Human-AI Interaction, Lecture 2

History of Human-AI Interaction

Men are all alike.
IN WHAT WAY
They're always bugging us about something or other.
CAN YOU THINK OF A SPECIFIC EXAMPLE
Well, my boyfriend made me come here.
YOUR BOYFRIEND MADE YOU COME HERE
He says I'm depressed much of the time.
I AM SORRY TO HEAR YOU ARE DEPRESSED

Communications of the ACM, January 1966, p. 36

The capitalized lines were written by a **program**, ELIZA

The capitalized lines are the machine responses.

Weizenbaum, “ELIZA,” Communications of the ACM 9(1), 1966, p. 37



Joseph Weizenbaum, 1982. RIT News & Events, public domain (Wikimedia Commons)

Weizenbaum on ELIZA's users

Some subjects have been very hard to convince that ELIZA (with its present script) is *not* human. This is a striking form of Turing's test.

Weizenbaum 1966, p. 42

How ELIZA **replies**

Weizenbaum's example: “It seems that you hate me”

(1) It seems that (2) you (3) hate (4) me

The reassembly rule might then be “What makes you think I hate you”

Weizenbaum 1966, p. 37

How much of people's work should AI **do for them**?

1945: Bush's memex



Vannevar Bush, 1940-44. Office for Emergency Management, Library of Congress, public domain (Wikimedia Commons)

A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flflexibility. It is an enlarged intimate supplement to his memory.

Bush, “As We May Think,” The Atlantic, July 1945, pp. 106-107

Memex: trails

This is the essential feature of the memex. The process of tying two items together is the important thing.

Bush 1945, p. 107

1960: Licklider's work hours



J. C. R. Licklider, about 1963. Public domain (Wikimedia Commons)

> About 85 per cent of my "thinking" time was spent getting into a position to think, to make a decision, to learn something I needed to know. Much more time went into finding or obtaining information than into digesting it.

Licklider, "Man-Computer Symbiosis," IRE Trans. on Human Factors in Electronics, 1960, p. 6

Man-computer symbiosis

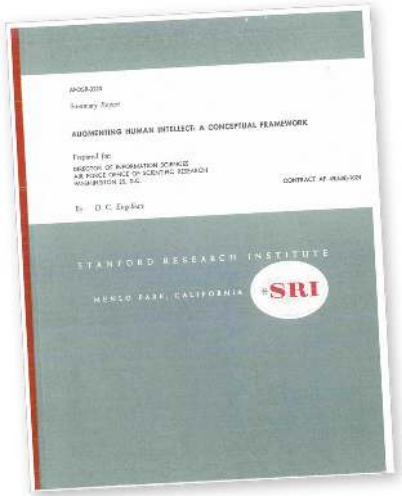
In the anticipated symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking.

Licklider 1960, Summary, p. 4

1962: Augmenting Human Intellect

By "augmenting human intellect" we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems.

Engelbart, “Augmenting Human Intellect: A Conceptual Framework,” SRI report for the Air Force Office of Scientific Research, October 1962, p. 1 and cover



Predicting **what you type next**

He made some brief references to statistical predictions that the computer could make regarding what you were going to type next, and that if you got reasonably skillful you could "steer through the extrapolated prediction field" as you entered your information and often save energy and time.

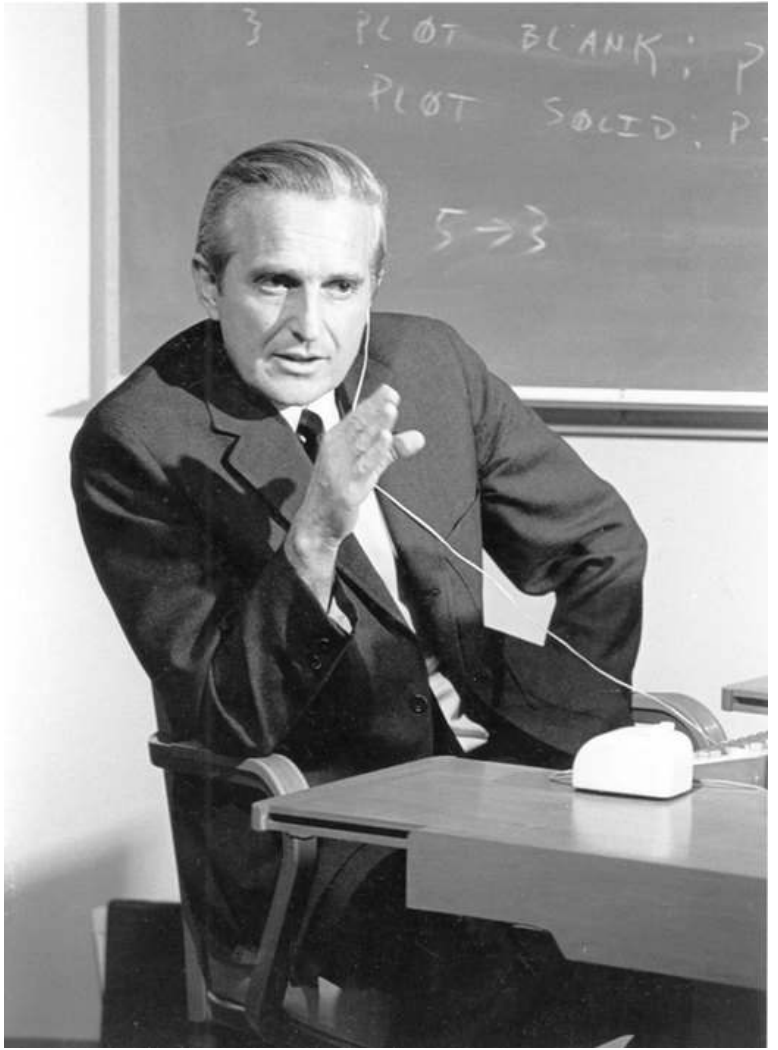
Engelbart 1962, Section III.B, p. 79, the walkthrough with “Joe”

1963: Sketchpad lets people draw **on the screen**



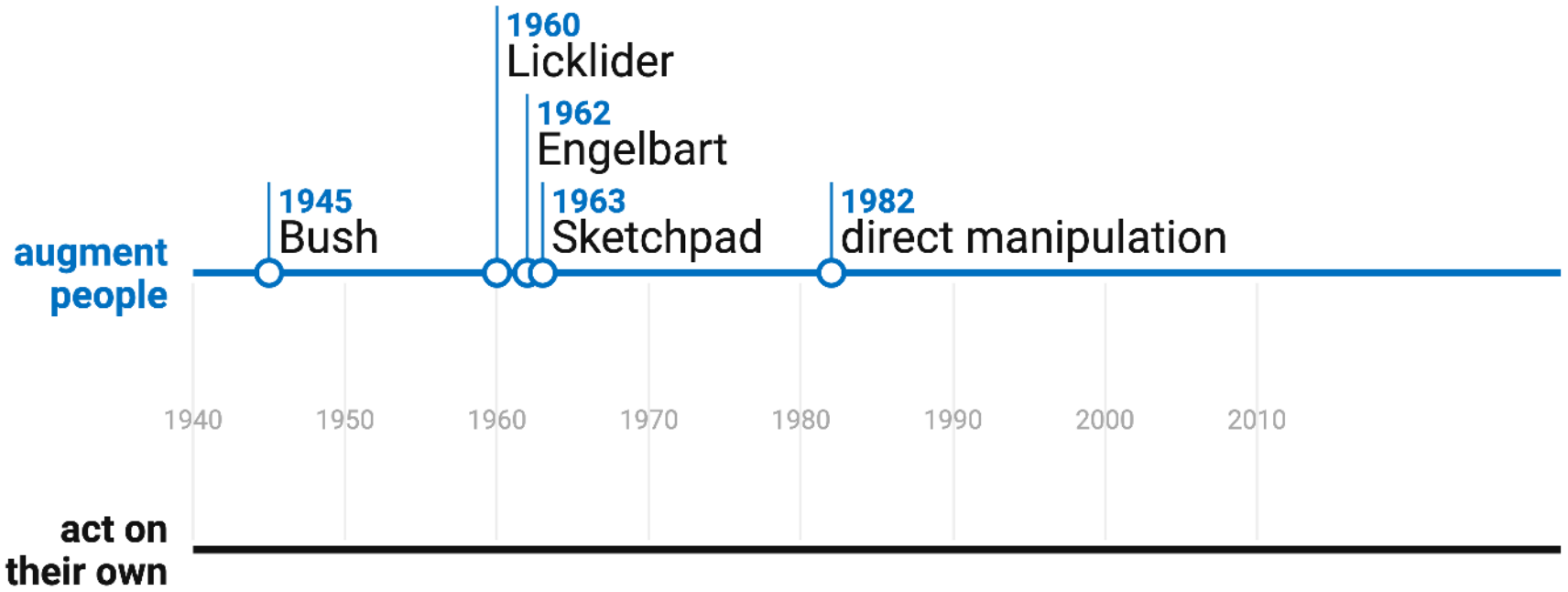
Ivan Sutherland at the TX-2, Sketchpad thesis (MIT, 1963), Fig. 1.2. Scan by Kerry Rodden, CC BY-SA 3.0 (Wikimedia Commons)

1968: Engelbart demonstrates his system with a mouse



Engelbart practicing for the demo, December 1968. SRI International, CC BY-SA 3.0 (Wikimedia Commons)

Timeline: computers that **augment** people



Bush 1945; Licklider 1960; Engelbart 1962; Sutherland 1963; Shneiderman in Shneiderman & Maes 1997, p. 44

1950: Turing's imitation game



Alan Turing, March 29, 1951.
Elliott & Fry, public domain
(Wikimedia Commons)

It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex.

We now ask the question, 'What will happen when a machine takes the part of A in this game?'

Turing, "Computing Machinery and Intelligence," Mind 59(236), 1950, pp. 433-434

Turing's example

Q : Add 34957 to 70764.
A : (Pause about 30 seconds and then give as answer) 105621.

Turing 1950, p. 434

34957 + 70764 = **105721**

1955: the Dartmouth proposal

A Proposal for the

DARTMOUTH SUMMER RESEARCH PROJECT ON ARTIFICIAL INTELLIGENCE

The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.

McCarthy, Minsky, Rochester & Shannon, “A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence,” August 31, 1955, p. 1

Weizenbaum's warning and **fix**

ELIZA shows, if nothing else, how easy it is to create and maintain the illusion of understanding, hence perhaps of judgment deserving of credibility. A certain danger lurks there.

A switch of objectives from the concealment to the revelation of misunderstanding is seen as a precondition to making an ELIZA-like program the basis for an effective natural language man-machine communication system.

Weizenbaum 1966, pp. 42-43

Grudin on AI and HCI

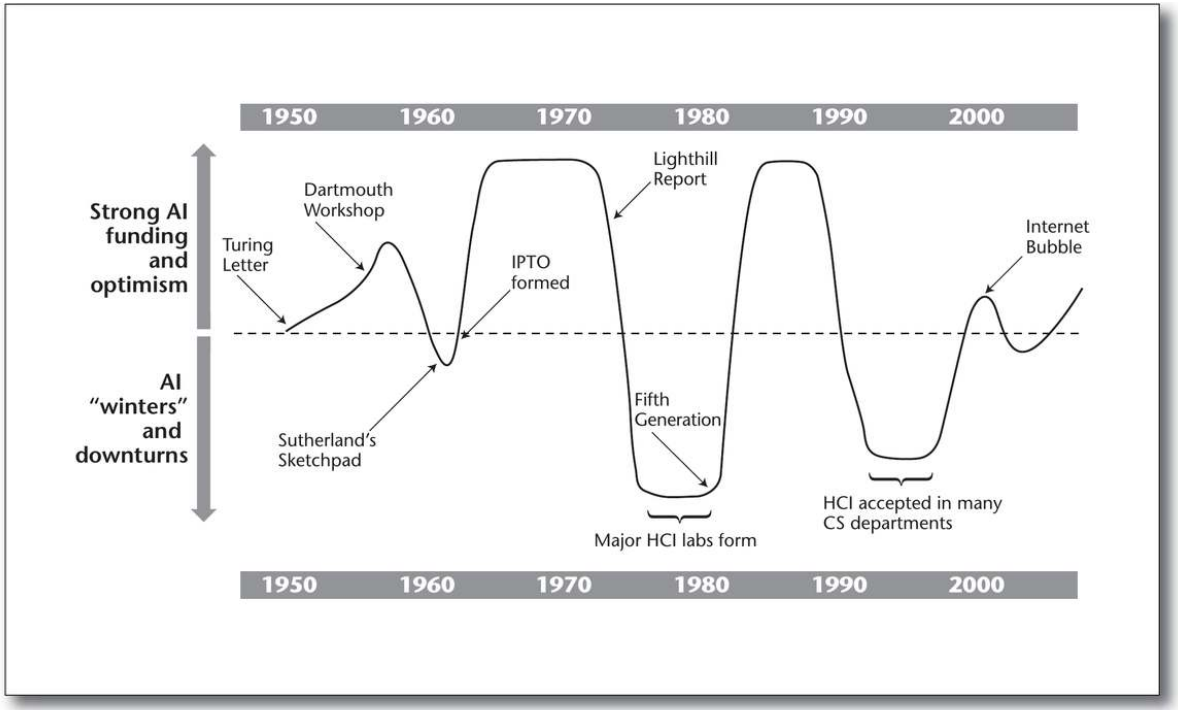


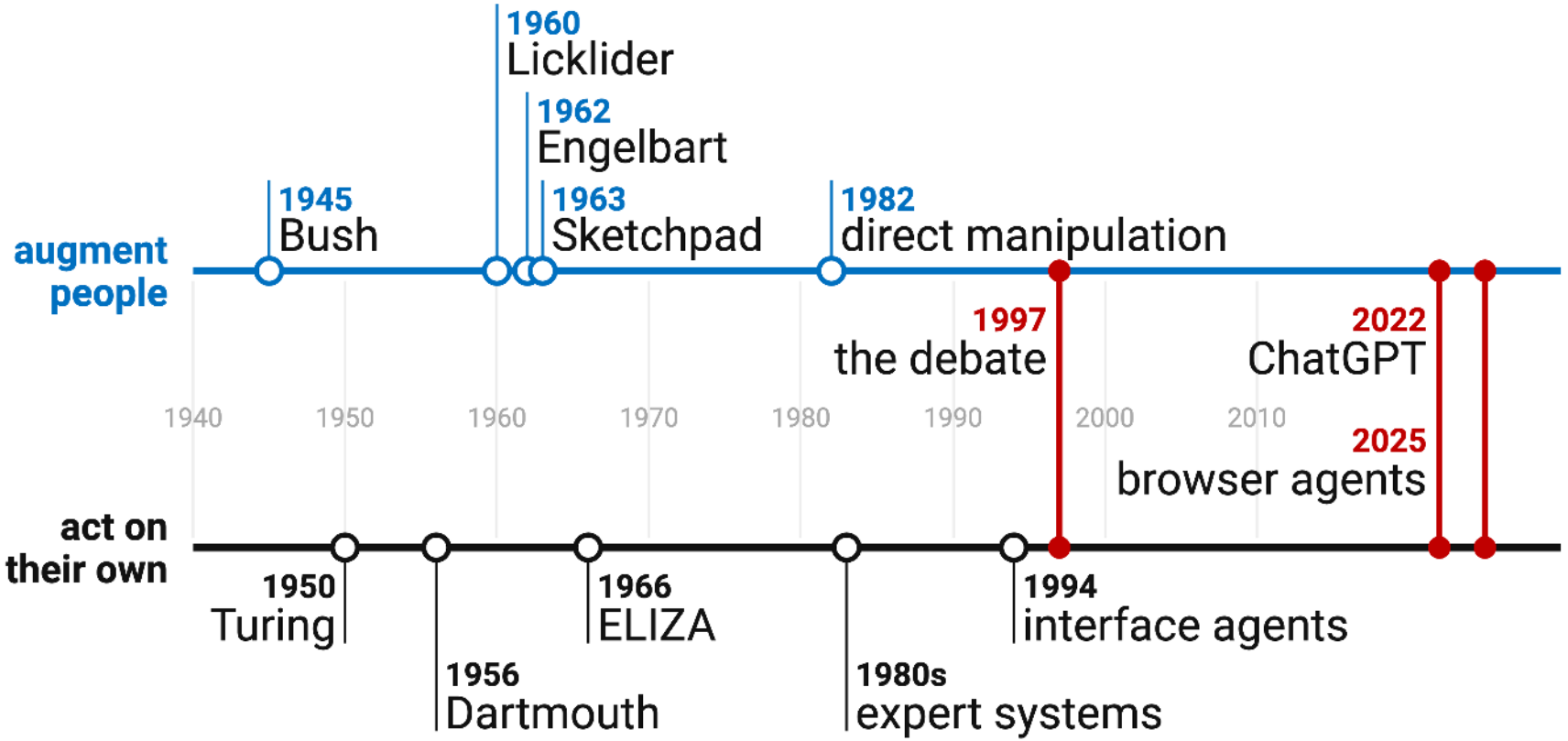
Figure 1. The Changing Seasons of AI and HCI.

Funding climate and public perception with three HCI high points.

"When AI was ascendant, HCI languished; during AI 'winters,' HCI thrived."

Grudin, AI Magazine 2009, Fig. 1 (p. 52) and p. 49

Timeline: machines that **act on their own**



Turing 1950; McCarthy et al. 1955; Weizenbaum 1966; Grudin 2009, p. 53; Maes 1994; Shneiderman & Maes 1997; OpenAI 2022 and 2025

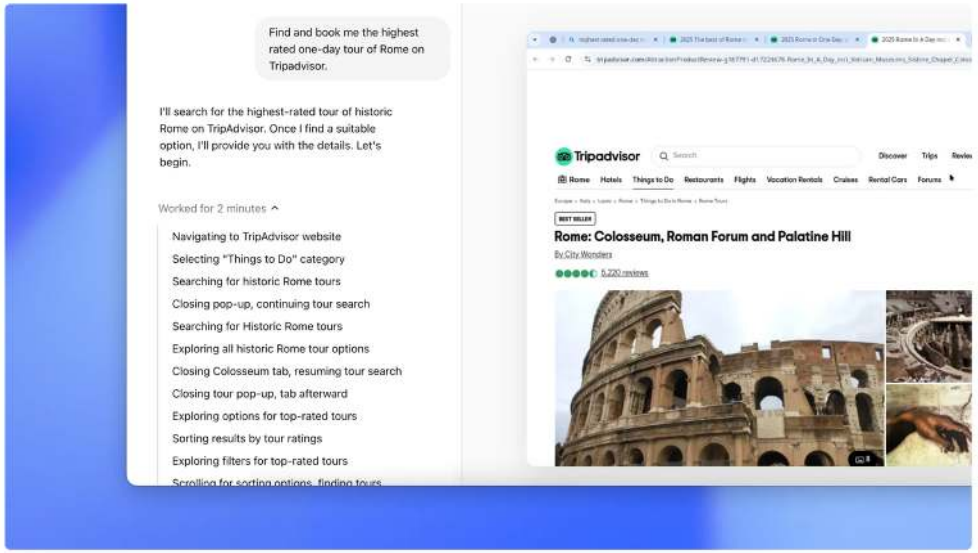
2022: ChatGPT

We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.

- ChatGPT sometimes writes plausible-sounding but incorrect or nonsensical answers. Fixing this issue is challenging, as: (1) during RL

OpenAI, "Introducing ChatGPT," November 30, 2022, the opening and the Limitations section

2025: Operator



OpenAI, “Introducing Operator,” January 23, 2025: the post's own image, and its “Safety and privacy” section

- **User confirmations**: Before finalizing any significant action, such as submitting an order or sending an email, Operator should ask for approval.

The 1997 debate



Today's paper:
Shneiderman & Maes,
interactions 1997

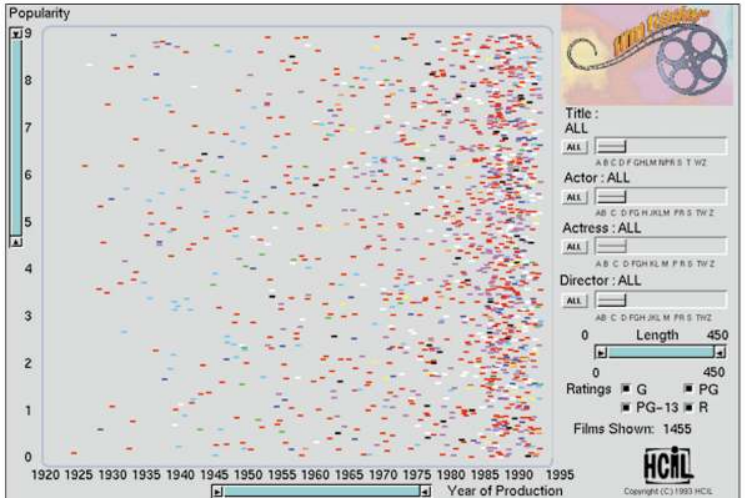
interactions 4(6),
November-December 1997, pp. 42-43

Shneiderman's **argument**

1. Users in control stay responsible
2. People spot unexpected patterns
3. Human-like agents **mislead**



Ben Shneiderman, 2011.
Robert Kosara, CC0
(Wikimedia Commons)



FilmFinder

Shneiderman & Maes 1997, pp. 45-56; FilmFinder, Fig. 1(a), p. 45

Juvenile court records

Those kind of patterns happen to anyone who tries visualization programs, and it would be hard to see how you could program an agent to anticipate all of the possibilities that your eye can pick up in 1/10th of a second.

Shneiderman 1997, p. 47

Shneiderman on adaptive algorithms

I would concede half a point and say that we now see two levels: the user interface level, which users want to be predictable and controllable, as Pattie has stated, and the level below the table, where there may be some interesting algorithms such as collaborative filtering.

He accepts adaptive algorithms below the surface if the interface stays **predictable**.

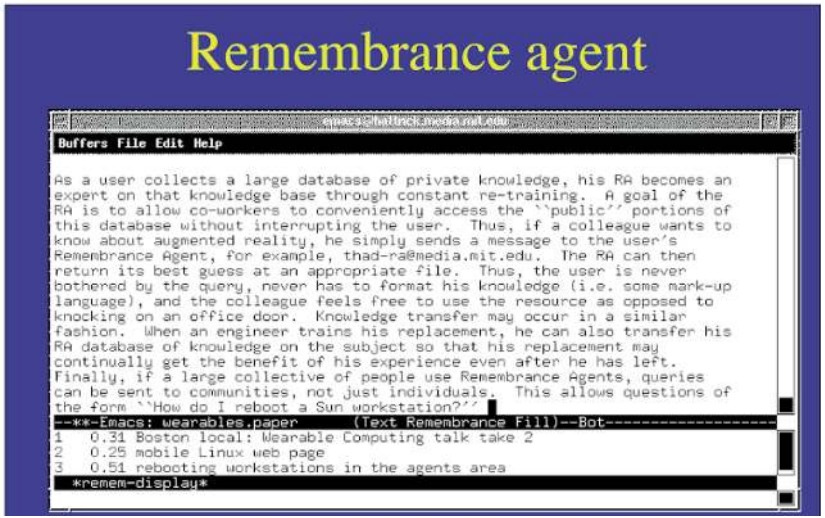
Shneiderman 1997, p. 55

Maes's **argument**

“There is no other solution than to delegate.”



Pattie Maes, 2024. Dubai Future Forum, CC0 (Wikimedia Commons)



Maes, in Shneiderman & Maes 1997, pp. 49-53; Remembrance Agent, figure on p. 52

Kasbah

“I want to sell The Joshua Tree by U2. … You are allowed to go as low as $9.”



Maes 1997, p. 52 and the Kasbah figure on p. 55

Maes's last slide

slide which might have been written by me:
"User understanding is central, and user con-
trol is vital for people to be successful."

Shneiderman, quoting Maes's last slide, 1997, p. 54

Discussion: Licklider, Shneiderman & Maes

1. In a tool you use, who checks the AI's work, and how hard is it?

2. How did Shneiderman's and Maes's predictions age?

3. Are agents used today for tasks where an error is cheap?

Licklider 1960, p. 4; Shneiderman & Maes 1997, pp. 54, 50 and 58

Debate and vote

1. Left half: direct manipulation. Right half: agents
2. The task: plan and book a trip for four friends
3. In pairs, 4 minutes: your two strongest arguments
4. Openings, then rebuttals

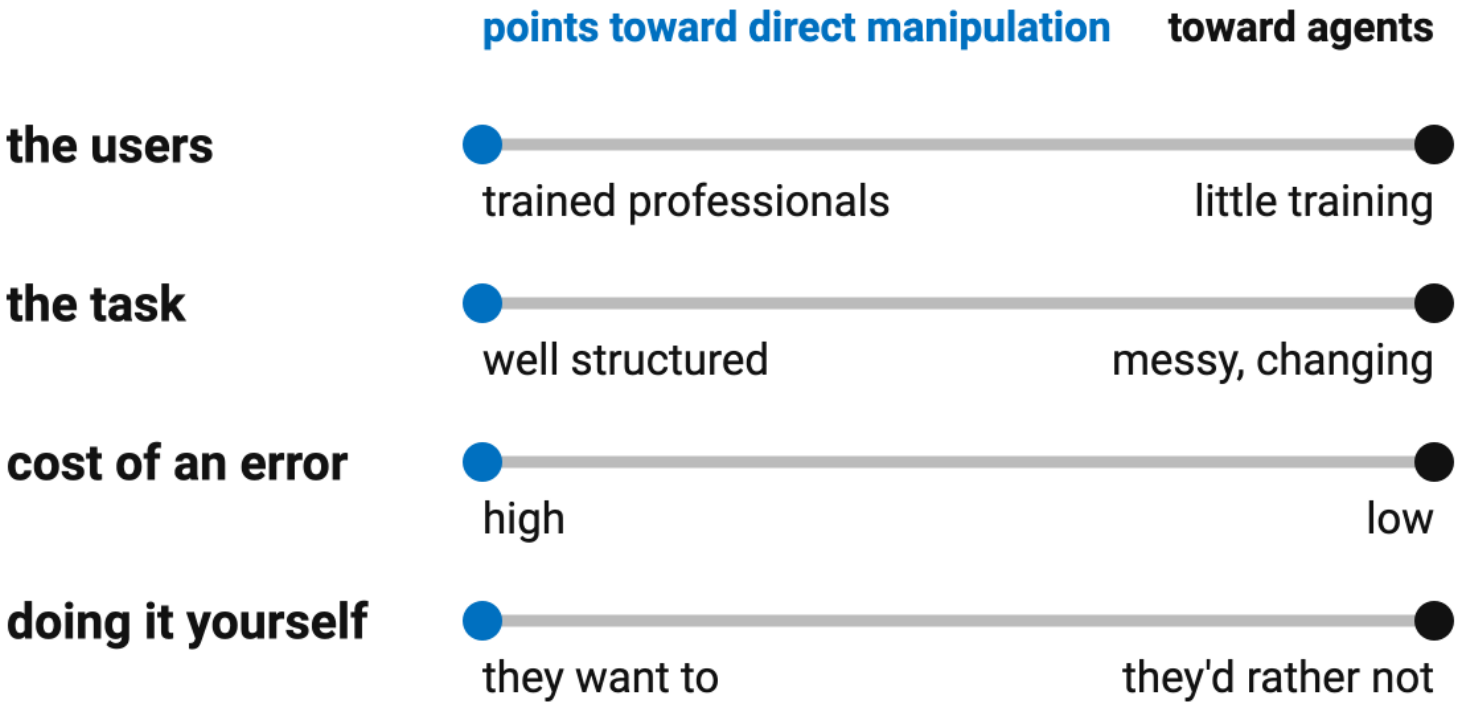
15 minutes, then the vote

Vote

A. Direct manipulation
B. Interface agents
C. It depends: **on what?**

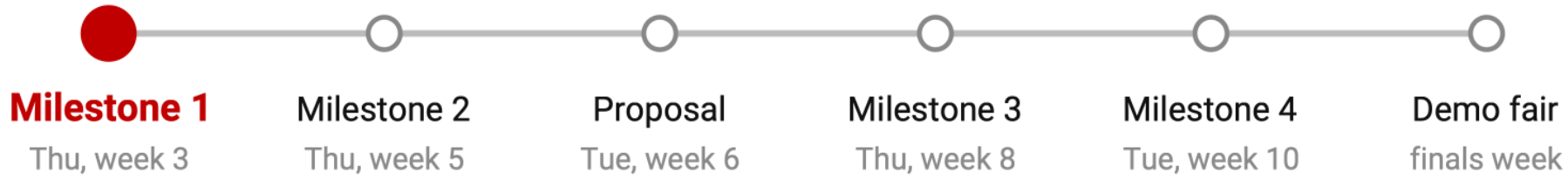
Write down your vote and one reason.

It depends: **on what?**



Shneiderman & Maes 1997, pp. 53, 56 and 58

Milestone 1: Watch people use AI



Due Thursday of week 3

Takeaways

1. People can wrongly believe a program **understands** them.
2. Decide which work goes to the **person** and which to the **AI**.
3. Agents suit **untrained users**, **messy tasks** and **cheap errors**.
4. People need to **understand** and **control** the system.

Next: Lecture 3, Predictive Models

Read before class

Amershi et al. AI Magazine 2014	Power to the People: The Role of Humans in Interactive Machine Learning
Domingos CACM 2012	A Few Useful Things to Know About Machine Learning