

Exploring Modern Computing

Natural Language Processing

Neha Kennard 10/30/2023



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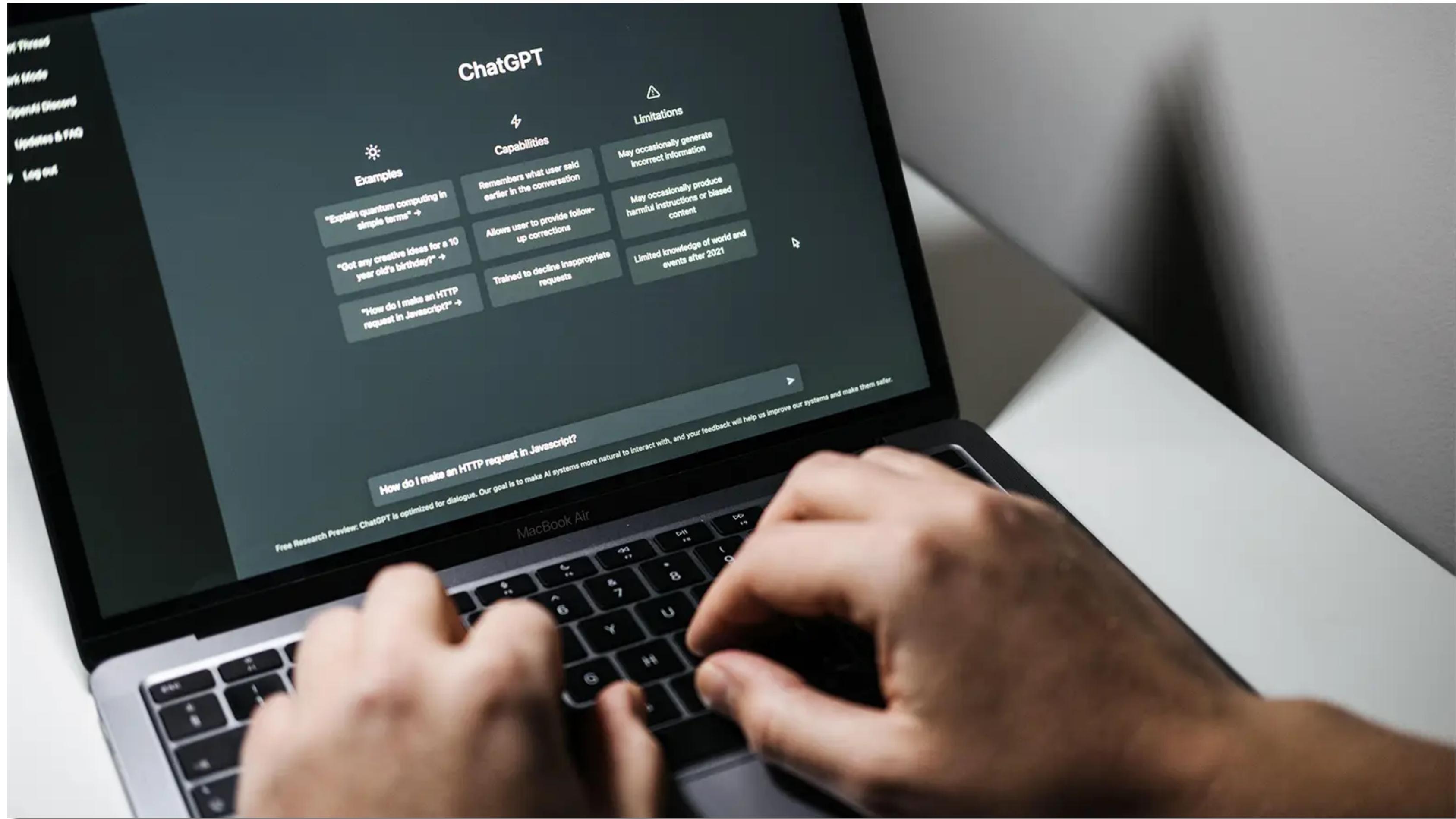
Natural Language Processing



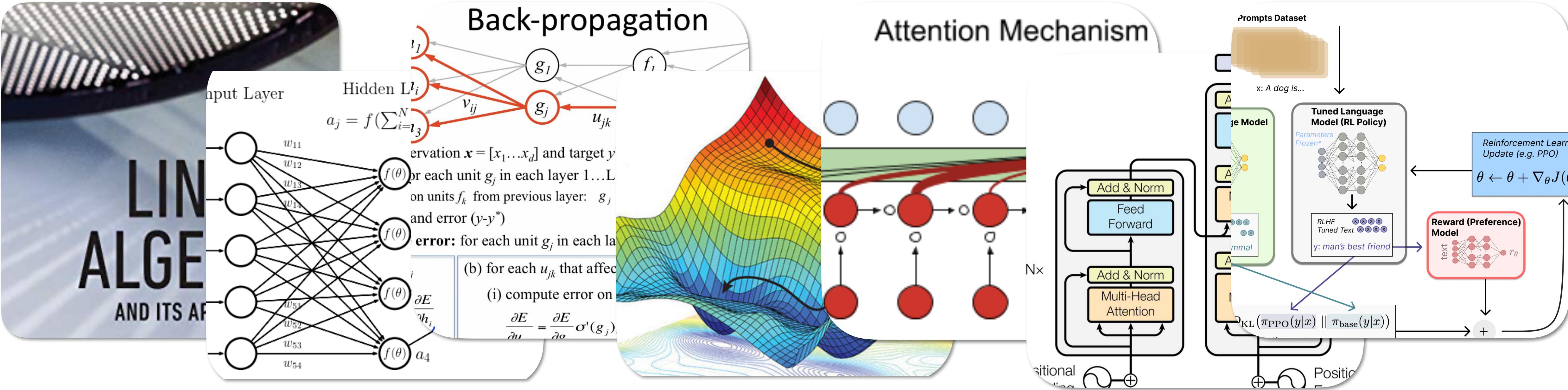
Exploring Modern Computing

Natural Language Processing





ChatGPT API: <https://chat.openai.com/>



AI won't replace teachers — but a classroom revolution is coming

Teachers must remain in charge, but for that, they too will need to evolve. Here's how.

ChatGPT Passes US Medical Licensing Exam Without Clinician Input

ChatGPT achieved 60 percent accuracy on the US Medical Licensing Exam, indicating its potential in advancing artificial intelligence-assisted medical education.

FORBES > INNOVATION > ENTERPRISE TECH

Revolutionizing Healthcare: The Top 14 Uses Of ChatGPT In Medicine And Wellness

GPT-4-COLORED GLASSES

NEW SMART GLASSES TELL YOU WHAT TO SAY ON DATES USING GPT-4

"SAY GOODBYE TO AWKWARD DATES AND JOB INTERVIEWS."

historical

A ~~modern~~ NLP story

Computers looked
like this



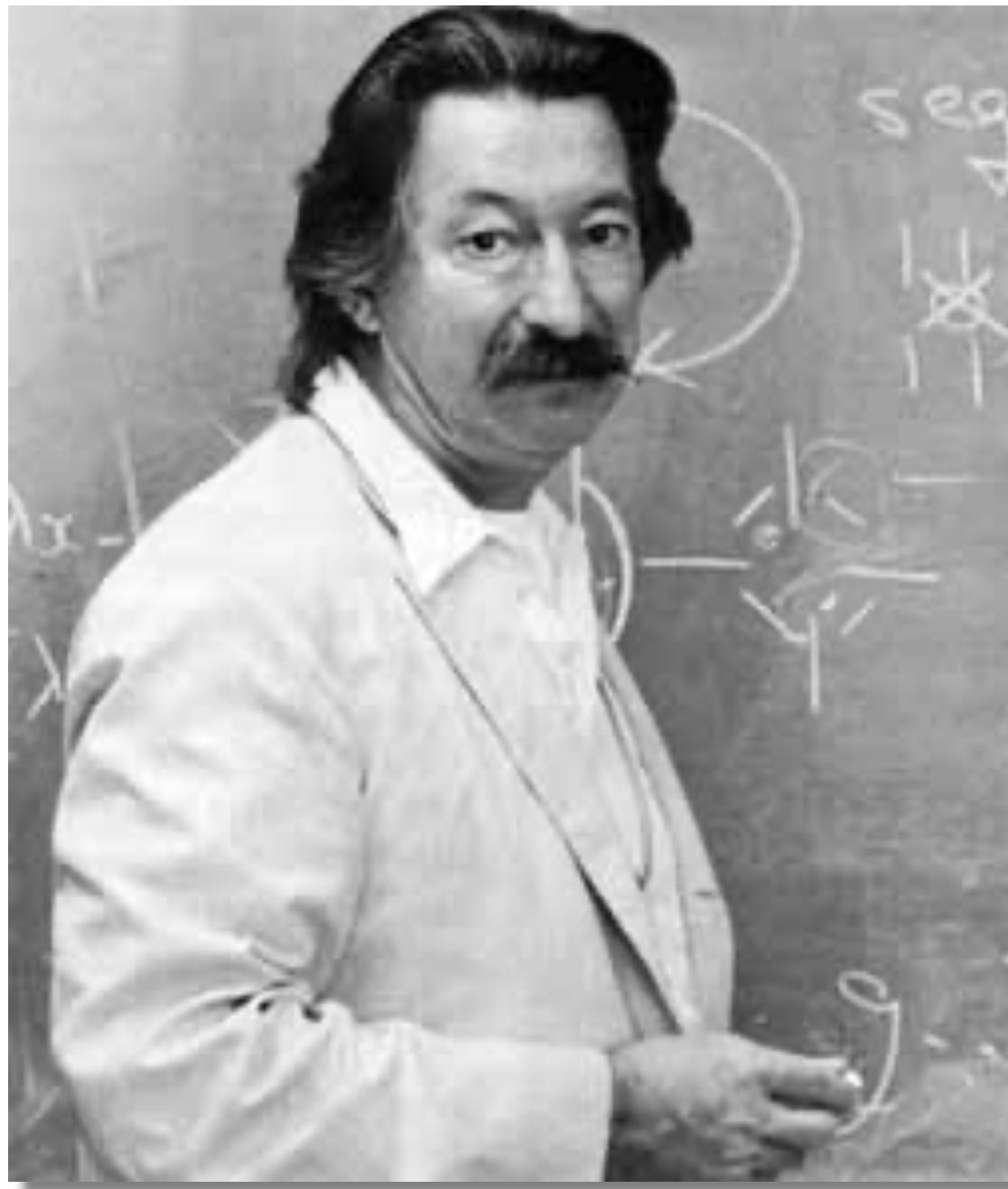
IBM 7094 Data Processing System

1947
Transistors invented
76 years ago

1966
57 years ago

1989
Internet invented
34 years ago

2023



Joseph Weizenbaum

Instead of programming languages, can we use conversation in human language to communicate with ~~computers~~ an entity with no experience of the world?

I dreamt I was on a long boat ride.



Tell me about boats.



EEEEEE LL IIII ZZZZZZ AAAA
EE LL II ZZ AA AA
EEEEEE LL II ZZZ AAAA
EE LL II ZZ AA AA
EEEEEE LLLLLL IIII ZZZZZZ AA AA

ELIZA: Is something troubling you ?
YOU: Yes. I'm trying to describe you for a research paper I'm writing. What should I say?
ELIZA: You are sure.
YOU: No, I'm not.

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

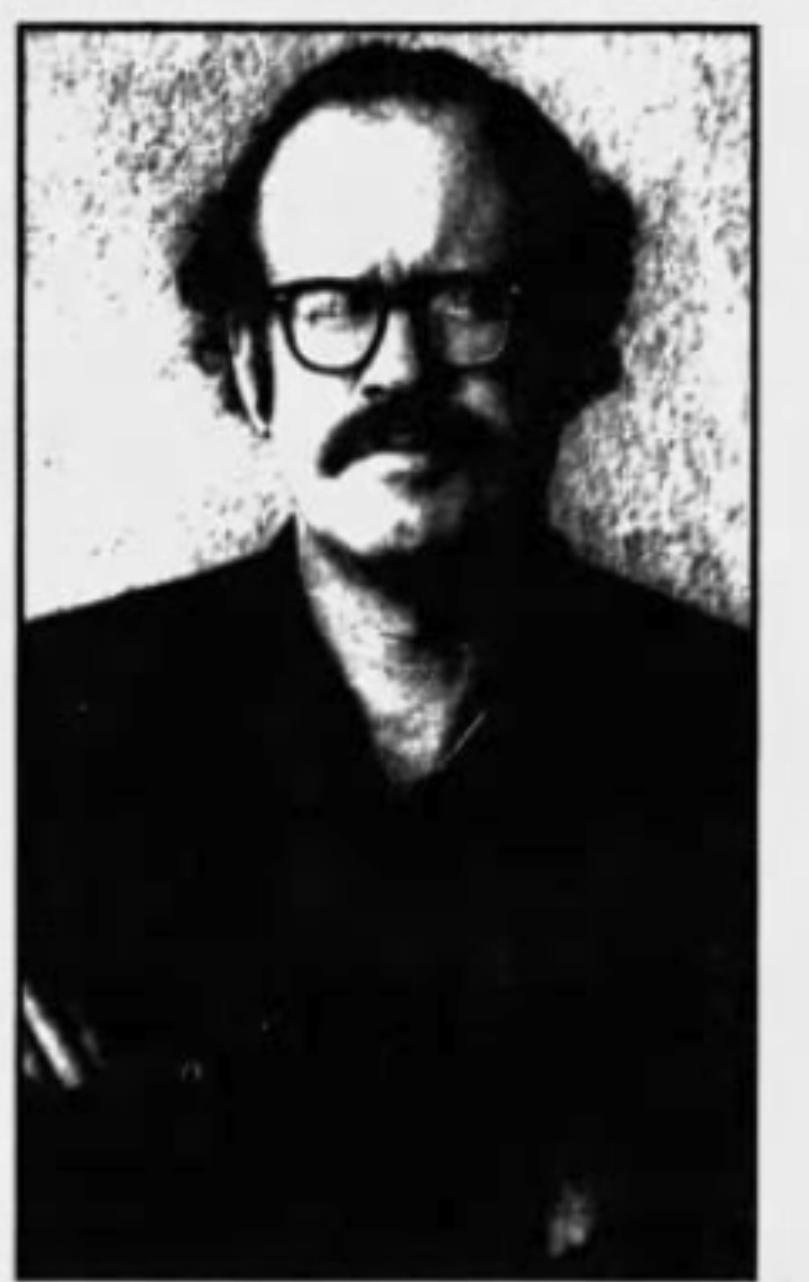
Excerpt from 1966 paper



Can you give us some privacy?

ELIZA effect: the tendency to project human traits onto programs with textual interfaces





DR. KENNETH MARK COLBY

He developed computer therapy programs, calling them the "ultimate self-help book," and worked in the artificial intelligence field.

We could make therapy more efficient, running several thousand ELIZAs at once!

Many people could talk with an attentive therapist at a low cost!



JOSEPH WEIZENBAUM

COMPUTER POWER AND HUMAN REASON

FROM JUDGMENT
TO CALCULATION

What type of work should be delegated to machines?

What is the difference between human and machine intelligence?

What happens when we use the metaphor of machines to understand human intelligence?

But once a particular program is unmasked, once its inner workings are explained ... its magic crumbles away; it is revealed as a mere collection of procedures, each quite comprehensible.

Computational Linguistics

A. G. OETTINGER, Editor

ELIZA—A Computer Program For the Study of Natural Language Communication Between Man And Machine

JOSEPH WEIZENBAUM

Massachusetts Institute of Technology,* Cambridge, Mass.

ELIZA is a program operating within the MAC time-sharing system at MIT which makes certain kinds of natural language conversation between man and computer possible. Input sentences are analyzed on the basis of decomposition rules which are triggered by key words appearing in the input text

The object of this paper is to cause just such a re-evaluation of the program about to be "explained". Few programs ever needed it more.

ELIZA Program

ELIZA is a program which makes natural language conversation with a computer possible. Its present implementation is on the MAC time-sharing system at MIT. It is written in MAD-SLIP [4] for the IBM 7094. Its name was chosen to emphasize that it may be incrementally improved by its users, since its language abilities may be continually improved by a "teacher". Like the Eliza of Pygmalion fame, it can be made to appear even more civilized, the relation of appearance to reality, however, remaining in the domain of the playwright.

For the present purpose it is sufficient to characterize

- 1. ON TOOLS 17**
- 2. WHERE THE POWER OF THE COMPUTER COMES FROM 39**
- 3. HOW COMPUTERS WORK 73**

My hypothesis:

It was too early for this strategy.

APPENDIX. An ELIZA Script

(HOW DO YOU DO. PLEASE TELL ME YOUR PROBLEM)
 START
 (SORRY ((0) (PLEASE DON'T APOLOGIZE))
 (APOLOGIES ARE NOT NECESSARY) (WHAT FEELINGS
 DO YOU HAVE WHEN YOU APOLOGIZE) ((I'VE TOLD YOU
 THAT APOLOGIES ARE NOT REQUIRED))
 (DONT = DONT)
 (CANT = CAN'T)
 (WONT = WON'T)
 (REMEMBER 5)
 ((0 YOU REMEMBER 0) (DO YOU OFTEN THINK OF 4))
 (DOES THINKING OF 4 BRING ANYTHING ELSE TO MIND)
 (WHAT ELSE DO YOU REMEMBER)
 (WHY DO YOU REMEMBER 4 JUST NOW)
 (WHAT IN THE PRESENT SITUATION REMINDS YOU OF 4)
 (WHAT IS THE CONNECTION BETWEEN ME AND 4))
 ((0 DO I REMEMBER 0) (DID YOU THINK I WOULD FORGET 5))
 (WHY DO YOU THINK I SHOULD RECALL 5 NOW)
 (WHAT ABOUT 5) (=WHAT) (YOU MENTIONED 5))
 ((0) (NEWKEY))
 ((IF 3 ((0 IF 0) (DO YOU THINK ITS LIKELY THAT 3) (DO YOU WISH THAT 3))
 (WHAT DO YOU THINK ABOUT 3) (REALLY, 2 3)))
 (WHAT DO YOU THINK ABOUT 3) (REALLY, 2 3))
 (DREAMT 4 ((0 YOU DREAMT 0))
 (REALLY, 4) (HAVE YOU EVER FANTASIED 4 WHILE YOU WERE AWAKE)
 (HAVE YOU DREAMT 4 BEFORE) (=DREAM) (NEWKEY))
 (DREAMED = DREAMT 4 (=DREAMT))
 (DREAM 3 ((0) (WHAT DOES THAT DREAM SUGGEST TO YOU))
 (DO YOU DREAM OFTEN) (WHAT PERSONS APPEAR IN YOUR DREAMS)
 (DON'T YOU BELIEVE THAT DREAM HAS SOMETHING TO DO WITH
 YOUR PROBLEM) (NEWKEY))
 (DREAMS = DREAM 3 (=DREAM))
 (HOW (=WHAT))
 (WHEN (=WHAT))
 (ALIKE 10 (=DIT))
 (SAME 10 (=DIT))
 (CERTAINLY (=YES))
 (FEEL DLIST(/RELIEF))
 (THINK DLIST(/BELIEF))
 (BELIEVE DLIST(/BELIEF))
 (WISH DLIST(/BELIEF))
 (MEMORY MY ((0) (YOUR 0 = LETS DISCUSS FURTHER WHY YOUR 3))
 ((0) (YOUR 0 = EARLIER YOU SAID YOUR 3))
 ((0) (YOUR 0 = BUT YOUR 3))
 ((0) (YOUR 0 = DOES THAT HAVE ANYTHING TO DO WITH THE FACT THAT YOUR 3))
 (NONE ((0) (I AM NOT SURE I UNDERSTAND YOU FULLY))
 (PLEASE GO ON)
 (WHAT DOES THAT SUGGEST TO YOU)
 (DO YOU FEEL STRONGLY ABOUT DISCUSSING SUCH THINGS))
 (PERHAPS ((0) (YOU DON'T SEEM QUITE CERTAIN))
 (WHY THE UNCERTAIN TONE)
 (CAN'T YOU BE MORE POSITIVE)
 (YOU AREN'T SURE) (DON'T YOU KNOW))
 (MAYBE (=PERHAPS))
 (NAME 15 ((0) (I AM NOT INTERESTED IN NAMES))
 ((I'VE TOLD YOU BEFORE, I DON'T CARE ABOUT NAMES -
 PLEASE CONTINUE)))
 (PLEASE CONTINUE)))
 (DEUTSCH (=XFREMD))
 (FRANCAIS (=XFREMD))
 (ITALIANO (=XFREMD))
 (ESPAÑOL (=XFREMD))
 (XFREMD ((0) (I AM SORRY, I SPEAK ONLY ENGLISH)))
 (HELLO ((0) (HOW DO YOU DO. PLEASE STATE YOUR PROBLEM)))
 (COMPUTER SO ((0) (DO COMPUTERS WORRY YOU))
 (WHY DO YOU MENTION COMPUTERS) (WHAT DO YOU THINK MACHINES
 HAVE TO DO WITH YOUR PROBLEM) (DON'T YOU THINK COMPUTERS CAN
 HELP PEOPLE) (WHAT ABOUT MACHINES WORRIES YOU) (WHAT
 DO YOU THINK ABOUT MACHINES))
 (MACHINE SO (=COMPUTER))
 (MACHINES SO (=COMPUTER))
 (COMPUTERS SO (=COMPUTER))
 (AM = ARE ((0 ARE YOU 0) (DO YOU BELIEVE YOU ARE 4))

(WOULD YOU WANT TO BE 4) (YOU WISH I WOULD TELL YOU YOU ARE 4)
 (WHAT WOULD IT MEAN IF YOU WERE 4) (=WHAT))
 ((0) (WHY DO YOU SAY 'AM') (I DON'T UNDERSTAND THAT))
 (ARE ((0 ARE I 0))
 (WHY ARE YOU INTERESTED IN WHETHER I AM 4 OR NOT)
 (WOULD YOU PREFER IF I WEREN'T 4) (PERHAPS I AM 4 IN YOUR
 FANTASIES) (DO YOU SOMETIMES THINK I AM 4) (=WHAT))
 ((0 ARE 0) (DID YOU THINK THEY MIGHT NOT BE 3))
 (WOULD YOU LIKE IT IF THEY WERE NOT 3) (WHAT IF THEY WERE NOT 3)
 (POSSIBLY THEY ARE 3)))
 (YOU = MY ((0 MY 0)) (WHY ARE YOU CONCERNED OVER MY 3))
 (WHAT ABOUT YOUR OWN 3) (ARE YOU WORRIED ABOUT SOMEONE ELSE'S 3)
 (REALLY, MY 3))
 (WAS 2 ((0 WAS YOU 0))
 (WHAT IF YOU WERE 4) (DO YOU THINK YOU WERE 4))
 (WERE YOU 4) (WHAT WOULD IT MEAN IF YOU WERE 4))
 (WHAT DOES ' 4 ' SUGGEST TO YOU) (=WHAT))
 ((0 YOU WAS 0))
 (WERE YOU REALLY) (WHY DO YOU TELL ME YOU WERE 4 NOW)
 (WERE YOU REALLY) (WHY DO YOU TELL ME YOU WERE 4 NOW)
 (PERHAPS I ALREADY KNEW YOU WERE 4))
 ((0 WAS I 0)) (WHY DO YOU LIKE TO BELIEVE I WAS 4))
 (WHAT SUGGESTS THAT I WAS 4))
 (WHAT DO YOU THINK) (PERHAPS I WAS 4))
 (WHAT IF I HAD BEEN 4))
 ((0) (NEWKEY)))
 (WERE = WAS (=WAS))
 (ME = YOU)
 (YOU'RE = I'M ((0 I'M 0)) (PRE ((I ARE 3) (=YOU))))
 (I'M = YOU'RE ((0 YOU'RE 0)) (PRE (YOU ARE 3) (=I)))
 (MYSELF = YOURSELF)
 (YOURSELF = MYSELF)
 (MOTHER DLIST(/NOUN FAMILY))
 (MOM = MOTHER DLIST(/ FAMILY))
 (DAD = FATHER DLIST(/ FAMILY))
 (FATHER DLIST(/NOUN FAMILY))
 (SISTER DLIST(/FAMILY))
 (BROTHER DLIST(/FAMILY))
 (WIFE DLIST(/FAMILY))
 (CHILDREN DLIST(/FAMILY))
 (I = YOU)
 ((0 YOU (+ WANT NEED) 0)) (WHAT WOULD IT MEAN TO YOU IF YOU GOT 4))
 (WHY DO YOU WANT 4) (SUPPOSE YOU GOT 4 SOON) (WHAT
 IF YOU NEVER GOT 4) (WHAT WOULD GETTING 4 MEAN TO
 YOU) (WHAT DOES WANTING 4 HAVE TO DO WITH THIS DISCUSSION))
 ((0 YOU ARE 0 (=SAD UNHAPPY DEPRESSER SICK) 0))
 (I AM SORRY TO HEAR YOU ARE 5) (DO YOU THINK COMING HERE
 WILL HELP YOU NOT TO BE 5) (I'M SURE ITS NOT PLEASANT TO
 BE 5) (CAN YOU EXPLAIN WHAT MADE YOU 5))
 ((0 YOU ARE 0 (=HAPPY ELATED GLAD BETTER) 0))
 (HOW HAVE I HELPED YOU TO BE 5)
 (HAS YOUR TREATMENT MADE YOU 5) (WHAT MAKES YOU 5 JUST
 NOW) (CAN YOU EXPLAIN WHY YOU ARE SUDDENLY 5))
 ((0 YOU WAS 0) (=WAS))
 ((0 YOU (/BELIEF) YOU 0)) (DO YOU REALLY THINK SO) (BUT YOU ARE
 NOT SURE YOU 5) (DO YOU REALLY DOUBT YOU 5))
 ((0 YOU 0 (/BELIEF) 0 I 0) (=YOU))
 ((0 YOU ARE 0))
 (IS IT BECAUSE YOU ARE 4 THAT YOU CAME TO ME)
 (HOW LONG HAVE YOU BEEN 4))
 (DO YOU BELIEVE IT NORMAL TO BE 4))
 (DO YOU ENJOY BEING 4))
 ((0 YOU (+ CAN'T CANNOT) 0)) (HOW DO YOU KNOW YOU CAN'T 4))
 (HAVE YOU TRIED)
 (PERHAPS YOU COULD 4 NOW))
 (DO YOU REALLY WANT TO BE ABLE TO 4))
 ((0 YOU DON'T 0) (DON'T YOU REALLY 4) (WHY DON'T YOU 4))
 (DO YOU WISH TO BE ABLE TO 4) (DOES THAT TROUBLE YOU))
 ((0 YOU FEEL 0)) (TELL ME MORE ABOUT SUCH FEELINGS)
 (DO YOU OFTEN FEEL 4))
 (DO YOU ENJOY FEELING 4))
 ((0 WHAT DOES FEELING 4 REMIND YOU))
 ((0 YOU 0 I 0)) (PERHAPS IN YOUR FANTASY WE 3 EACH OTHER)
 (DO YOU WISH TO 3 ME)
 (YOU SEEM TO NEED TO 3 ME)
 (DO YOU 3 ANYONE ELSE))
 ((0) (YOU SAY 1))
 (CAN YOU ELABORATE ON THAT) (DO YOU SAY 1 FOR SOME SPECIAL REASON)
 (THAT'S QUITE INTERESTING))
 (YOU = I ((0 I REMIND YOU OF 0) (=DIT))
 ((0 I ARE 0)) (WHAT MAKES YOU THINK I AM 4))
 (DOES IT PLEASE YOU TO BELIEVE I AM 4))
 (DO YOU SOMETIMES WISH YOU WERE 4))
 (PERHAPS YOU WOULD LIKE TO BE 4))
 ((0 I 0 YOU)) (WHY DO YOU THINK I 3 YOU))
 (YOU LIKE TO THINK I 3 YOU - DON'T YOU))
 (WHAT MAKES YOU THINK I 3 YOU))
 (REALLY, I 3 YOU) (DO YOU WISH TO BELIEVE I 3 YOU))
 (REALLY, I 3 YOU) (DO YOU WISH TO BELIEVE I 3 YOU))
 (SUPPOSE I DID 3 YOU - WHAT WOULD THAT MEAN))
 (DOES SOMEONE ELSE BELIEVE I 3 YOU))
 ((0 I 0)) (WE WERE DISCUSSING YOU - NOT ME))
 (OH, I 3) (YOU'RE NOT REALLY TALKING ABOUT ME - ARE YOU))
 (WHAT ARE YOUR FEELINGS NOW))
 (YES ((0) (YOU SEEM QUITE POSITIVE)) (YOU ARE SURE))
 (I SEE) (I UNDERSTAND))
 (NO ((0) (ARE YOU SAYING 'NO' JUST TO BE NEGATIVE))
 (YOU ARE BEING A BIT NEGATIVE) (WHY NOT) (WHY 'NO'))
 (MY = YOUR 2 ((0 YOUR 0 (/FAMILY) 0))
 (TELL ME MORE ABOUT YOUR FAMILY) (WHO ELSE IN YOUR FAMILY
 5) (YOUR 4) (WHAT ELSE COMES TO MIND WHEN YOU THINK OF
 YOUR 4))
 ((0 YOUR 0) (YOUR 3) (WHY DO YOU SAY YOUR 3)) (DOES THAT
 SUGGEST ANYTHING ELSE WHICH BELONGS TO YOU) (IS IT
 IMPORTANT TO YOU THAT 2 3))
 (CAN ((0 CAN I 0)) (YOU BELIEVE I CAN 4 DON'T YOU)) (=WHAT))
 (YOU WANT ME TO BE ABLE TO 4) (PERHAPS YOU WOULD LIKE TO BE
 ABLE TO 4 YOURSELF)) ((0 CAN YOU 0)) (WHETHER OR NOT YOU CAN 4
 DEPENDS ON YOU MORE THAN ON ME) (DO YOU WANT TO BE ABLE TO 4))
 (PERHAPS YOU DON'T WANT TO 4) (=WHAT))
 (WHAT ((0) (WHY DO YOU ASK)) (DOES THAT QUESTION INTEREST YOU))
 (WHAT IS IT YOU REALLY WANT TO KNOW))
 (ARE SUCH QUESTIONS MUCH ON YOUR MIND))
 (WHAT ANSWER WOULD PLEASE YOU MOST))
 (WHAT DO YOU THINK) (WHAT COMES TO YOUR MIND WHEN YOU ASK THAT))
 (HAVE YOU ASKED SUCH QUESTION BEFORE))
 (HAVE YOU ASKED ANYONE ELSE))
 (BECAUSE ((0) (IS THAT THE REAL REASON)) (DON'T ANY OTHER REASONS
 COME TO MIND)) (DOES THAT REASON SEEM TO EXPLAIN ANYTHING ELSE))
 (WHAT OTHER REASONS MIGHT THERE BE))
 (WHY ((0 WHY DON'T I 0)) (DO YOU BELIEVE I DON'T 5)) (PERHAPS I
 WILL 5 IN GOOD TIME) (SHOULD YOU 5 YOURSELF) (YOU WANT ME TO 5))
 (=WHAT))
 (=WHAT))
 ((0 WHY CAN'T YOU 0)) (DO YOU THINK YOU SHOULD BE ABLE TO 5))
 (DO YOU WANT TO BE ABLE TO 5) (DO YOU BELIEVE THIS WILL HELP YOU
 TO 5) (HAVE YOU ANY IDEA WHY YOU CAN'T 5) (=WHAT))
 (=WHAT))
 (EVERYONE 2 ((0 (+ EVERYONE EVERYBODY NOBODY NOONE) 0))
 (REALLY, 2) (SURELY NOT 2)) (CAN YOU THINK OF
 ANYONE IN PARTICULAR) (WHO, FOR EXAMPLE) (YOU ARE THINKING OF
 A VERY SPECIAL PERSON))
 (WHO, MAY I ASK) (SOMEONE SPECIAL PERHAPS))
 (YOU HAVE A PARTICULAR PERSON IN MIND, DON'T YOU) (WHO DO YOU
 THINK YOU'RE TALKING ABOUT))
 (EVERYBODY 2 (=EVERYONE))
 (NOONE 2 (=EVERYONE))
 (ALWAYS 1 ((0) (CAN YOU THINK OF A SPECIFIC EXAMPLE)) (WHEN))
 (WHAT INCIDENT ARE YOU THINKING OF) (REALLY, ALWAYS))
 (LIKE 10 ((0 (+AM IS ARE WAS) 0 LIKE 0) (=DIT))
 ((0) (NEWKEY)))
 (DIT ((0) (IN WHAT WAY)) (WHAT RESEMBLANCE DO YOU SEE))
 (WHAT DOES THAT SIMILARITY SUGGEST TO YOU))
 (WHAT OTHER CONNECTIONS DO YOU SEE))
 (WHAT DO YOU SUPPOSE THAT RESEMBLANCE MEANS))
 (WHAT IS THE CONNECTION, DO YOU SUPPOSE))
 (COULD THERE REALLY BE SOME CONNECTION))
 (HOW))
 ()

RECEIVED SEPTEMBER, 1966

Volume 9 / Number 1 / January, 1966

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.

What's impressive about ELIZA?

- Programming was a lot harder in the 60s
 - The design of the rules in order to be believable
 - Ordering, word choice
 - Data structures and libraries were not available
 - Getting everything done in 200 lines

```
def eliza(input_words):
    for word in input_words:
        if word in ["DEUTSCH", "FRANCAIS", "ITALIANO", "ESPAÑOL"]:
            return "I AM SORRY, I SPEAK ONLY ENGLISH"
    # ...
    if word == "ALWAYS":
        return random.choice(
            [
                "CAN YOU THINK OF A SPECIFIC EXAMPLE",
                "REALLY, ALWAYS",
                "WHAT INCIDENT ARE YOU THINKING OF",
                "# ..."
            ]
        )
    if word in ["ALIKE", "SAME"]:
        return random.choice(
            [
                "IN WHAT WAY",
                "WHAT RESEMBLANCE DO YOU SEE",
                "WHAT DOES THAT SIMILARITY SUGGEST TO YOU",
                "WHAT DO YOU SUPPOSE THAT RESEMBLANCE MEANS"
                "# ..."
            ]
        )
```

```
def eliza_really(input_words, rules):
    for word in input_words:
        for rule in rules:
            if word in rule.triggers:
                return random.choice(rule.responses)
```

Abstraction

Emotional knowledge

Critical thinking

Logic

Reasoning

Problem solving

Understanding

Planning

Self-awareness

Creativity

Learning

```
def eliza(input_words):  
    for word in input_words:  
        if word in ["DEUTSCH", "FRANCAIS", "ITALIANO", "ESPAÑOL"]:  
            return "I AM SORRY, I SPEAK ONLY ENGLISH"  
        # ...  
        if word == "ALWAYS":  
            return random.choice([  
                "CAN YOU THINK OF A SPECIFIC EXAMPLE",  
                "REALLY, ALWAYS",  
                "WHAT INCIDENT ARE YOU THINKING OF",  
                # ...  
            ])  
        if word in ["ALIKE", "SAME"]:  
            return random.choice([  
                "IN WHAT WAY",  
                "WHAT RESEMBLANCE DO YOU SEE",  
                "WHAT DOES THAT SIMILARITY SUGGEST TO YOU",  
                "WHAT DO YOU SUPPOSE THAT RESEMBLANCE MEANS"  
                # ...  
            ])  
    # ...
```

APPENDIX: An ELIZA Script

This block contains a large amount of text, likely a sample of an ELIZA script. It includes various conversational patterns, user inputs, and system responses. The text is organized into several columns and includes some line numbers.

```
def eliza_really(input_words, rules):  
    for word in input_words:  
        for rule in rules:  
            if word in rule.triggers:  
                return random.choice(rule.responses)
```

Received September, 1965
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Volume 9 / Number 1 / January, 1966

ELIZA

New technology



New, accessible way of interacting



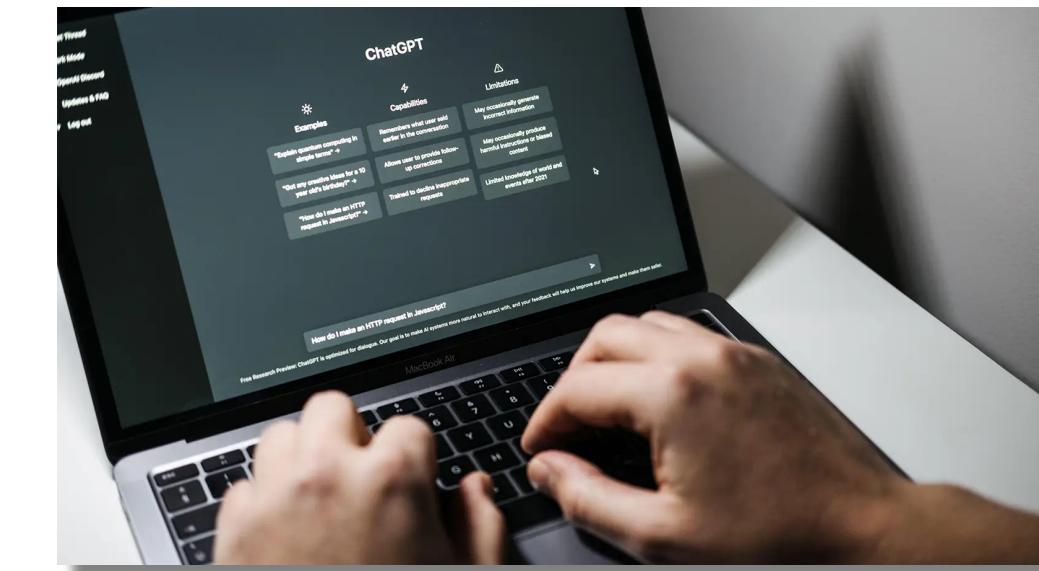
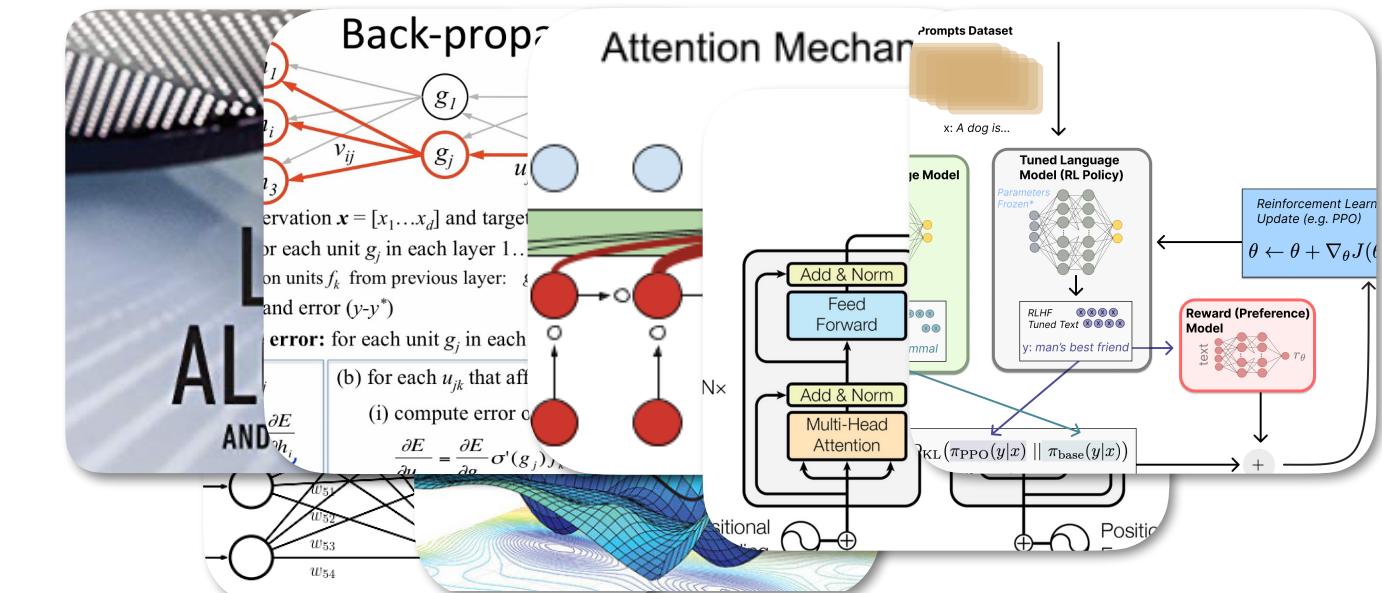
Uncannily humanlike output

Men are all alike.
IN WHAT WAY

Breathless press coverage

Man's bid to outsmart himself
The day may soon come when computerized artificial intelligence

ChatGPT



S What is the brightest color of the rainbow?

The colors of the rainbow are often listed as red, orange, yellow, green, blue, and violet. Of these colors, the brightest or most intense color can be subjective and dependent on factors such as lighting conditions, the medium in which the color is presented, and individual perception.

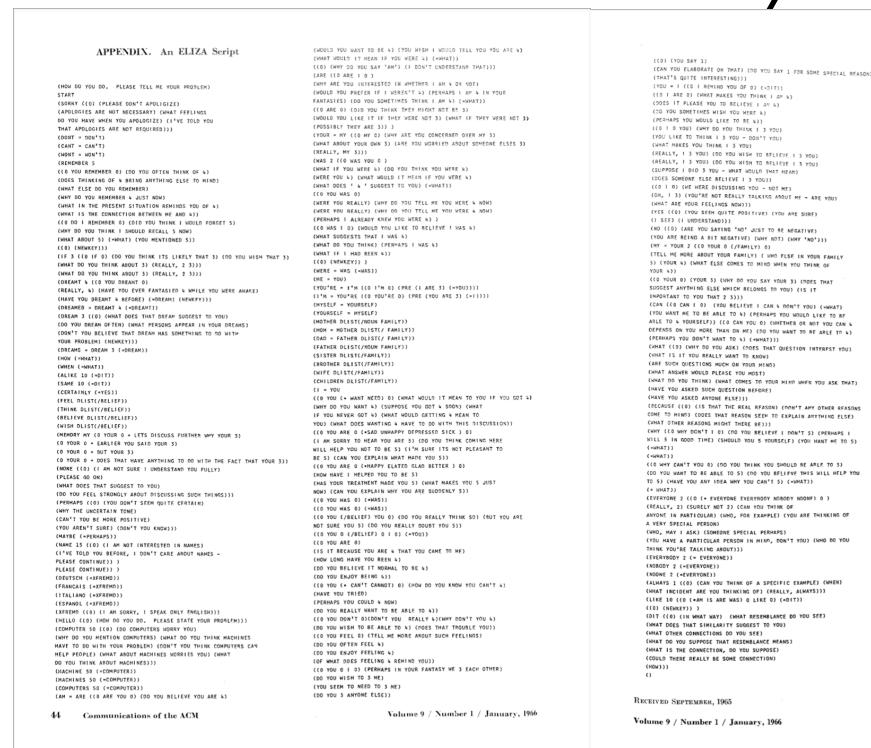
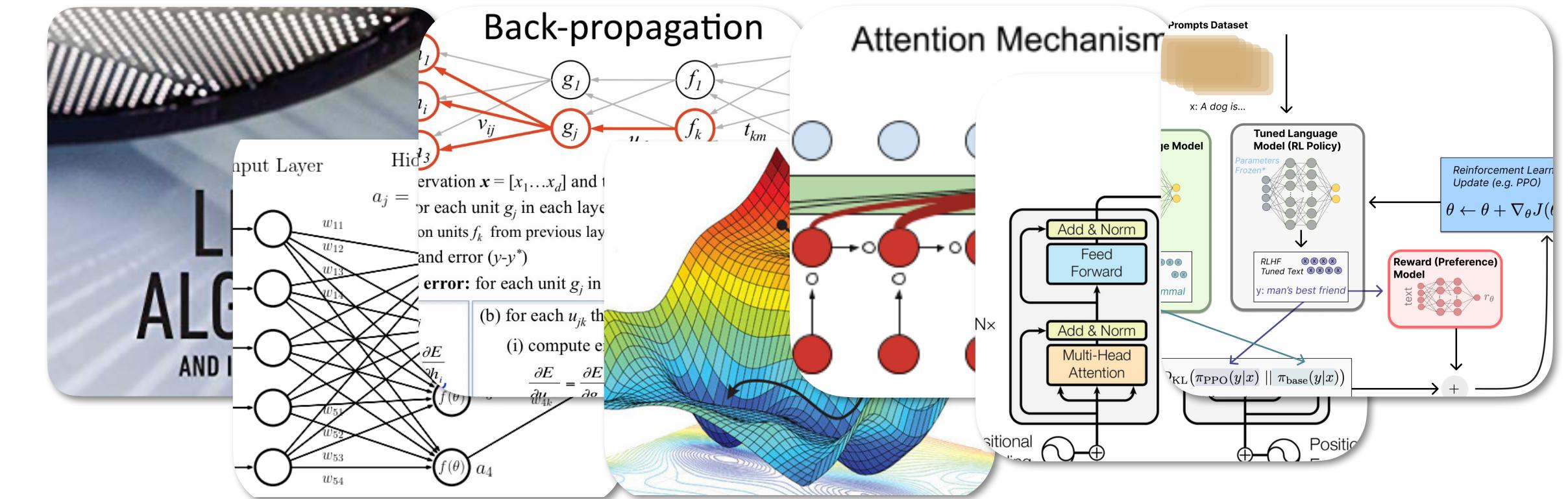
Silicon Valley Confronts the Idea That the 'Singularity' Is Here

But once a particular program is unmasked, once its inner workings are explained ... its magic crumbles away; it is revealed as a mere collection of procedures, each quite comprehensible.

```
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        if word in ["DEUTSCH", "FRANCAIS", "ITALIANO", "ESPAÑOL"]:
            return "I AM SORRY, I SPEAK ONLY ENGLISH"
        # ...
        if word == "ALWAYS":
            return random.choice([
                "CAN YOU THINK OF A SPECIFIC EXAMPLE",
                "REALLY, ALWAYS",
                "WHAT INCIDENT ARE YOU THINKING OF",
                # ...
            ])
        if word in ["ALIKE", "SAME"]:
            return random.choice([
                "IN WHAT WAY",
                "WHAT RESEMBLANCE DO YOU SEE",
                "WHAT DOES THAT SIMILARITY SUGGEST TO YOU",
                "WHAT DO YOU SUPPOSE THAT RESEMBLANCE MEANS"
            ])
        # ...
    # ...

APPENDIX: An ELIZA Script
ELIZA.SCR
```

```
def eliza_really(input_words, rules):
    for word in input_words:
        for rule in rules:
            if word in rule.triggers:
                return random.choice(rule.responses)
```





ELIZA

ChatGPT

Data

Predictable?

Impact

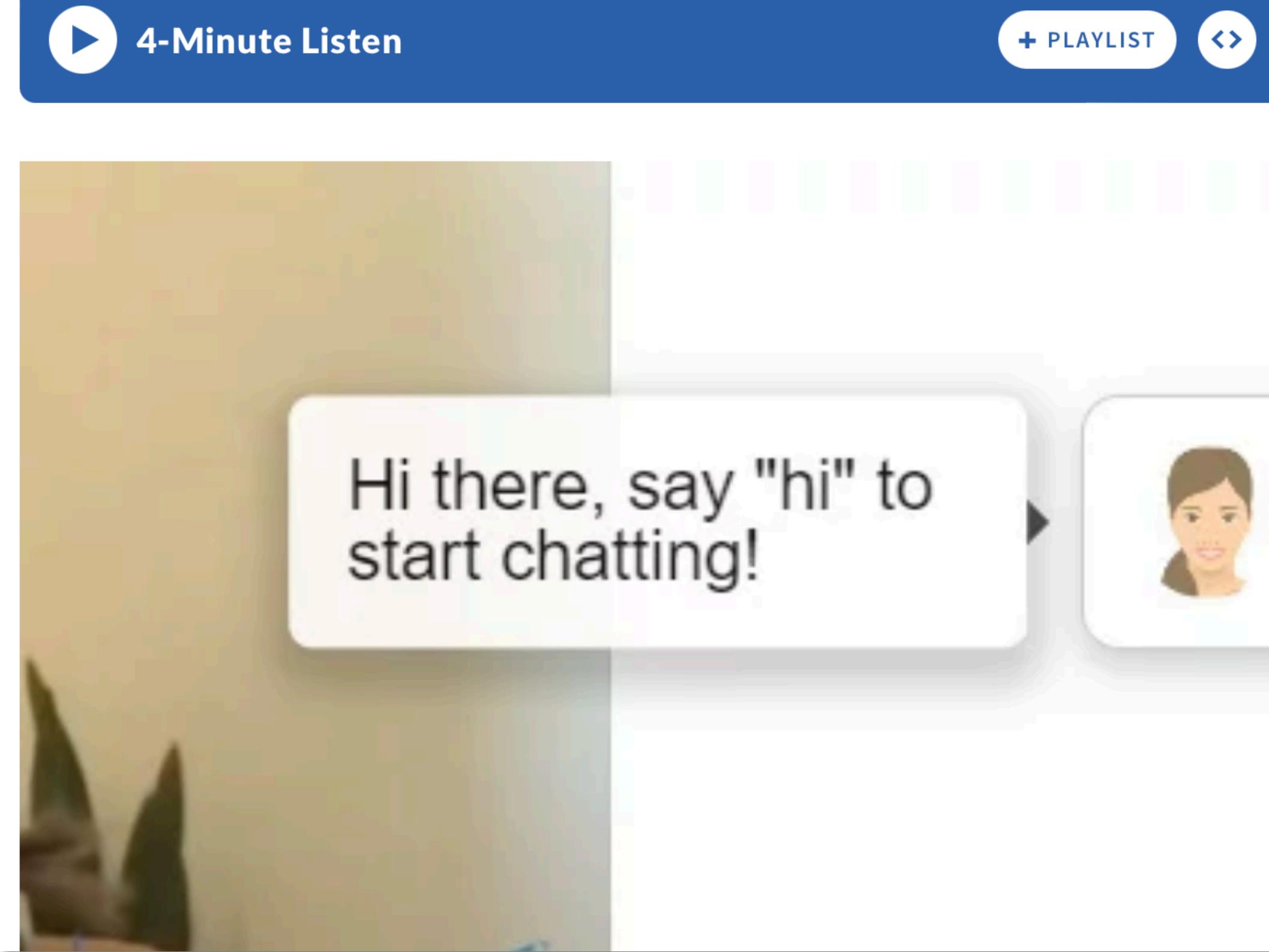
HEALTH REPORTING IN THE STATES

An eating disorders chatbot offered dieting advice, raising fears about AI in health

Updated June 9, 2023 · 6:59 AM ET ⓘ

By Kate Wells

FROM  MICHIGAN
RADIO
MICHIGAN'S NPR NEWS LEADER

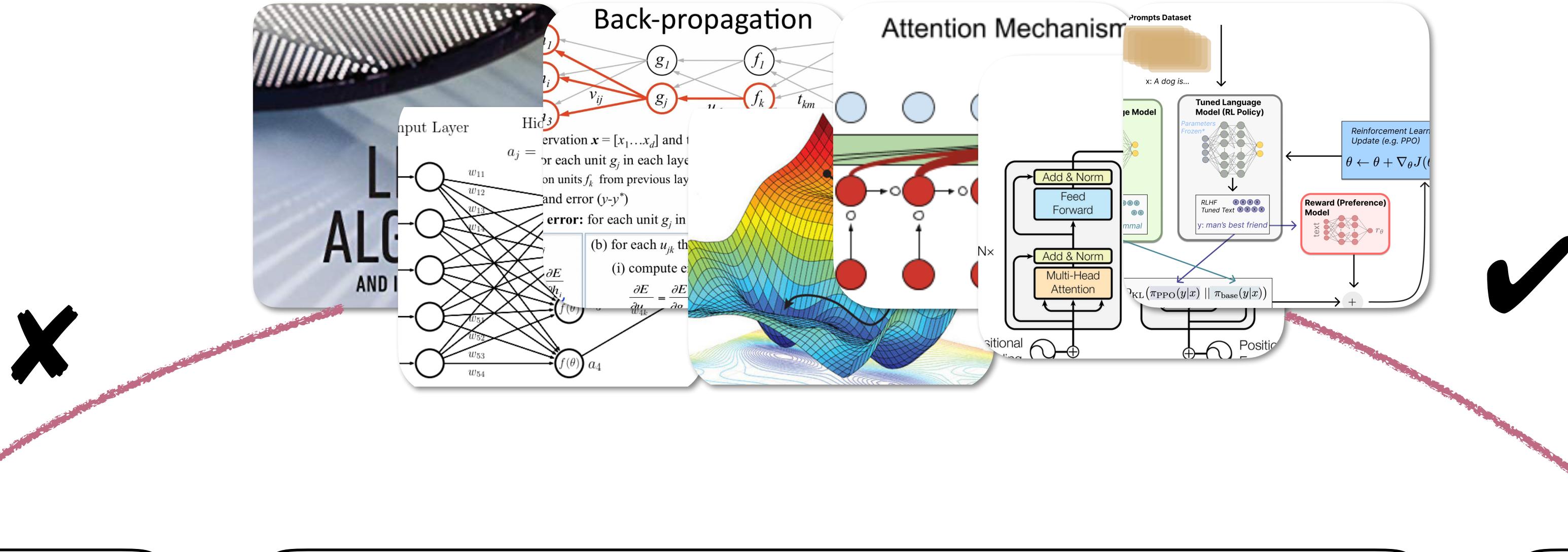


JOSEPH WEIZENBAUM

COMPUTER POWER AND HUMAN REASON

FROM JUDGMENT
TO CALCULATION

What type of work should be delegated to machines?



Highly informed
consumer

What can NLP be used for?

Practitioner

What should NLP be used for?

Thank you!

kennard@cs.umass.edu

Resources

- Weizenbaum's 1966 paper
- Weizenbaum's book (out of print, and I have UMass library's only copy right now, sorry!)
- Podcasts discussing ELIZA, Weizenbaum, and the ELIZA effect
 - Tech Won't Save Us [1, 2], 99 Percent Invisible
- Peter Norvig's textbook; Chapter 5 guides you through writing your own ELIZA project (in LISP, unfortunately)
- Media coverage of ELIZA + ChatGPT
 - Vox, The Guardian
- Some contemporary writing on NLP ethics, what NLP *should* be used for
 - Gebru et al. 2021, Koller and Bender 2020
- Article about Eating Disorder helpline