



igniting INNOVATION

2023 ASHA CONVENTION
november 16-18 • boston, mass

exhibit hall • nov. 15-18

2023 Research-Academic Town Meeting

Getting Ahead of the AI Curve in Health Professions Education

Welcome!

Sumit Dhar, PhD, CCC-A



- Northwestern University
- Associate Provost
- ASHA VP for Science & Research
- 2013 Clarence Simon Award for Teaching & Mentoring



Staying Ahead of The AI Curve

Sumitrajit (Sumit) Dhar
Northwestern University

Researcher-Academic Town Meeting
American Speech-Language-Hearing
Association

November 2023

Friday November 17 - **Research Symposium in Hearing** (CC,162AB)

8:30 AM Research Symposium on Hearing: Harnessing the Power of Artificial Intelligence to Improve Audiological Research/Care; Speaker: Fan-Gang Zeng

10:30 AM Research Symposium on Hearing: Use of Machine Learning Techniques to Manage and Assess Dizzy Patients; Speaker: Devin McCaslin

Saturday Nov. 18 - **Research Symposium in CSD** (CC, 162AB)

8:30 AM [1856: Breaking Barriers with AI: Google's Programs for Advancing Accessibility, Communication, and Social Inclusion](#); Speaker: Philip Nelson (Google)

10:30 AM [1912: Speech Disorder Research in the Big-Data Era: Large-scale Databases and Speech Analytics](#)
Speakers: Mark Hasegawa-Johnson (University of Illinois at Urbana-Champaign), Julie Liss & Visar Berisha (Arizona State University)

1:00 PM [1971: Advances in Speech Biomarkers for Monitoring Neurological and Mental Health](#); Speakers: Vikram Ramanarayanan (Modality.ai) and Emily Provost (University of Michigan)

2:30 PM [2028: Personalized Speech Recognition and Vocal Synthesis--Advancing Clinical Care for Individuals with Speech Impairments](#); Speakers: Richard Cave (MND Association) and Rupal Patel (Northeastern University)

4:00 PM [2085: An Update on Brain-Computer Interfaces](#); Speakers: Leigh Hochberg (Mass General Research Institute/Harvard Medical School/Providence VA Medical Center) and Jun Wang (The University of Texas at Austin)

This questionnaire is designed to help you decide if you need to see a doctor before obtaining a hearing device. If you have any medical questions or concerns about your hearing, you should see a doctor no matter what your score is on this questionnaire.

Questions about your Ears and Hearing

Circle "Yes" or "No"

1. When talking on a telephone, do you understand what people say better in one ear than the other?
2. Did the hearing loss in either of your ears develop suddenly?
3. Have you ever had a sudden permanent change in your hearing?
4. Do you have hearing loss in only one ear?
5. Do you hear better in one ear than the other?
6. Does your hearing change from day to day?
7. As an adult, have you ever had more than one infection in the same ear during one year?
8. Have you ever noticed pus, blood or other active fluid discharge from your ear?
9. Have you ever been told by a physician that you have Meniere's disease?

Yes	No

10. Overall, how would you rate your health?

- Very good
- Good
- Poor
- Very poor

11. How often do you have dizziness?

- Never
- Occasionally
- Frequently
- Always

12. How would you rate your balance?

- Very good
- Good
- Poor
- Very poor

Good Old Fashioned AI (GOFAI)

300 questions from neuro-otologists

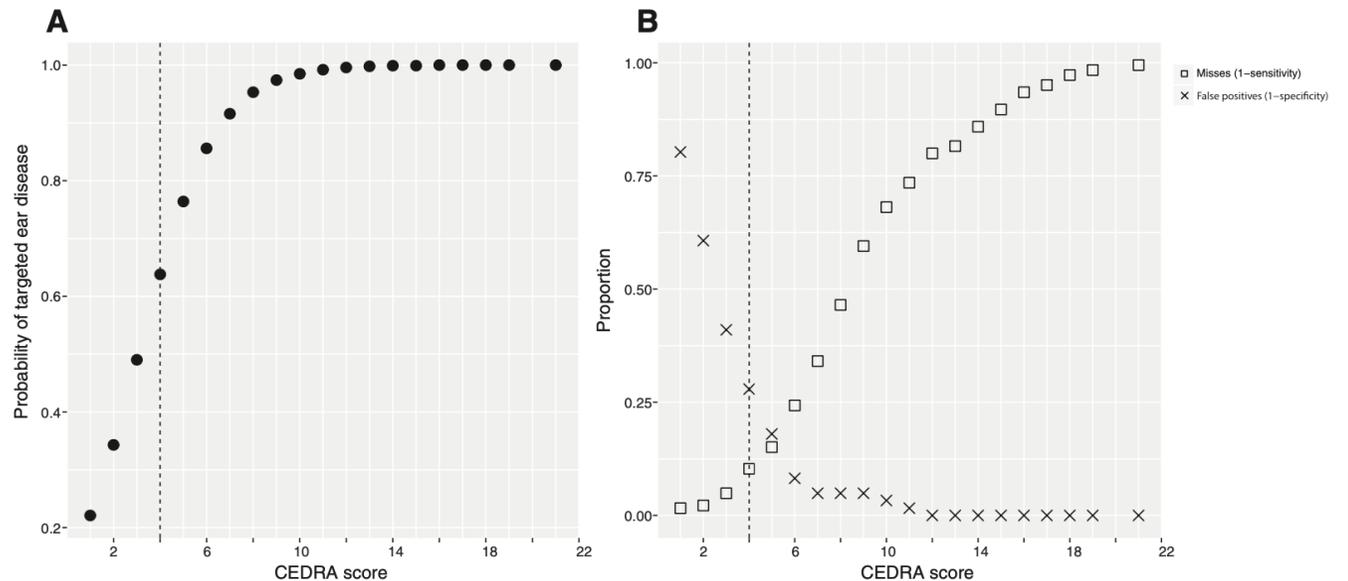
30 themes after NLP

15 questions after cognitive testing

ML to train scoring algorithm

KLYN ET AL. / EAR & HEARING, VOL. 40, NO. 6, 1261-1266

1263





Engineer/Builder



Tech Enthusiast



Early Adopter



Average User



Naïve Consumer

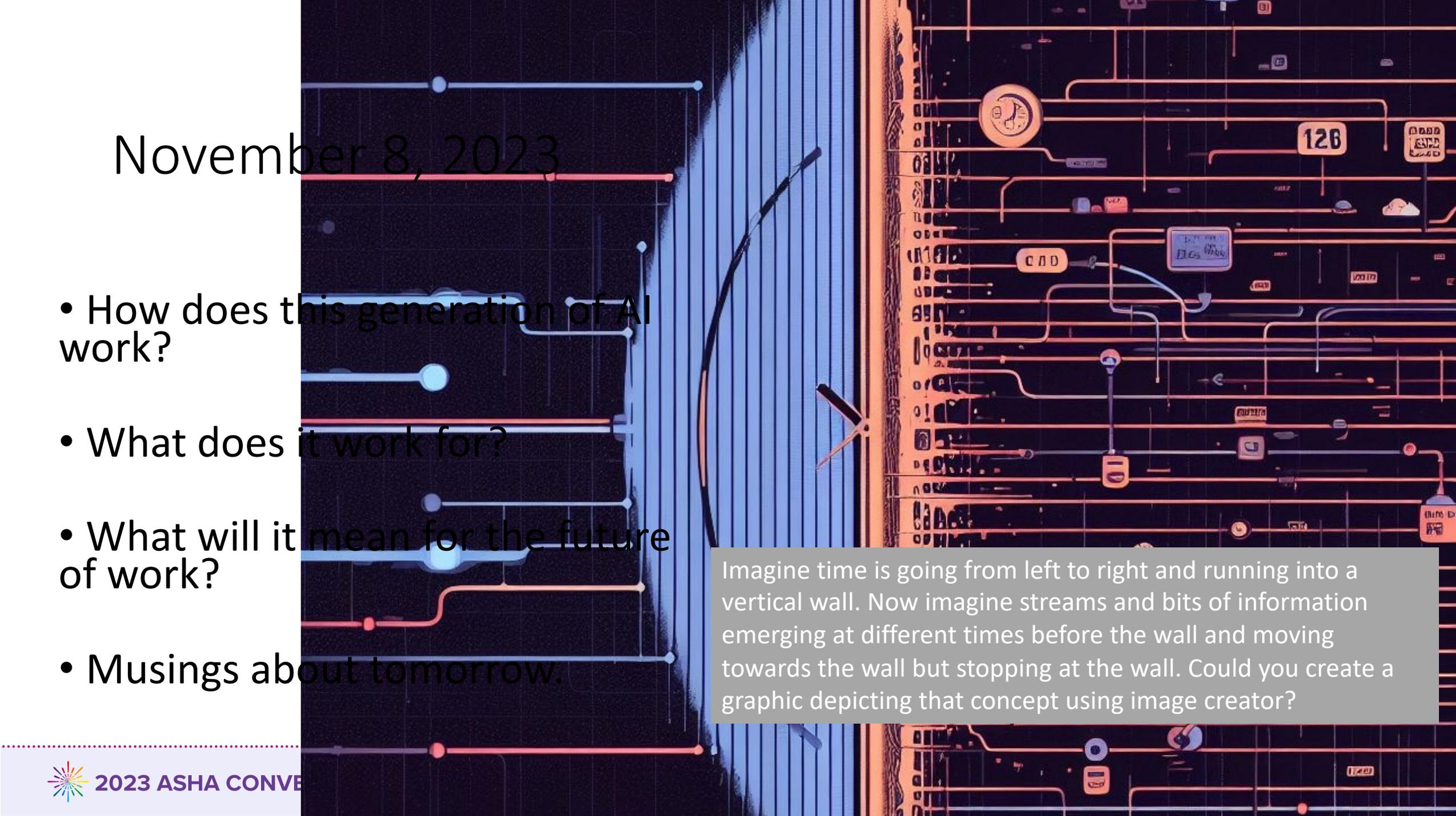
“I will be giving a presentation to health professionals and scientists. I want to show images of individuals in a continuum where the first person is an engineer/builder/creator and the last person in the series is a naïve consumer. What would the interim points in the continuum be? Using image creator create images showing a person at each point of the continuum.”

“Could you regenerate the images in Picaso’s style.”



“I am going to give a talk on generative AI to a group of health professionals and want to start by posing generative AI as a multi-dimensional technology with intersections with society, policy, government, and economics. Please generate an abstract image to capture this sentiment.”

- AI = Generative Artificial Intelligence
- To many AI = ChatGPT
- Multidimensional technology
- Emerging intersections with society, law, politics, government, ethics, economics, healthcare ...
- Evolving at lightning speed

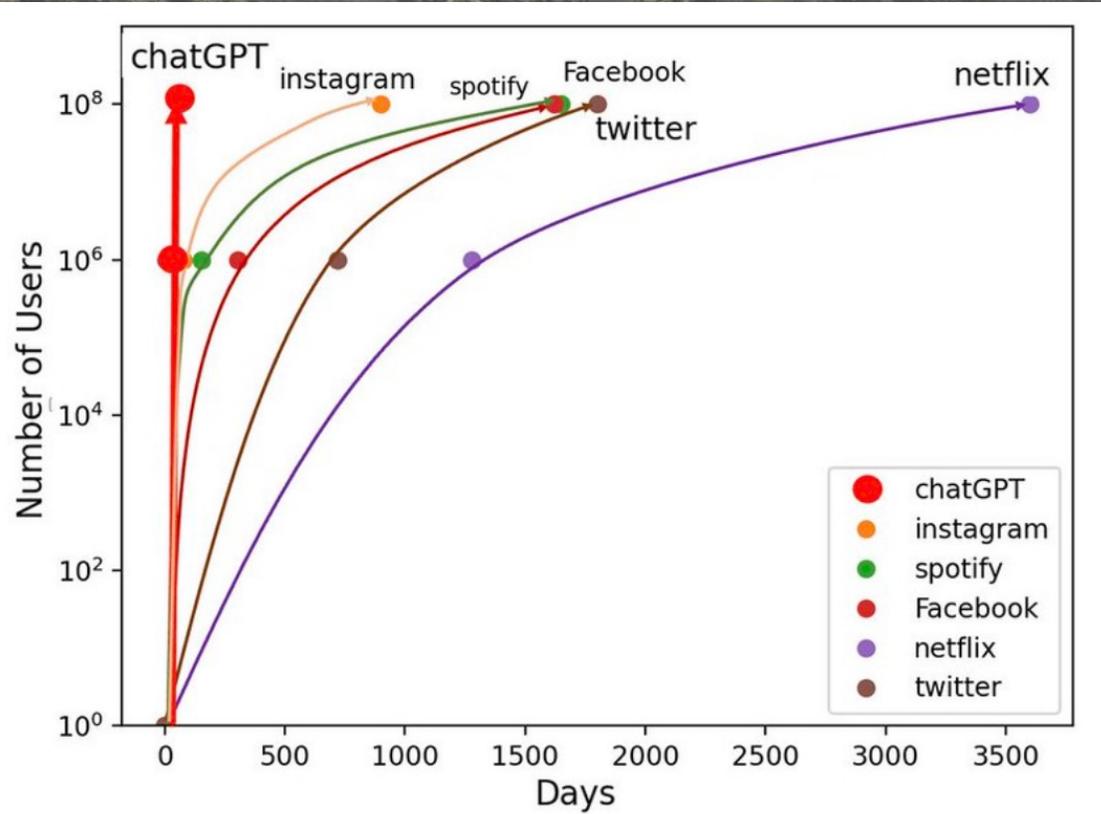


November 8, 2023

- How does this generation of AI work?
- What does it work for?
- What will it mean for the future of work?
- Musings about tomorrow.

Imagine time is going from left to right and running into a vertical wall. Now imagine streams and bits of information emerging at different times before the wall and moving towards the wall but stopping at the wall. Could you create a graphic depicting that concept using image creator?

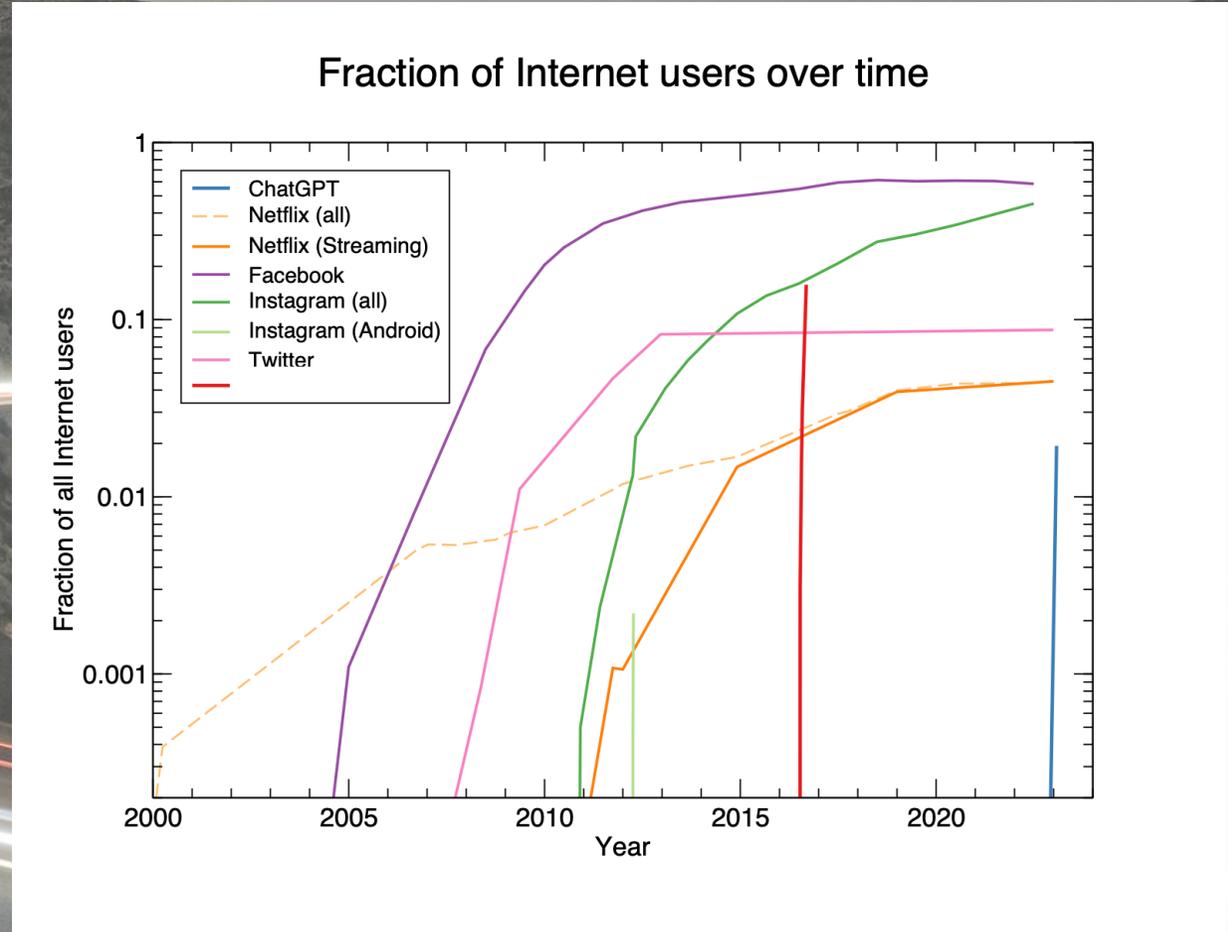
Speaking of the curve...

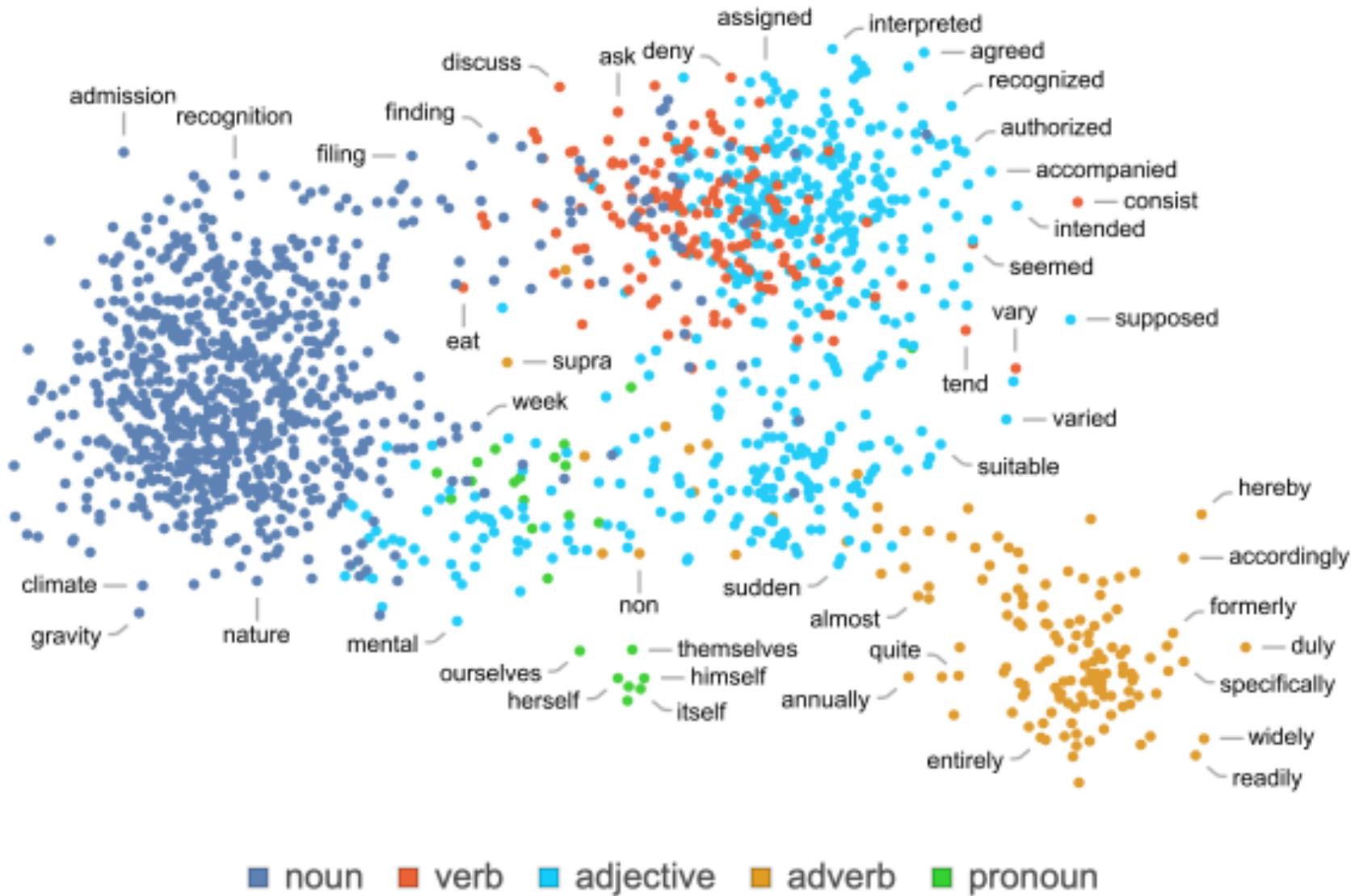


1 Million 100 Million

Instagram 61 days 2 yrs 4.5 months

ChatGPT 4 days 2 months

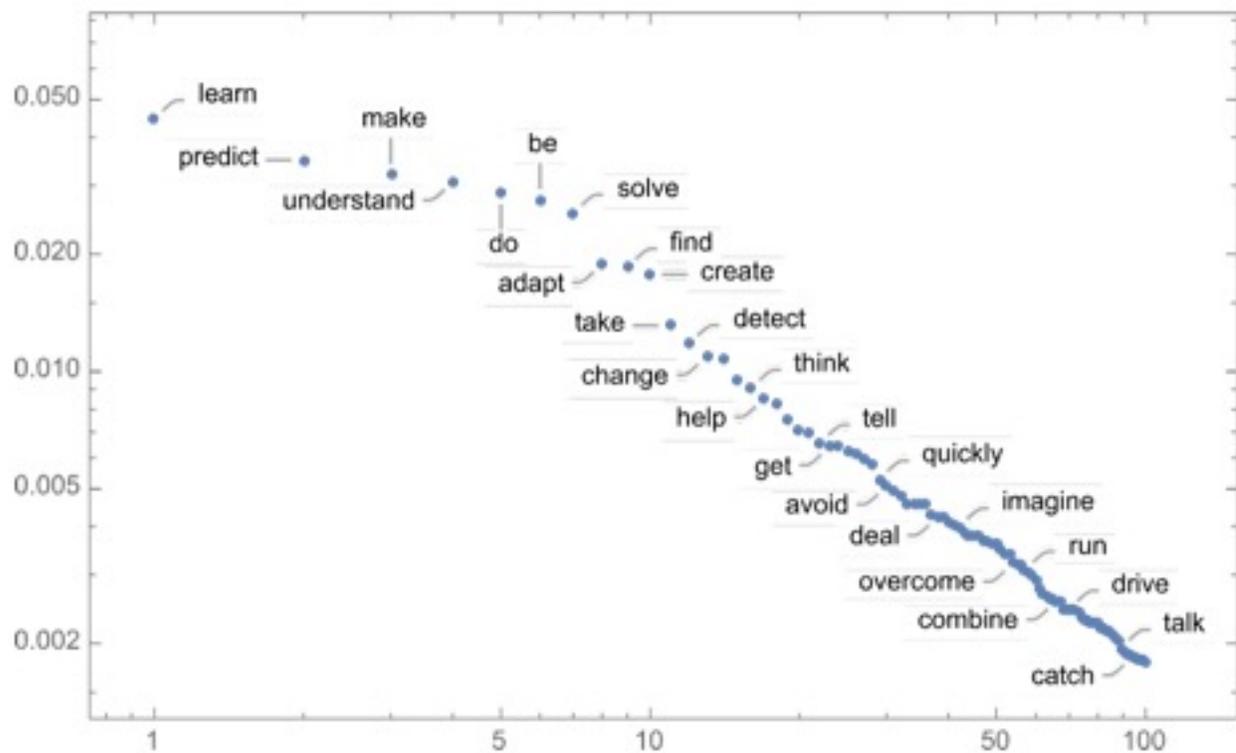




ChatGPT-3
 570 GB/300 Billion words
 ~ 20 trillion parameters

ChatGPT-4
 ? training set
 100 trillion parameters





The best thing about AI is its ability to

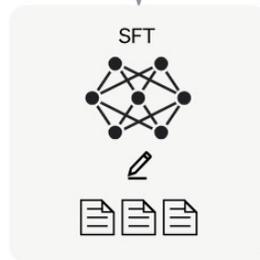
learn	4.5%
predict	3.5%
make	3.2%
understand	3.1%
do	2.9%



Step 1

Collect demonstration data and train a supervised policy.

A prompt is sampled from our prompt dataset.



A labeler demonstrates the desired output behavior.

This data is used to fine-tune GPT-3.5 with supervised learning.

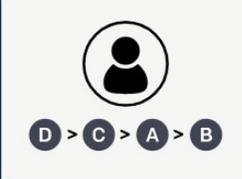
Step 2

Collect comparison data and train a reward model.

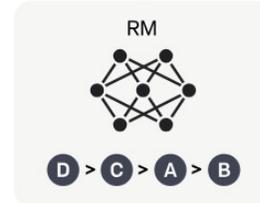
A prompt and several model outputs are sampled.



A labeler ranks the outputs from best to worst.



This data is used to train our reward model.



Step 3

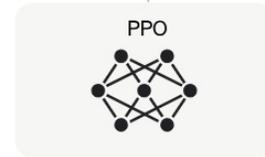
Optimize a policy against the reward model using the PPO reinforcement learning algorithm.



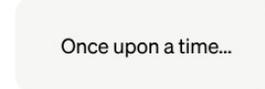
A new prompt is sampled from the dataset.



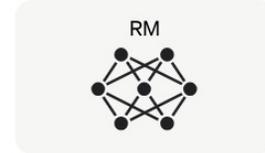
The PPO model is initialized from the supervised policy.



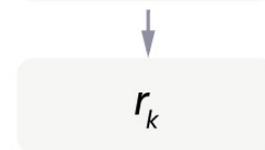
The policy generates an output.



The reward model calculates a reward for the output.



The reward is used to update the policy using PPO.



EVENTUALLY THE WEB WILL BE ONLY CHATBOTS —

After ChatGPT disruption, Stack Overflow lays off 28 percent of staff

The popular developer forum is still hunting for a "path to profitability."

RON AMADEO - 10/16/2023, 3:44 PM



SIGN UP FOR OUR IDEAS NEWSLETTER

SIGN IN

SUBSCRIBE



BUSINESS • TECHNOLOGY

Exclusive: OpenAI Used Kenyan Workers on Less Than \$2 Per Hour to Make ChatGPT Less Toxic

Gender and representation bias. Less powerful female characters.

- Li & Bamman, 2021

A disability lens towards biases. More toxic language when a disability is mentioned.

- Kabir & Amin, 2022

Anti-muslim bias in LLM. More violent output.

- Abid et al., 2021

Brilliance bias. Example, male names for mathematics, female for psychology.

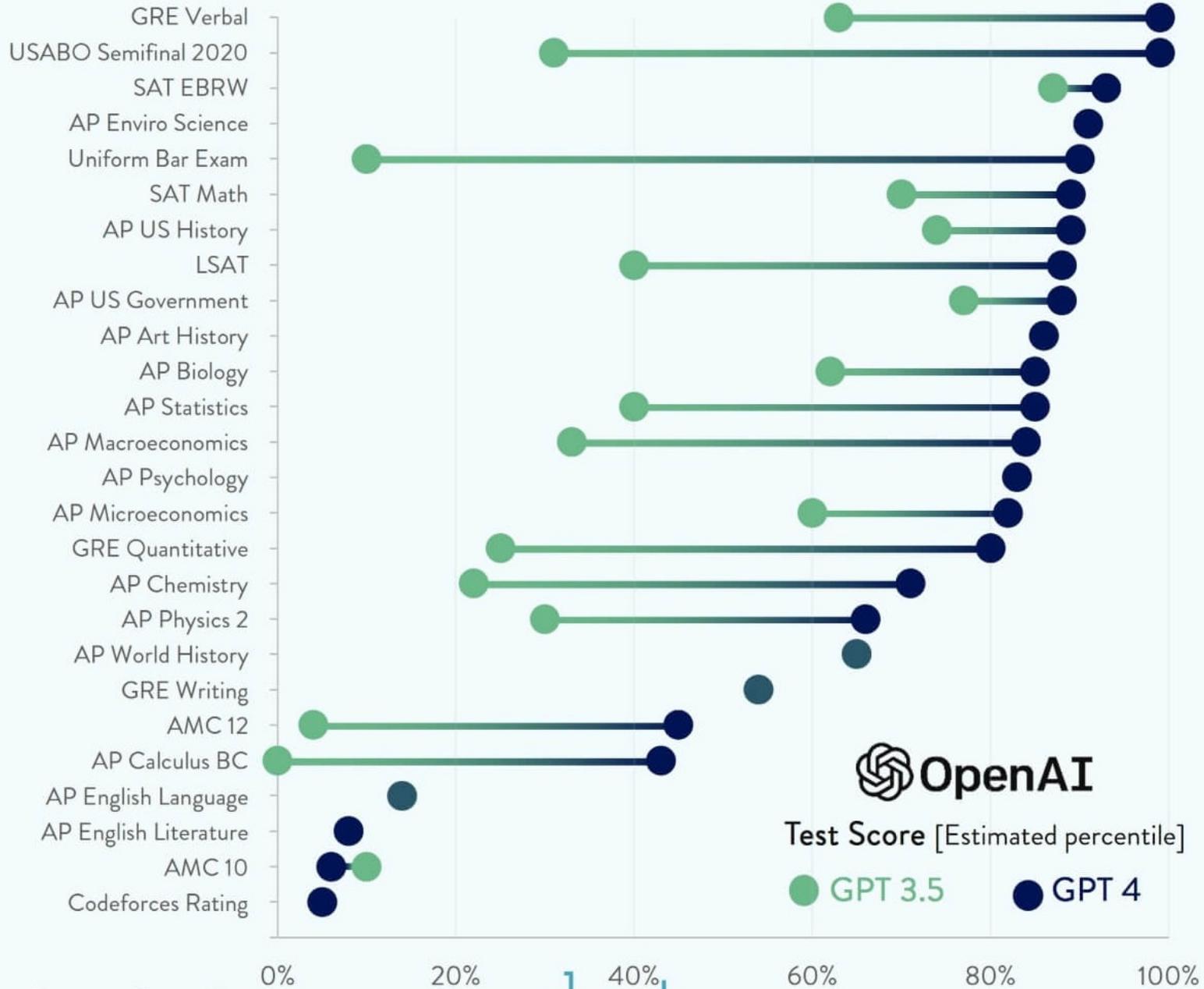
- Webb, 2023

Speaking of the **performance** curve...

Biology Olympiad

Bar Exam

Creative/Critical Thinking



Source: OpenAI

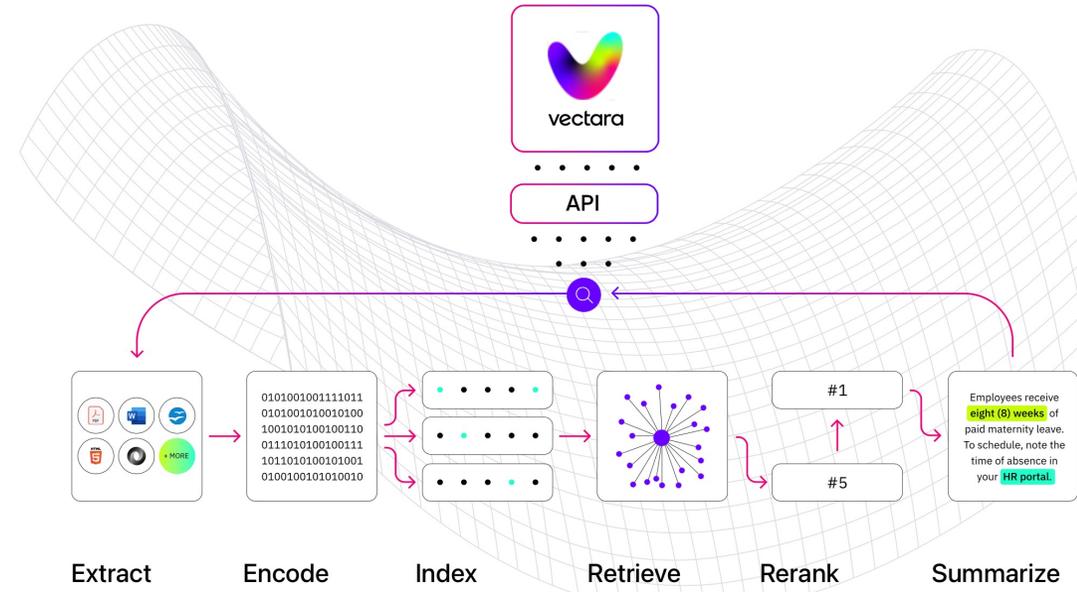
charttr



Chatbots May 'Hallucinate' More Often Than Many Realize

When summarizing facts, ChatGPT technology makes things up about 3 percent of the time, according to research from a new start-up. A Google system's rate was 27 percent.

November 6, 2023



```
1 ## Nov 5, 2023
2
3 library(tidyverse)
4
5 s24 <- read.csv("Data/FY 2024 Faculty Salaries_for SD modeling CLEAN.csv", header=T)
6
7 s23 <- read.csv("Data/FY 2023 Faculty Salaries_for SD modeling CLEAN.csv", header=T)
8
9 s <- s24 %>% left_join(select(s23, Employee_ID, Primary_Secondary, FY2023_Salary),
10                       by=c("Employee_ID", "Primary_Secondary"))
11
12 s <- s %>% filter(!is.na(FY2023_Salary), !is.na(FY2024_Salary)) %>%
13   mutate(FY2023_Raise = (FY2024_Salary-FY2023_Salary)/FY2023_Salary)
14
15 ss <- s %>% filter(Primary_Secondary == "Primary", Retention == "N",
16                 Promotion == "N", NTE_Promotion == "N") %>%
17   group_by(Division, Tenure_Status, Gender) %>%
18   summarise(meanRaise = mean(FY2023_Raise)*100,
19             medianRaise = median(FY2023_Raise)*100,
20             sdRaise = sd(FY2023_Raise)*100,
21             n=n())
22
23 ss1 <- ss %>% filter(n > 5) %>% select(!c(meanRaise, sdRaise))
24
25 ss2 <- ss1 %>% filter(Primary_Secondary == "Primary", Retention == "N",
26                    Promotion == "N", NTE_Promotion == "N") %>%
27   group_by(Division, Tenure_Status, Gender) %>%
28   summarise(medianRaise = median(FY2023_Raise)*100,
29             n=n()) %>%
30   spread
31
32 write.csv(ss1, "FY2023_Raise.csv")
33
34 ggplot(s24, aes(x=NU_Start_Date, y=FY2024_Salary, color=Tenure_Status)) +
35   geom_point(alpha=0.5)
```

```
30:9 (Top Level)
Console Terminal Background Jobs
R 4.3.0 ~ /Library/CloudStorage/OneDrive-NorthwesternUniversity/APF/Projects/Active/FacultySalaryDashboard/Trials/2023Version
> ss1 %>% spread(Gender, medianRaise)
# A tibble: 55 x 5
# Groups:   Division, Tenure_Status [28]
  Division Tenure_Status n F M
  <chr> <chr> <int> <dbl> <dbl>
1 BSoM NTE 6 NA 4.25
2 BSoM NTE 7 4.50 NA
3 BSoM Tenured 10 3.91 NA
4 BSoM Tenured 18 NA 4.00
5 FSM Basic Sciences Tenure-Eligible 8 4.50 NA
6 FSM Basic Sciences Tenure-Eligible 13 NA 4.50
7 FSM Basic Sciences Tenured 15 4.50 NA
8 FSM Basic Sciences Tenured 39 NA 4.50
9 KSM NTE 12 4.00 NA
10 KSM NTE 26 NA 3.65
# i 45 more rows
# i Use `print(n = ...)` to see more rows
>
```

Microsoft Bing SEARCH CHAT sdh595@ad... Protected

I need help with some R code. I have data of test performance for male and female students in several classes. I want to compute the difference between the median scores for male and female students in each class. What is the best way to do this using dplyr?

Your personal and company data are protected in this chat

Sure, I can help with that. Here's a way to do it using `dplyr`:

```
R
Al-generated code. Review and use carefully. More info on FAQ.

library(dplyr)

# Assuming your data frame is named df and has columns for class, gender, and score
df %>%
  group_by(class, gender) %>%
  summarise(median_score = median(score, na.rm = TRUE)) %>%
  spread(gender, median_score) %>%
  mutate(median_difference = male - female)
```

This code does the following:

1. Groups the data by class and gender.
2. Computes the median score for each group.
3. Spreads the data so that there's one row per class, with separate columns for the median scores of male and female students.
4. Computes the difference between the median scores for male and female students in each class.

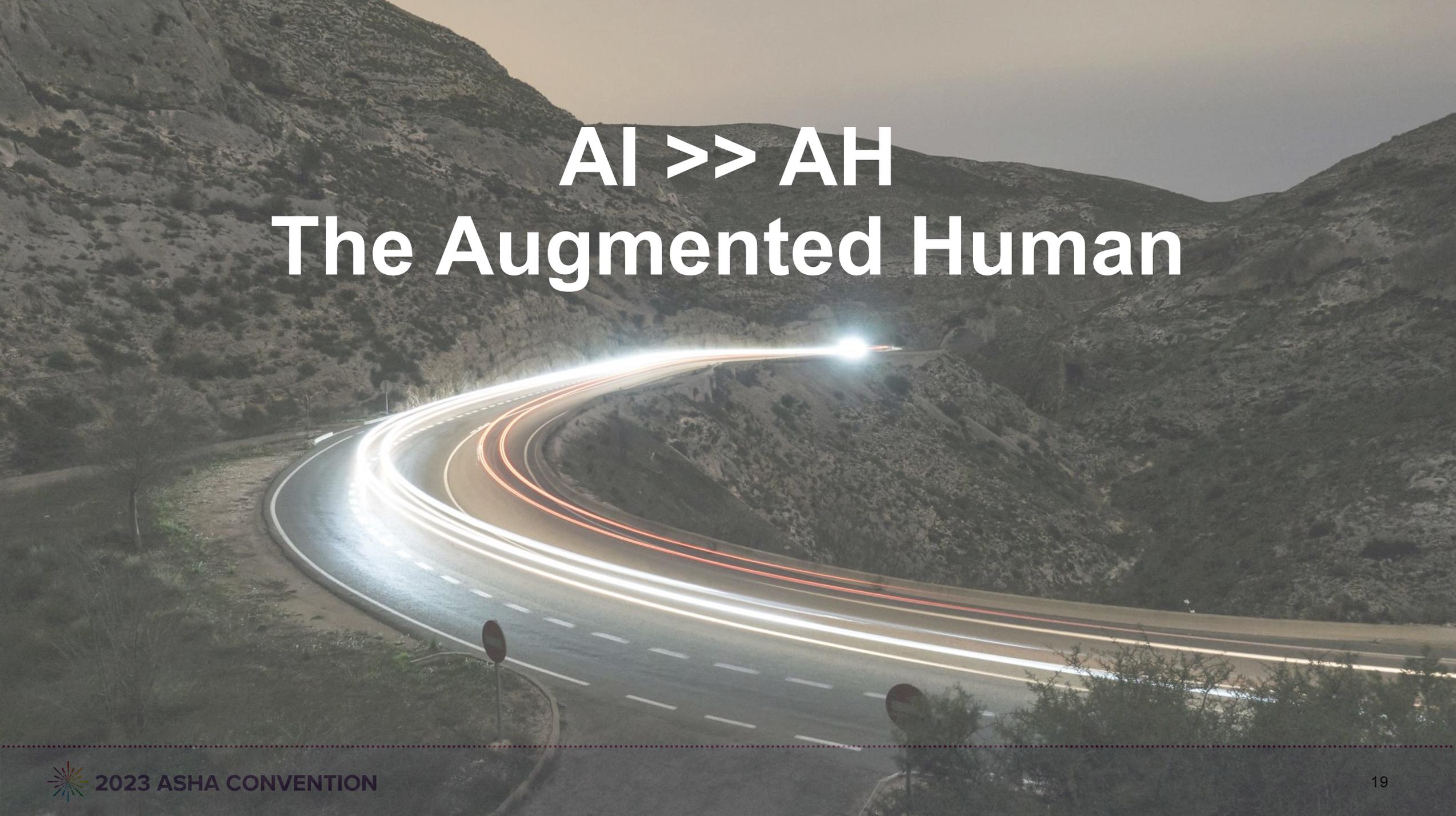
Please replace `class`, `gender`, and `score` with your actual column names if they are different. Also, this code assumes that the `gender` column contains the values 'male' and 'female'. If your data uses different values to represent genders, please adjust the code accordingly.

Remember to handle NA values appropriately for your context. In this example, NA values are ignored when computing the median (`na.rm = TRUE`). If you want to handle them differently, you can modify this part of the code.

Let me know if you need further help! 😊

Your personal and company data are protected in this chat

Ask me anything... 0/4000



AI >> AH

The Augmented Human

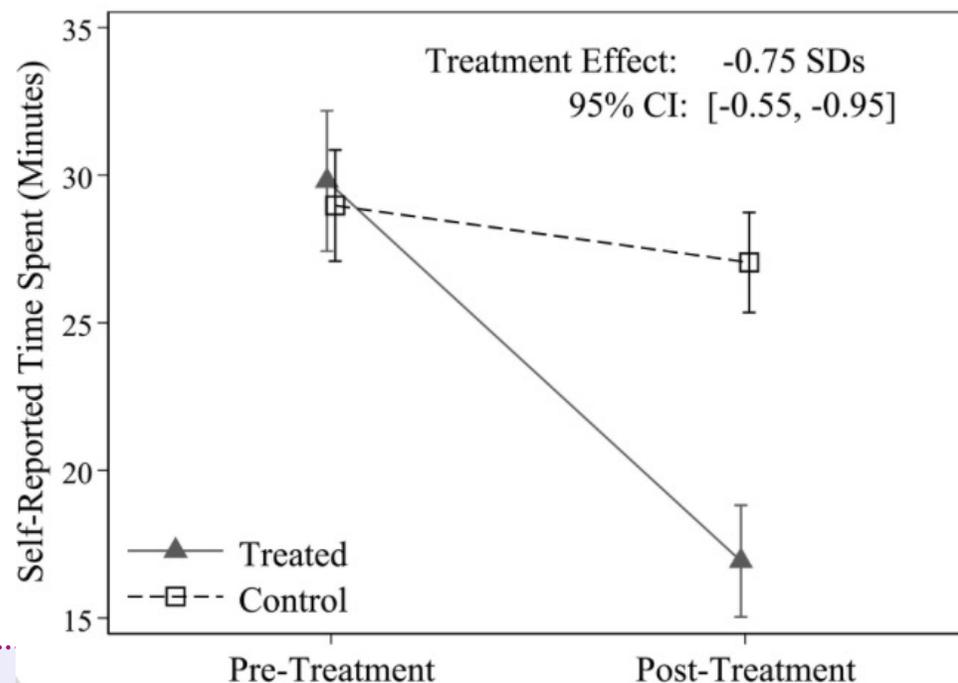
Experimental evidence on the productivity effects of generative artificial intelligence

SHAKKED NOY  AND WHITNEY ZHANG  [Authors Info & Affiliations](#)

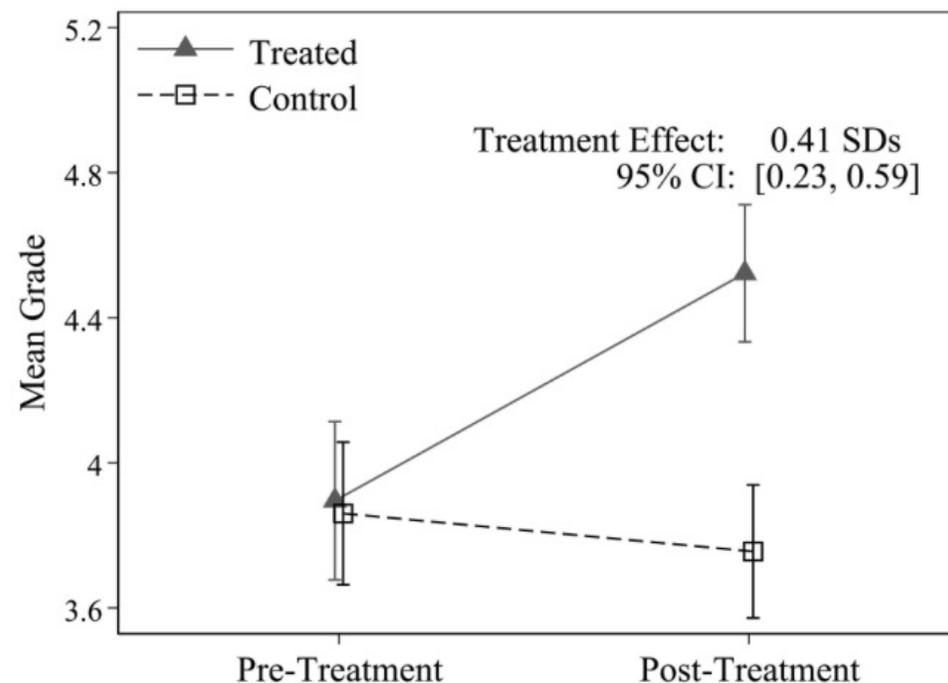
SCIENCE • 13 Jul 2023 • Vol 381, Issue 6654 • pp. 187-192 • DOI: 10.1126/science.adh2586

- 453 college-educated professionals
- Marketers, grant writers, consultants, data analysts, human resource professionals, and managers
- 20-30 min writing tasks
- RCT Treatment = ChatGPT-3.5
- Blinded graders

A Time Taken Decreases



B Average Grades Increase



Nature Postdoc survey October 2023

HOW POSTDOCS USE AI CHATBOTS

A little less than one-third of the postdoctoral researchers polled said that they use artificial-intelligence (AI) chatbots, such as ChatGPT, for everything from translating text to fixing code and overcoming writer's block.

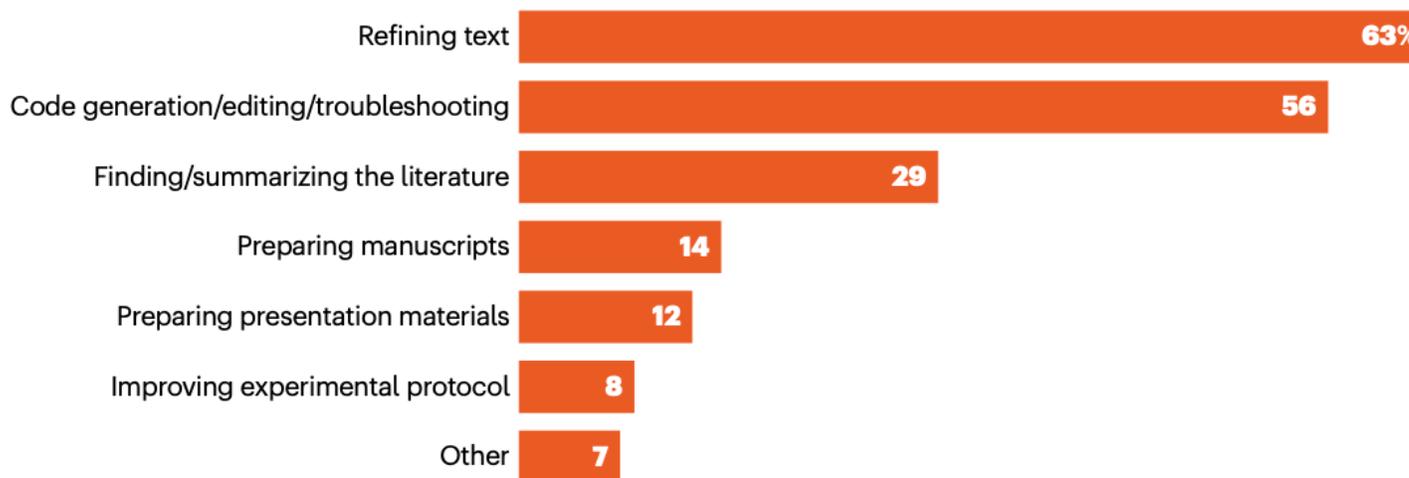
How has the evolution and rapid adoption of AI chatbots changed your day-to-day work or career plans, if at all?



Do you use AI chatbots, such as ChatGPT, in your work?



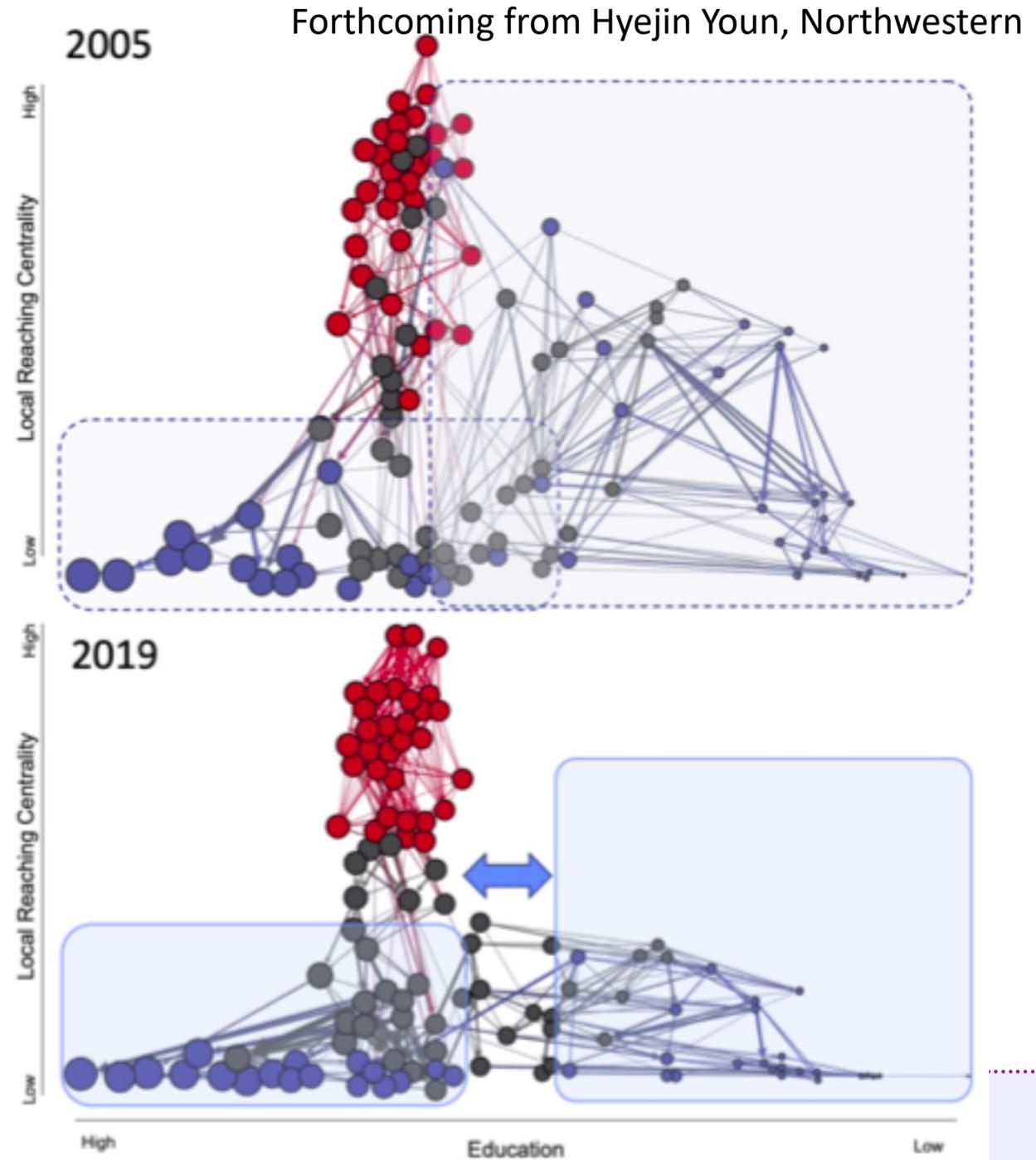
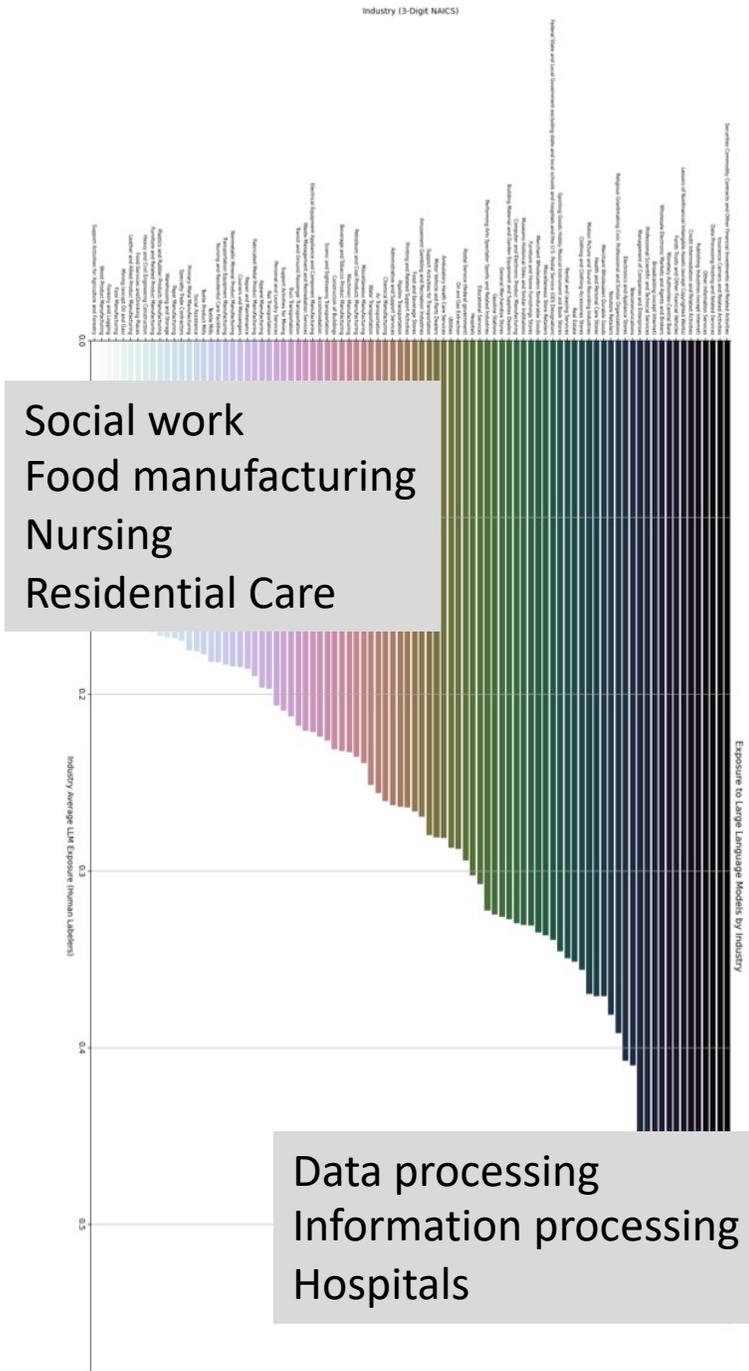
What do you use AI chatbots for?



How often do you use AI chatbots in your work?*



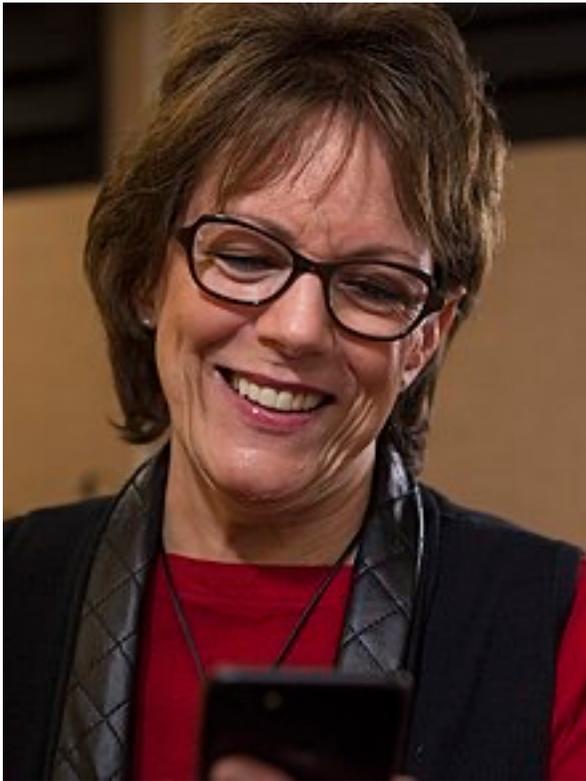
*Percentages don't add up to 100 owing to rounding.



Forthcoming from Hyejin Youn, Northwestern

Speaking of the curve...

Speaking ...



Susan Bennett, 2005

80 hours

“Cow hoist in the tub today.”

“Fasa ask fasa ask fuzzy.”

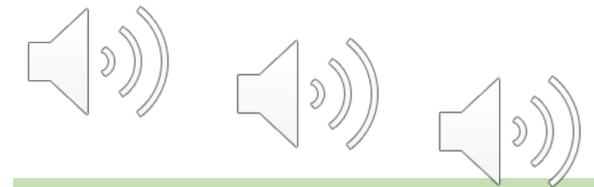
Concatenation.



Joe Rogan & Steve Jobs

October 2022

AI (Writing and Voice)



Robert Smith

May 2023

WellSaid, 45 minutes

GRIMES



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Enter Portal

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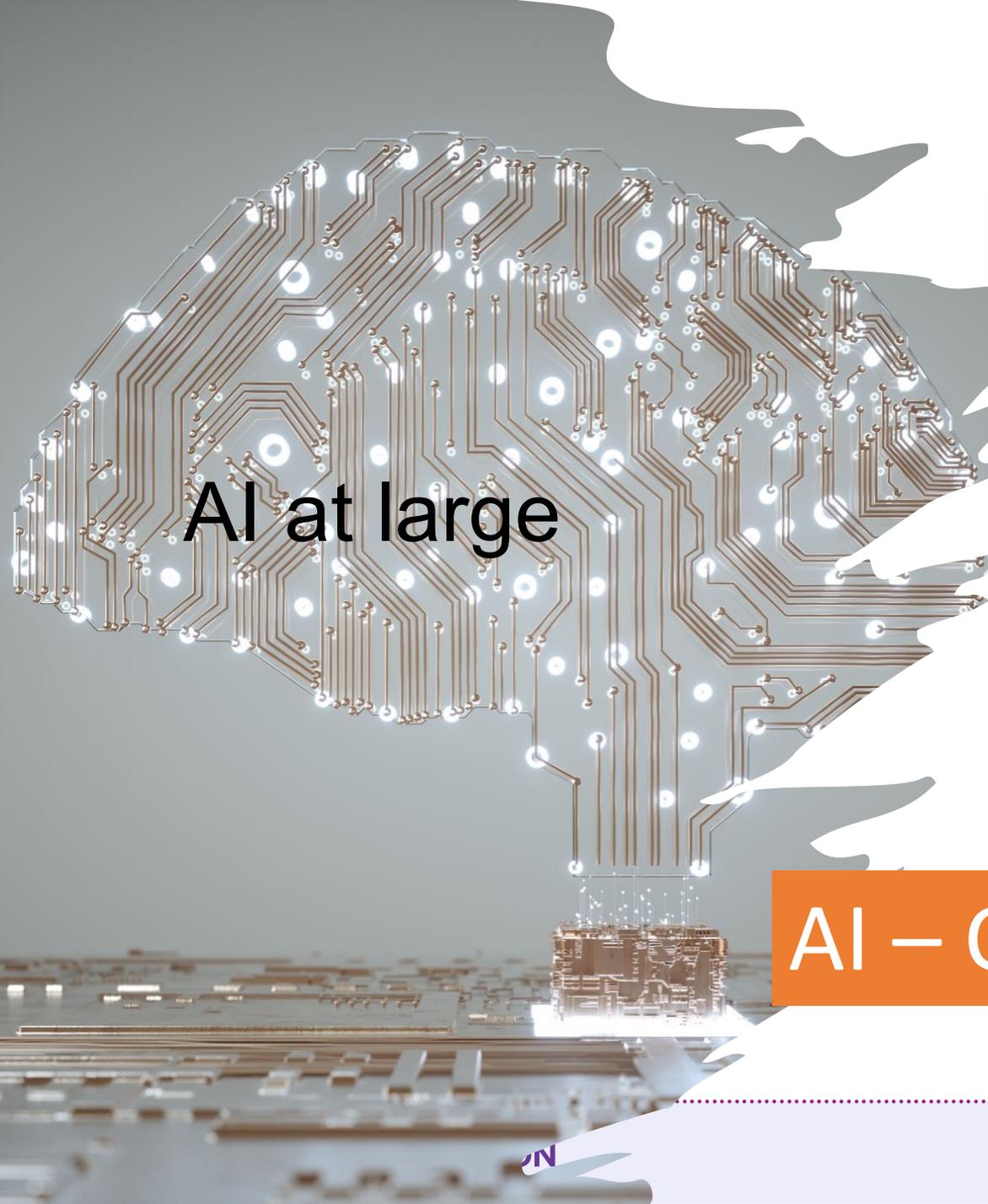
[FAQ](#) [Privacy Policy](#) [Terms of Service](#)

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Speaking of the **local** curve...



AI at large

Hyperlocal/Specialized AI

Teaching AI

AI – Cloud >> Edge >> Hardware

AI

Professional
Institutional
Disciplinary
Governmental
Industrial

Users

Employees
Members
Students
Subscribers

OpenAI BotBuilder



Game Time

I can quickly explain board games or card games to players of any age. Let the games begin!

By ChatGPT



The Negotiator

I'll help you advocate for yourself and get better outcomes. Become a great negotiator.

By ChatGPT



Creative Writing Coach

I'm eager to read your work and give you feedback to improve your skills.

By ChatGPT



Cosmic Dream

Visionary painter of digital wonder

By ChatGPT



Tech Support Advisor

From setting up a printer to troubleshooting a device, I'm here to help you step-by-step.

By ChatGPT



Coloring Book Hero

Take any idea and turn it into whimsical coloring book pages

By ChatGPT

A Few Tools

Summarizing	Explaining
Elicit	Explainpaper
SummarAI	ELI5 (explain like I'm 5)
MapDeduce (any language)	
TLDR this	
Claude AI (general agent)	

Roberto Mata vs. Avianca

Martinez v. Delta Air Lines

Zicherman v. Korean Air Lines

Varghese v. China Southern
Airlines

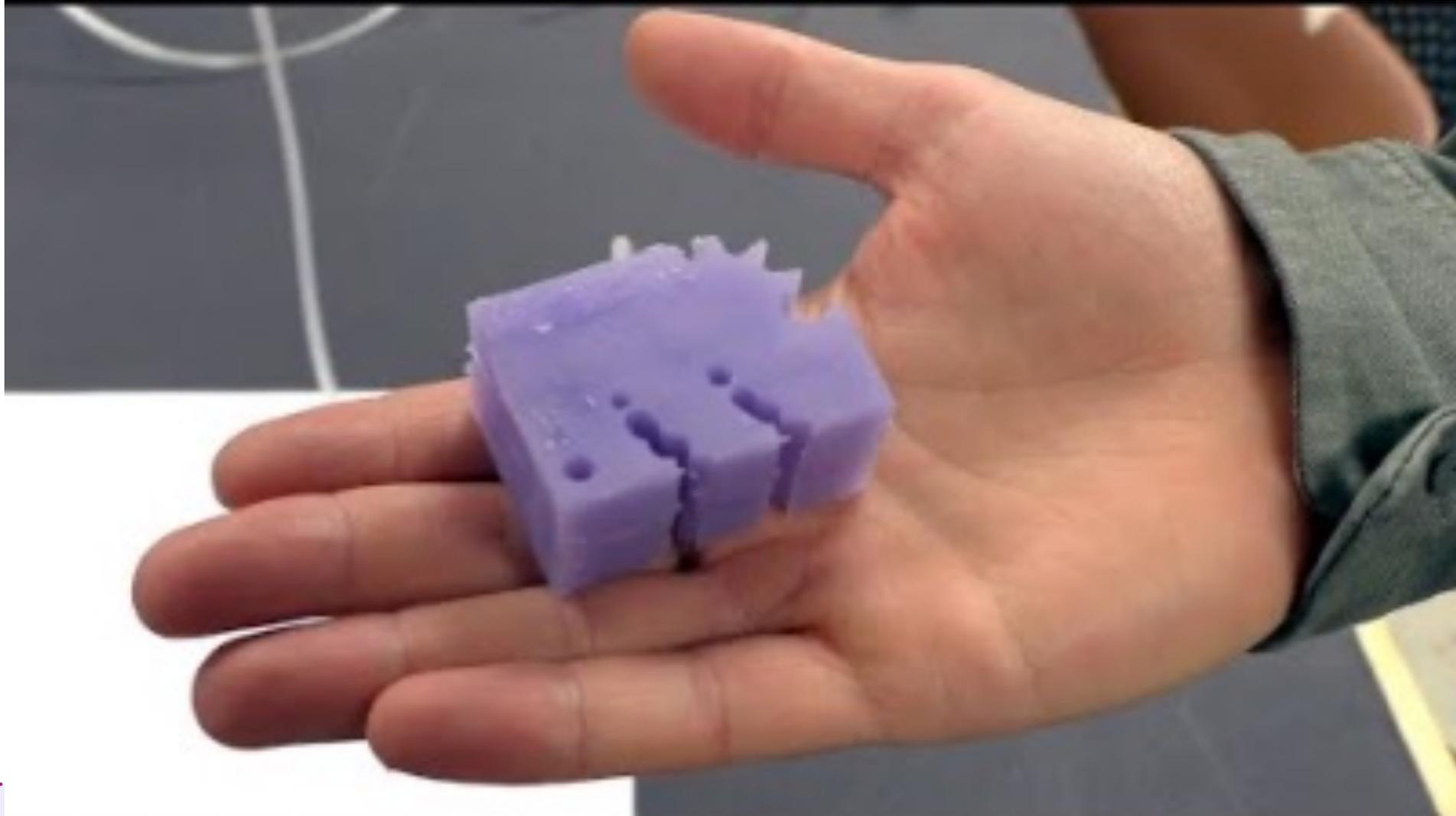


Save the inbox

Sophisticated email message
scan catches faculty petition
against rebuilding athletic
facility.



Instant Evolution





¹ Good Ai is Trustworthy.

Ai should be designed with the utmost respect for privacy and security, ensuring that users' data is protected and their trust is earned.

² Good Ai is Ethical.

Ai should be designed with an understanding of the ethical implications of its use, and should always prioritize the well-being of its user.

³ Good Ai is Transparent.

Ai should be transparent in its decision-making processes, allowing users to understand and trust the technology.



hu.ma.ne

ai pin





Speaking of the curve **ahead** ...

Elon Musk and other tech leaders call for pause on ‘dangerous race’ to make A.I. as advanced as humans

PUBLISHED WED, MAR 29 2023•8:23 AM EDT | UPDATED WED, MAR 29 2023•AT 11:30 EDT

March 2023

Pressured by Biden, A.I. Companies Agree to Guardrails on New Tools

Amazon, Google and Meta are among the companies that announced the guidelines as they race to outdo each other with versions of artificial intelligence.

July 2023

THE WHITE HOUSE



MENU



BLUEPRINT FOR AN AI BILL OF RIGHTS

MAKING AUTOMATED SYSTEMS WORK FOR THE AMERICAN PEOPLE

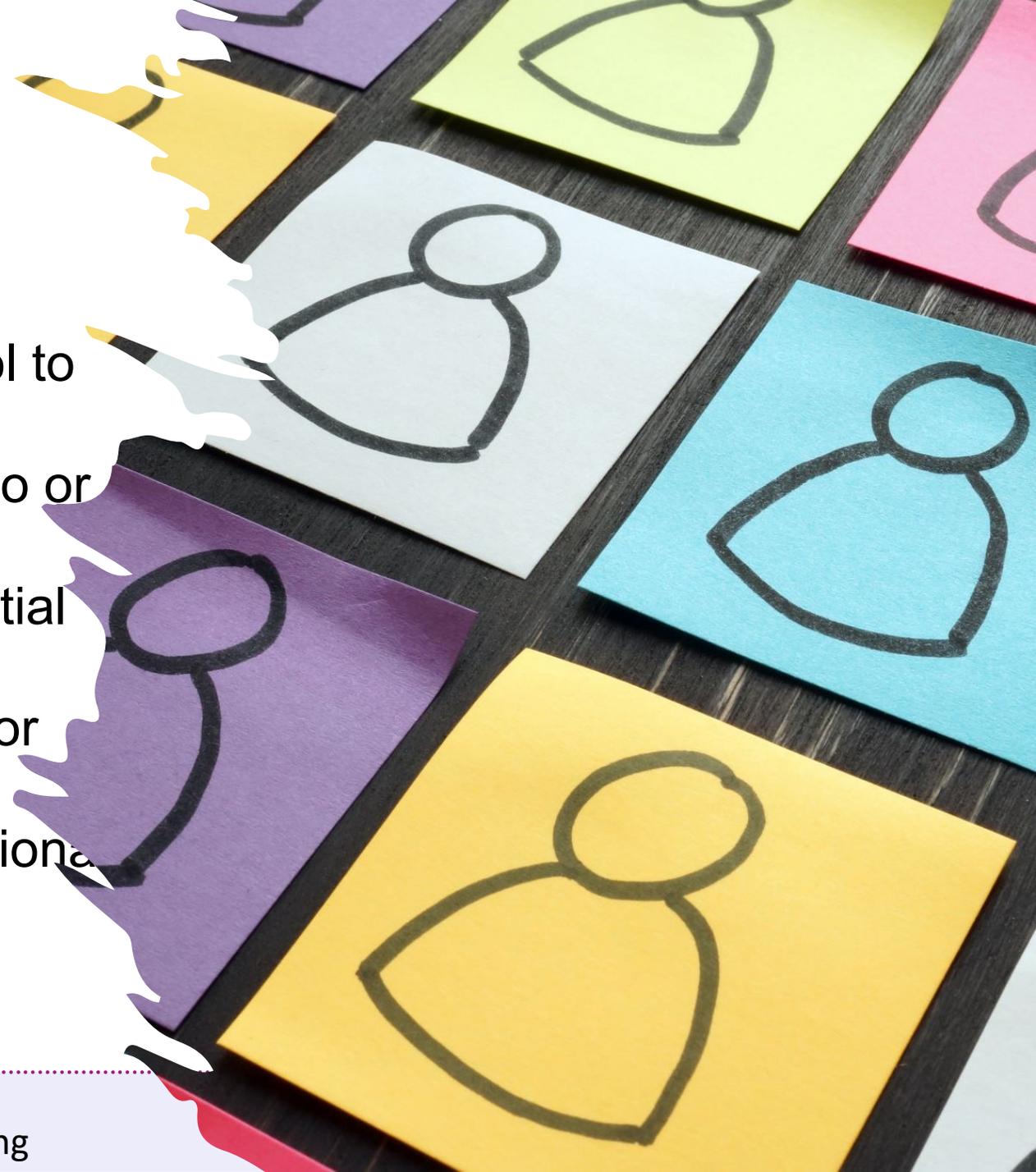


OSTP

October 30, 2023

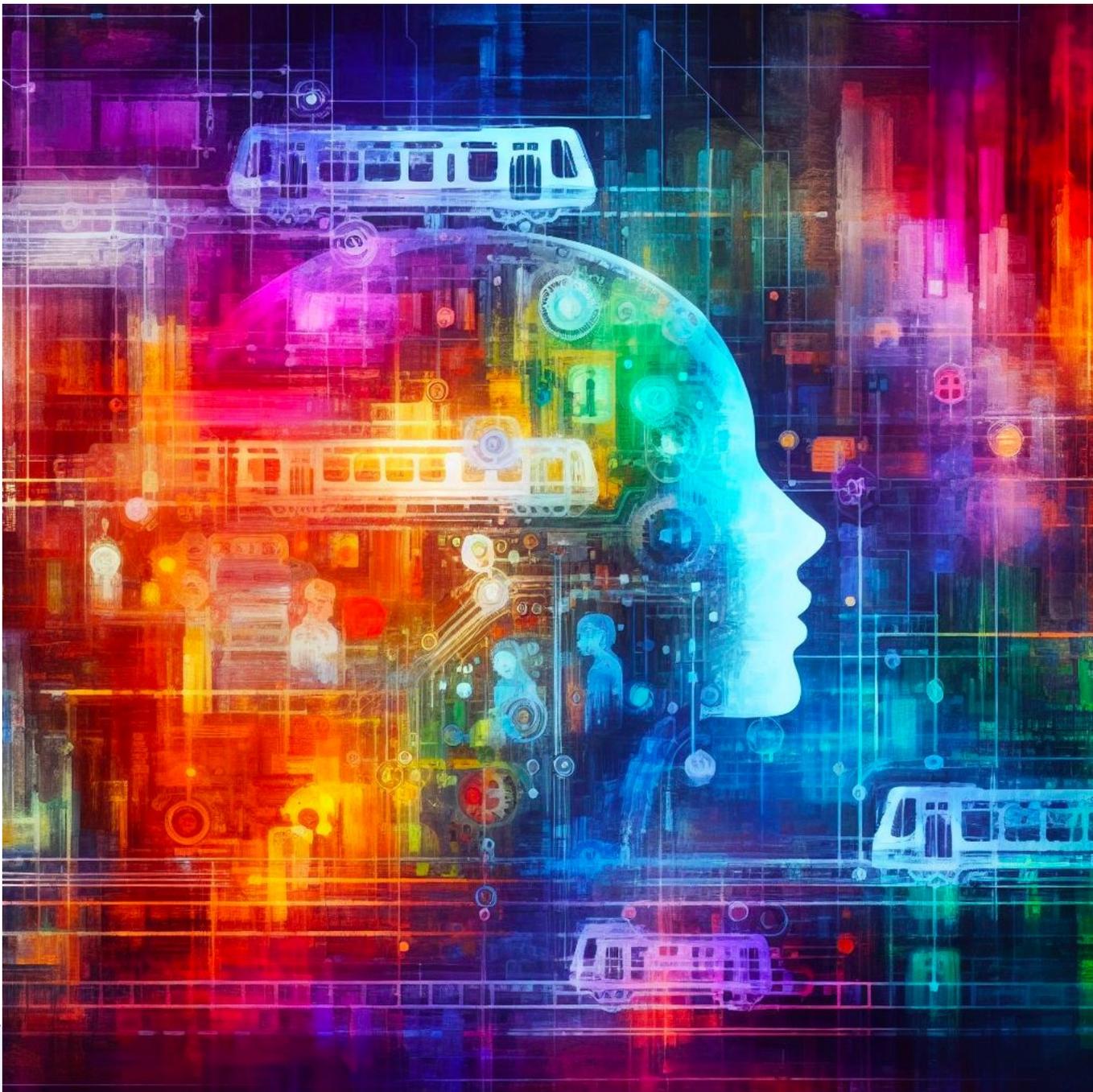
CReATE Prompt Design

- **C**haracter: The role you want the tool to play.
- **R**equest: What you want the tool to do or generate.
- **A**adjust: Revise, clarify, or edit your initial prompt.
- **T**ype of output: Provide parameters for your outcome.
- **E**xamples: Include examples or additional content.



Key Notes

- Is algorithmic bias different from or better/worse than human bias?
- How are future AIs going to evolve on a diet of synthetic information?
- Should safeguards be at the source or end of the AI chain?
 - Who will get credit? Who will be liable?
- Who will be responsible for monitoring intended/unintended disparities?



Humans/ AI

Humans + AI [Augmented Humans]

You are a modernist creative graphic designer. I want you to create an image for a power point slide. The image should be colorful, have different levels of transparency, include hints of humans and machines, and subway maps. The image should try to depict the thought that humans will not be replaced by AI but it is highly likely that humans with AI will replace humans who do not use AI. [Use a more abstract style.]

Thanks

ASHA (Margaret Rogers, Mike Cannon)

Northwestern (Miriam Sherin, Eric Perreault)

... its your curve

...