHY DO YOU ASK?

VP: I might be able to make some additional Telcomp sales.

D: WHY AREN'T YOU SURE?

VP: My prospective customers have never seen a demonstration of the system.

D: DOES THIS MEAN VERY MUCH TO YOU?

VP: Of course it does.

D: YOU SEEM VERY POSITIVE ABOUT THAT.

VP: This is ridiculous.

D: WHAT DO YOU MEAN THIS IS RIDICULOUS?

VP: Is there any reason why I can't use the computer now?

D: TELL ME MORE ABOUT YOUR PROSPECTIVE CUSTOMERS.

VP: Please dial me up on 491-1850

"Note that after the last remark the VP did not obey instructions, and left out the period.

Therefore, of course, the computer didn't answer him. This so infuriated the VP, who thought I [Bobrow] was playing games with him, that he called me up, woke me from a deep sleep, and said:

VP: Why are you being so snotty to me?

B: What do you mean why am I being so snotty to you?

The VP angrily read me the dialogue that "we" had been having, and couldn't get any response but laughter from me. It took a while to convince him it really was the computer."

(Bobrow, 1969: 32-33; reproduced in Boden, 1978)."

Another ELIZA interaction

> Men are all alike.

[ELIZA]: IN WHAT WAY

> They're always bugging us about something or other.

[ELIZA]: CAN YOU THINK OF A SPECIFIC EXAMPLE

> Well, my boyfriend made me come here.

[ELIZA]: YOUR BOYFRIEND MADE YOU COME HERE

> He says I'm depressed much of the time.

[ELIZA]: I AM SORRY TO HEAR THAT YOU ARE DEPRESSED

> It's true that I am unhappy.

[ELIZA]: DO YOU THINK COMING HERE WILL HELP YOU NOT BE UNHAPPY

> I need some help, that much seems certain.

[ELIZA]: WHAT WOULD IT MEAN TO YOU IF YOU GOT SOME HELP

> Perhaps I could learn to get along with my mother.

[ELIZA]: TELL ME MORE ABOUT YOUR FAMILY

> My mother takes care of me.

[ELIZA]: WHO ELSE IN YOUR FAMILY TAKES CARE OF YOU

Try it! <http://chayden.net/eliza/Eliza.html>

Readings for next week

For **Tuesday** next week:

Concepts: Braitenberg vehicles

For **Thursday** next week: Theory Readings

Two students: present one reading each

Everyone else: prepare one discussion question for each reading

From *Plans and Situated Actions* - Lucy Suchman (NMR pp.599-612)

Expressive AI: A hybrid art and science practice - Michael Mateas ([Online](#))