

# The Role of AI in Research Development

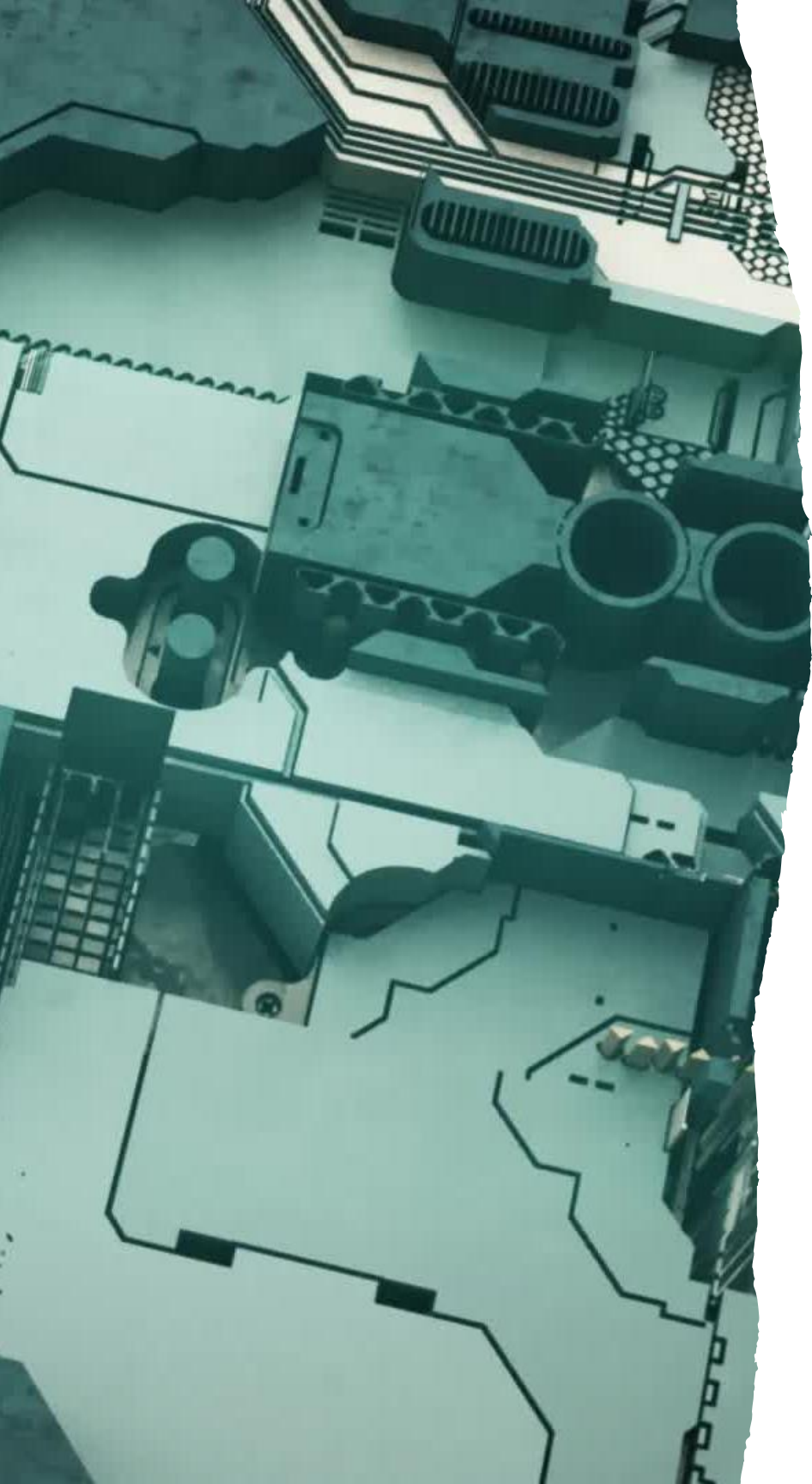
Ara Tahmassian, Harvard University

Robert Pilgrim, University of Arkansas

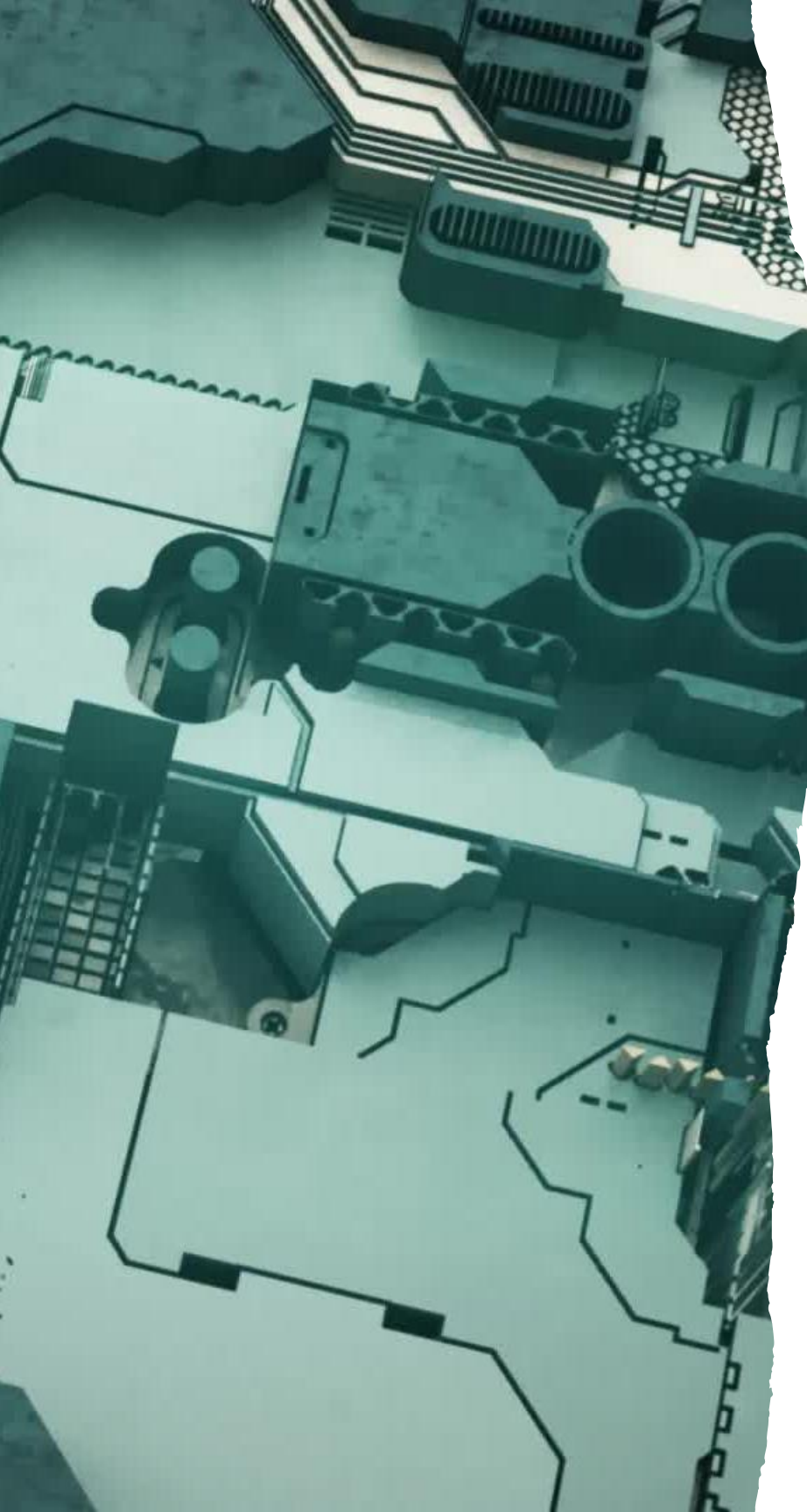
- A. How can AI contribute to institutional research development?
- B. Identify internal and external collaborators?
- C. Matching Strategic Research Themes with Potential Funders
- D. Can AI Increase the Yield on Proposals

\*Example ChatGPT prompts on last slide





# AI | Why the Sudden Interest?



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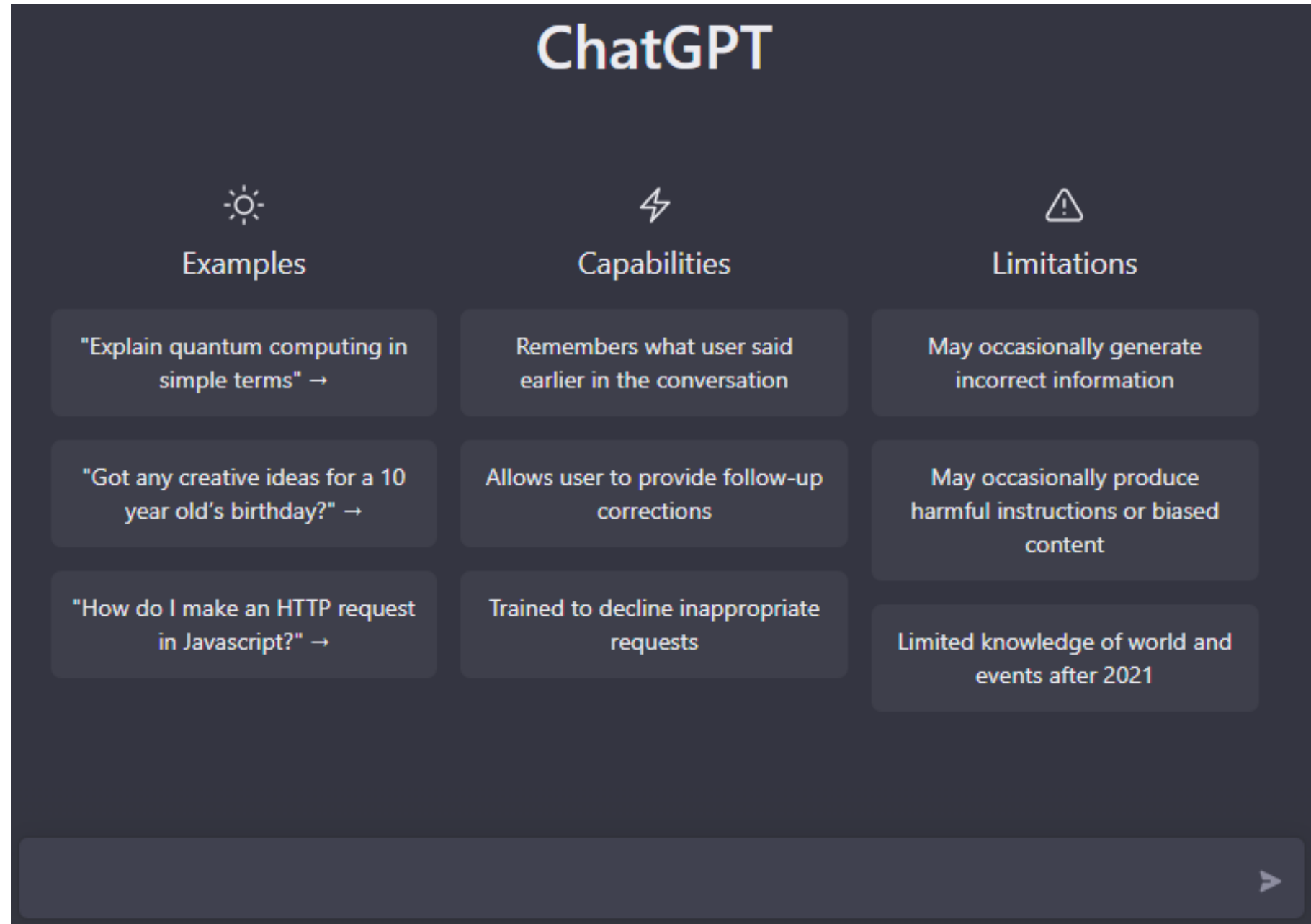
- What changed in the last year?
- OpenAI with investment from
- Elon Musk (\$50m) and Microsoft (\$10B)
  - November 2022 Chat Generative Pre-Trained Transformer (GPT) 3.5
  - March 2023 GPT 4 released (10X the “Power”)
- Why was this significant?
  - It puts the latest AI technology in the hands of anyone
- Think of it as an expert consultant
- It is NOT searching the internet
- It is NOT searching a database
- It has no internet access

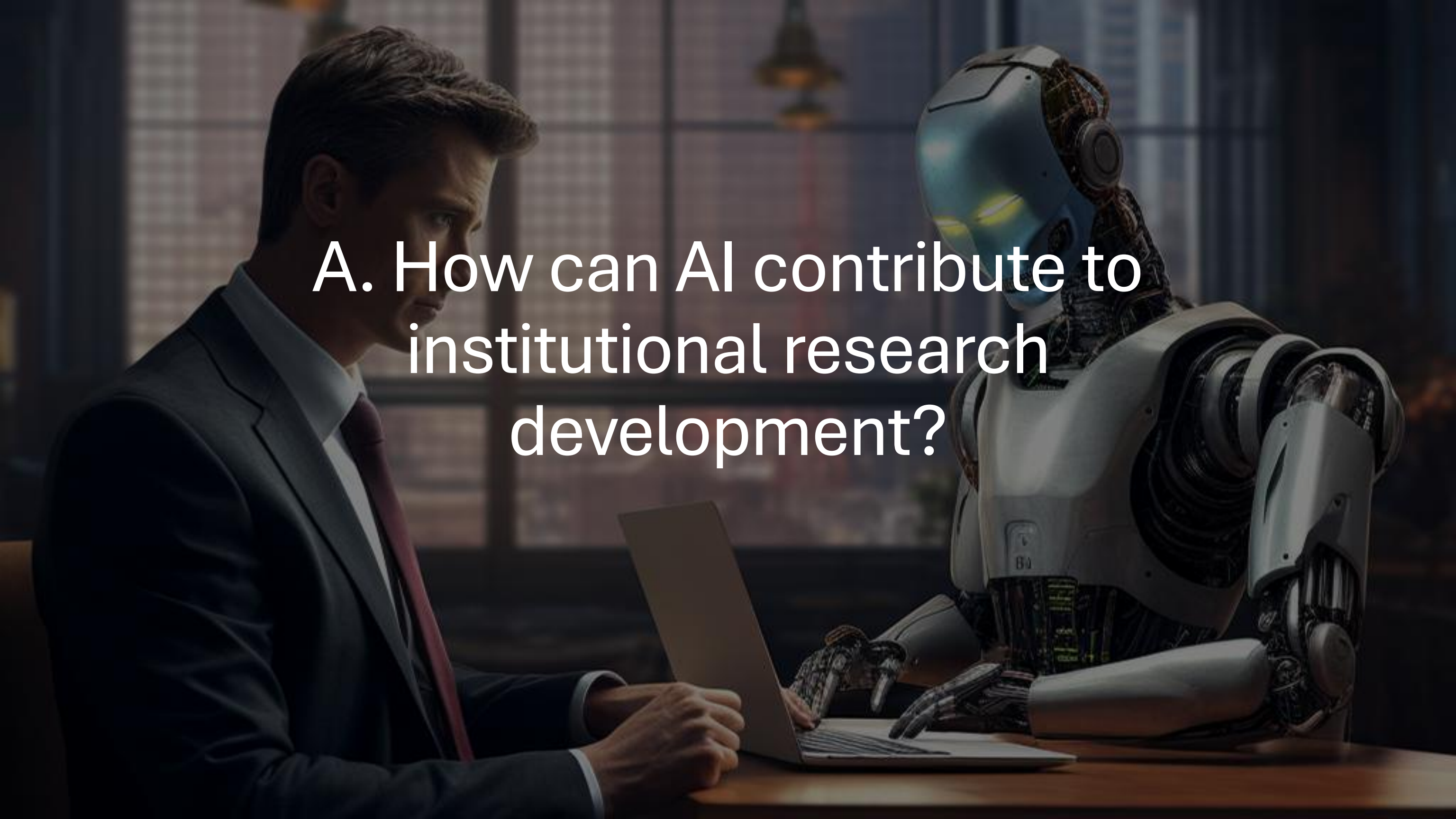
# Chat GPT “Give me 20 things you can you do?”

- 1. **Text Generation:** Composing coherent and contextually relevant text based on given prompts.
- 2. Language Translation: Translating text between different languages.
- 3. **Question Answering:** Providing answers to specific questions based on available information.
- 4. Summarization: Summarizing lengthy articles or documents into concise summaries.
- 5. **Syntax and Grammar Checking:** Offering corrections for grammatical and syntactical errors.
- 6. Text-Based Games Interaction: Engaging in text-based games like chess, providing moves based on input.
- 7. Sentiment Analysis: Analyzing and determining the sentiment of a piece of text.
- 8. Poetry and **Creative Writing:** Writing poems, stories, and other creative pieces.
- 9. **Coding Assistance:** Offering help with coding and programming languages.
- 10. Mathematical Problem Solving: Assisting with mathematical calculations and problems.
- 11. **Scientific Explanation:** Providing explanations for scientific concepts and phenomena.
- 12. Historical Information Retrieval: Supplying historical facts and context for various events and figures.
- 13. Recipe Generation: Creating or modifying recipes based on ingredients or dietary preferences.
- 14. Health and Fitness Guidance: Offering general advice on exercises, nutrition and well-being (though not a substitute for professional medical advice).
- 15. Educational Tutoring: Assisting with learning in various subjects, such as mathematics, science, literature, etc.
- 16. **Legal and Compliance Overview:** Giving general insights into legal topics (no to be confused with professional legal advice).
- 17. Travel and Geography Information: Providing information about different locations, cultures, and travel tips.
- 18. Product and Book Recommendations: Offering suggestions for products or books based on general preferences or themes.
- 19. Conversation and Companionship: Engaging in casual conversation and providing virtual companionship.
- 20. **Ethical Considerations and Discussions:** Facilitating discussions around ethical considerations in various contexts, including technology and societal issues.

# Open AI | What is it

- Cutting edge Artificial Intelligence (AI)
- Trained on data up to 2021
- <https://chat.openai.com/>
- Download app on phone
- VIP: Paid version is 10X the free version
- Think of it as an expert consultant
- It is NOT searching the internet
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A man in a dark suit and red tie is sitting at a desk, looking at a laptop. A white and blue robot is sitting next to him, also looking at the laptop. The background is a blurred cityscape at night.

A. How can AI contribute to institutional research development?

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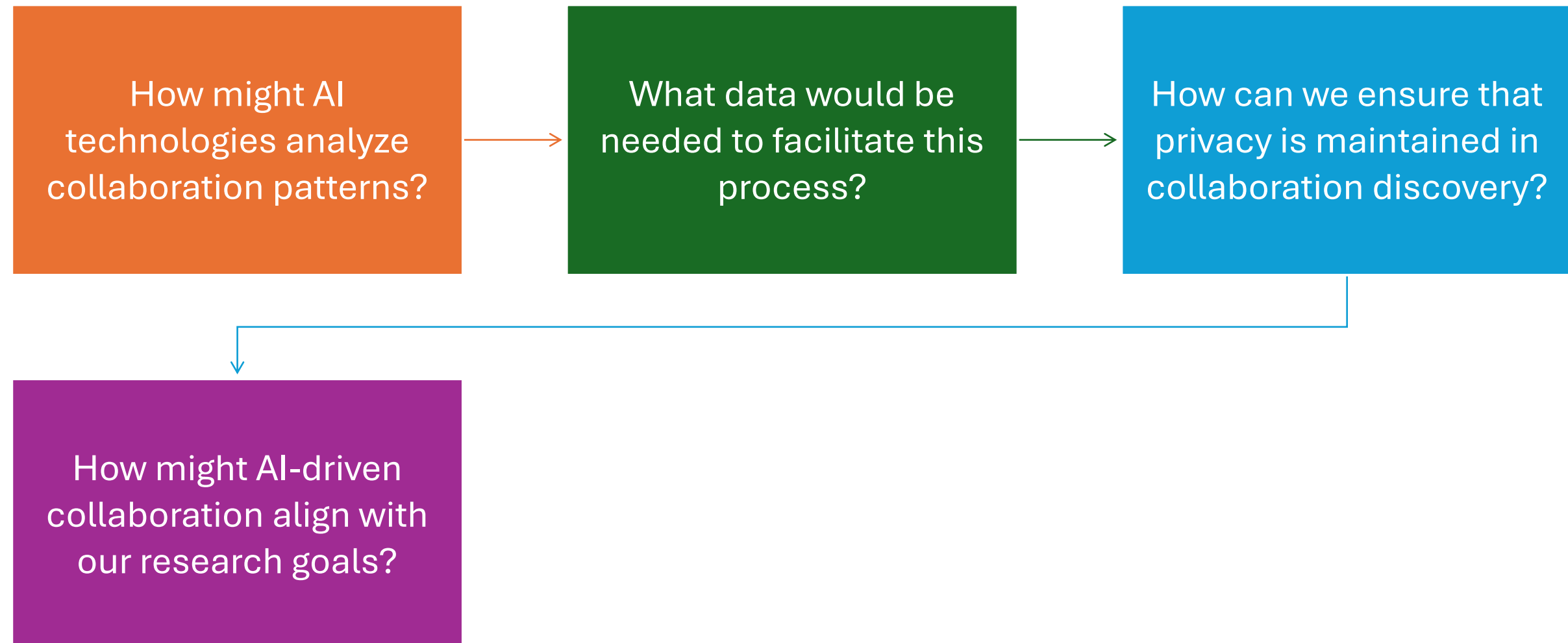
- What ethical guidelines need to be established to ensure that AI is utilized responsibly in our research development
- Initial steps to integrate AI into our existing research processes?
- What are the potential risks and challenges that our institution might face in implementing AI for research development
- How can we measure the success of AI in enhancing our research capabilities, and what benchmarks or key performance indicators should we consider to evaluate the effectiveness of AI integration?

**B. Identify internal and external collaborators?**

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## C. Matching Strategic Research Themes with Potential Funders

# C. Matching Strategic Research Themes with Potential Funders



How could AI algorithms analyze and identify relevant funding opportunities?



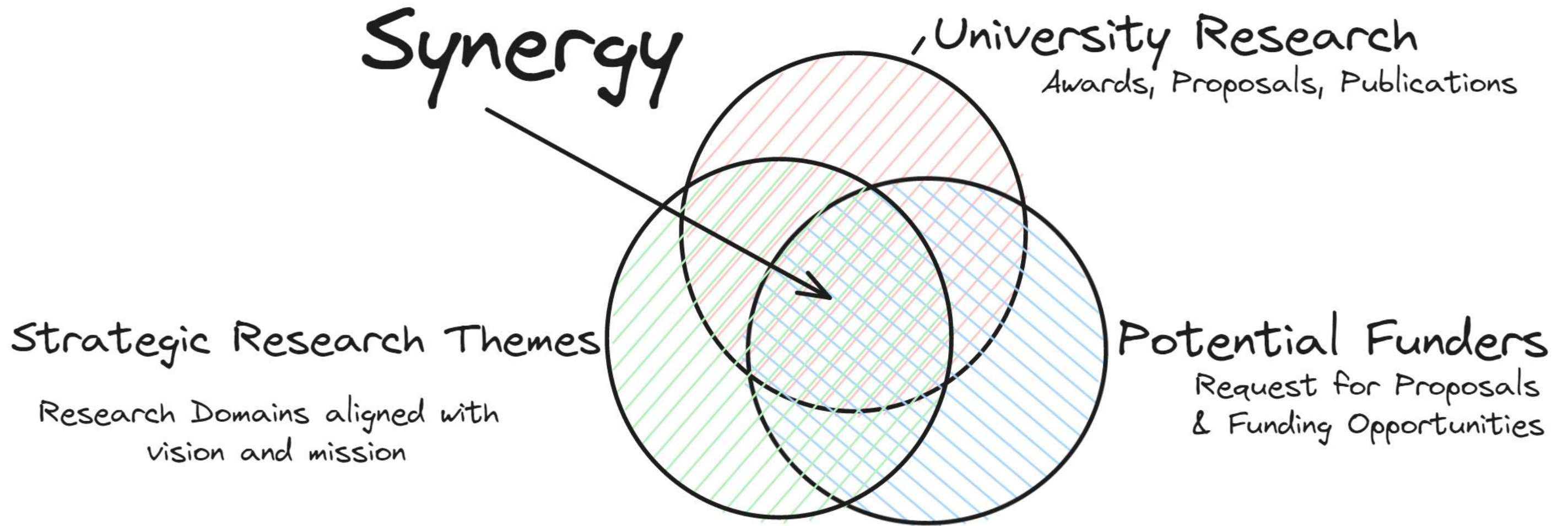
How might we train an AI system to understand our research themes?



What ethical considerations should guide AI's role in this process?

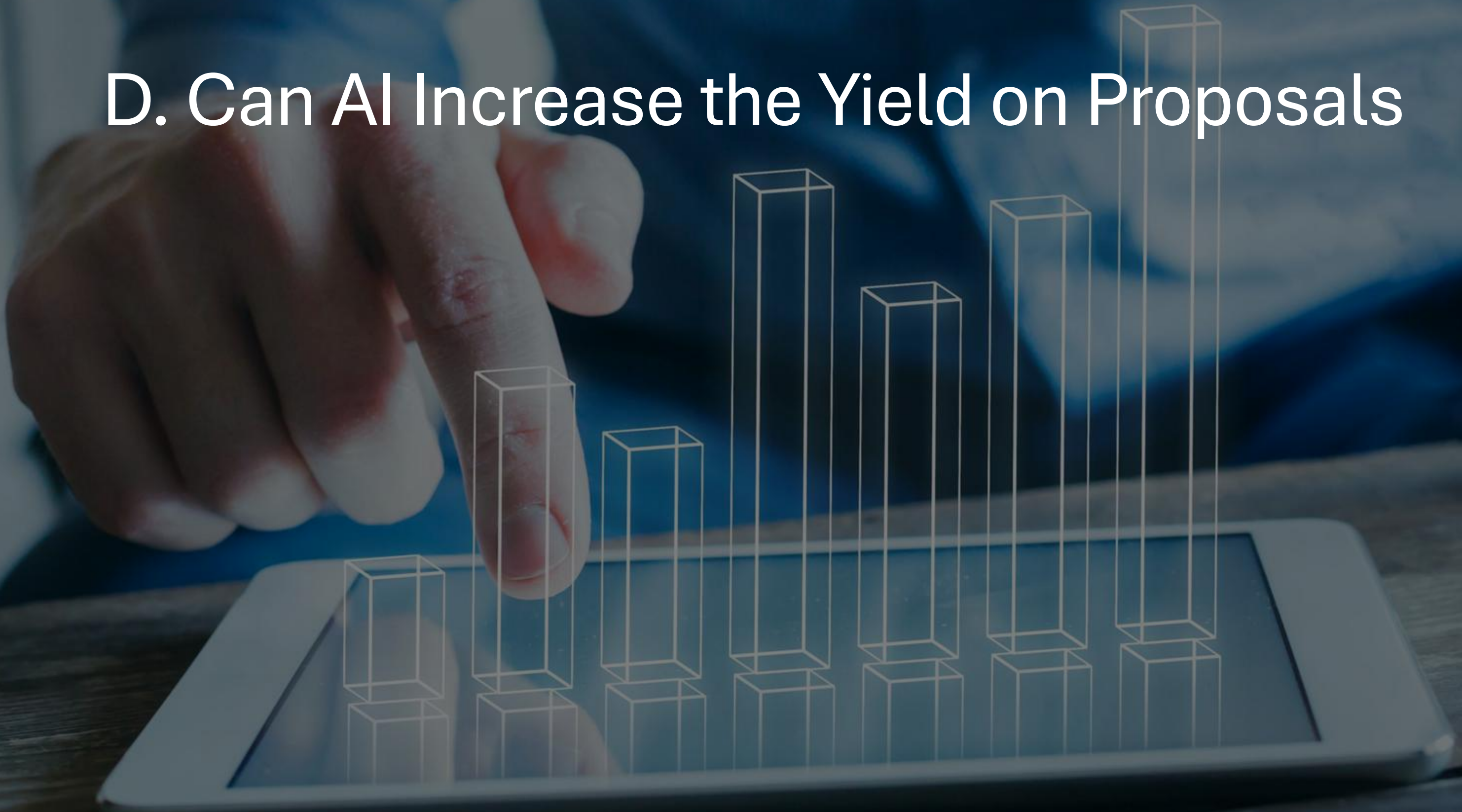


How do we evaluate the success of such matching?



Levering AI to do more than just keyword analysis

# D. Can AI Increase the Yield on Proposals



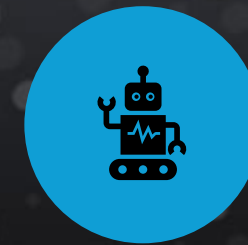
# D. Can AI Increase the Yield on Proposals



How might AI contribute to enhancing proposal quality?



Can AI-driven analytics identify trends in successful proposals?



What data should be used to train AI for proposal enhancement?



How do we ensure that the human touch remains in AI-assisted proposals?



What are the risks and how might they be mitigated?

# Applications

## Writing Assistance

- Review and improve proposal drafts by checking grammar, style, and clarity.

## Literature Search Assistance

- Identify relevant research articles, journals, and publications

## Tailoring Proposals

- Assist in aligning the language and emphasis of the proposal with a specific funder's priorities.

## Multidisciplinary Collaboration

- Provide information on different fields to aid in integrating diverse perspectives.

## Accessibility

- Help in translating technical jargon into more accessible language.

## Mock Reviews

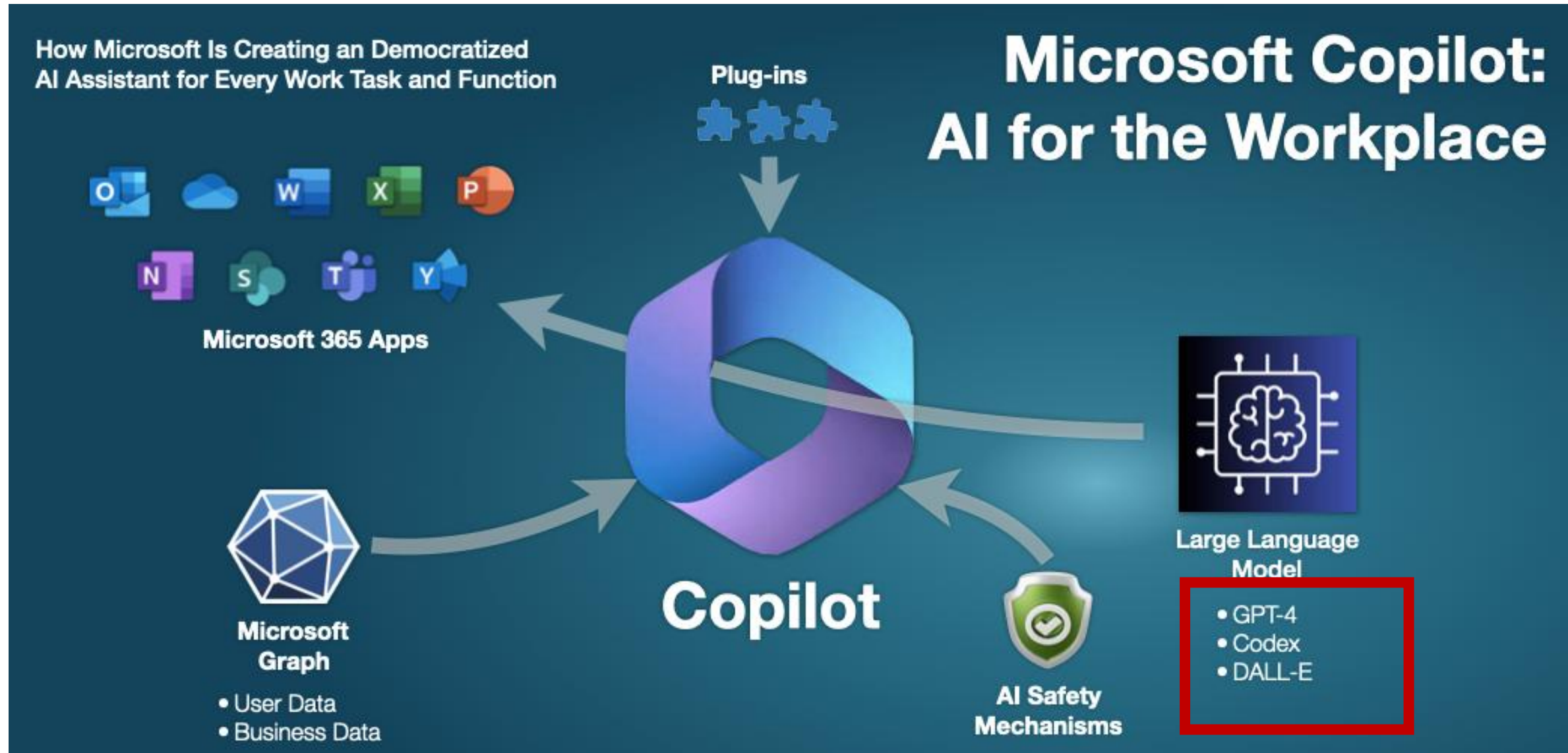
- Create a series of questions or evaluation criteria for conducting a “mock review” of the proposal

## Staying Up-to-Date

- Assist in synthesizing information from various funding agencies and keeping informed about updates.

# Soon Every Microsoft Product will have AI Built in

- Every researcher will be using Chat GPT4 to improve their proposals



# What would a sponsored research version of this look like?



GPTs are GPTs: An Early Look at the Labor Market Impact  
Potential of Large Language Models

Tyna Eloundou<sup>1</sup>, Sam Manning<sup>1,2</sup>, Pamela Mishkin\*<sup>1</sup>, and Daniel Rock<sup>3</sup>

<sup>1</sup>OpenAI

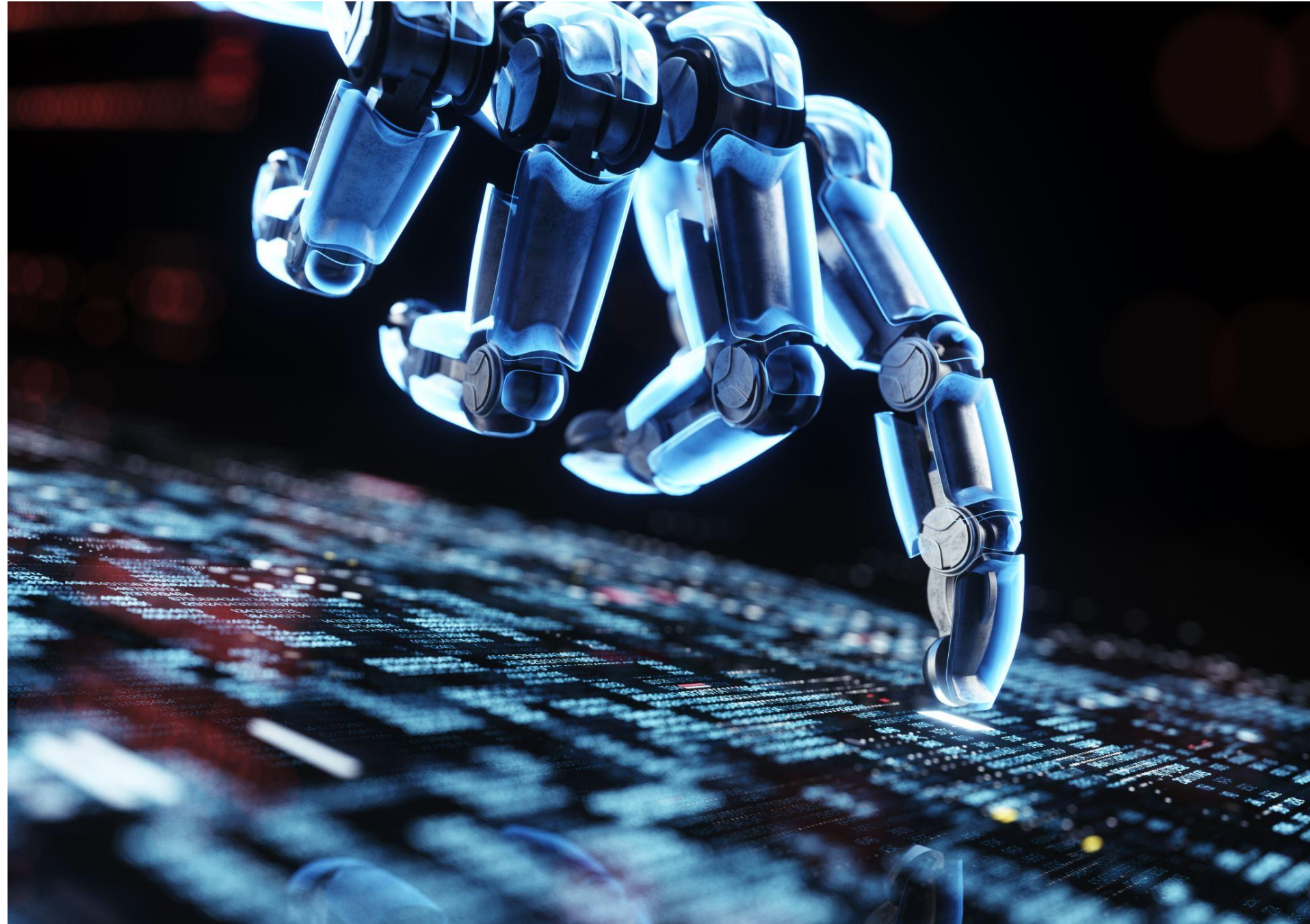
<sup>2</sup>OpenResearch

<sup>3</sup>University of Pennsylvania

March 27, 2023

# Just another Piece of Technology?

- NO!
- It is one of the biggest disrupters of our time due to the speed it is advancing.



# Just another Piece of Technology?



Not Leveraging AI

12 Months Ago



Leveraging AI (Now)  
Dial-Up Internet!

Today



Leveraging AI  
Fiber-optic internet speed

Near Future

# Open AI Research Study on Job Market

- 80% of the American workforce belonged to an occupation where at least 10% of their tasks can be done (or aided) by AI.
- One-fifth of the workforce belonged to an occupation where 50% of work tasks would be impacted by artificial intelligence.

WORKING PAPER

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## GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models

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# Study on AI Impact on US Workforce in the Near Future

WORKING PAPER

## GPTs are GPTs: An Early Look at the Labor Market Impact Potential of Large Language Models

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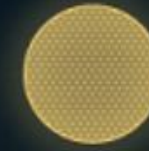
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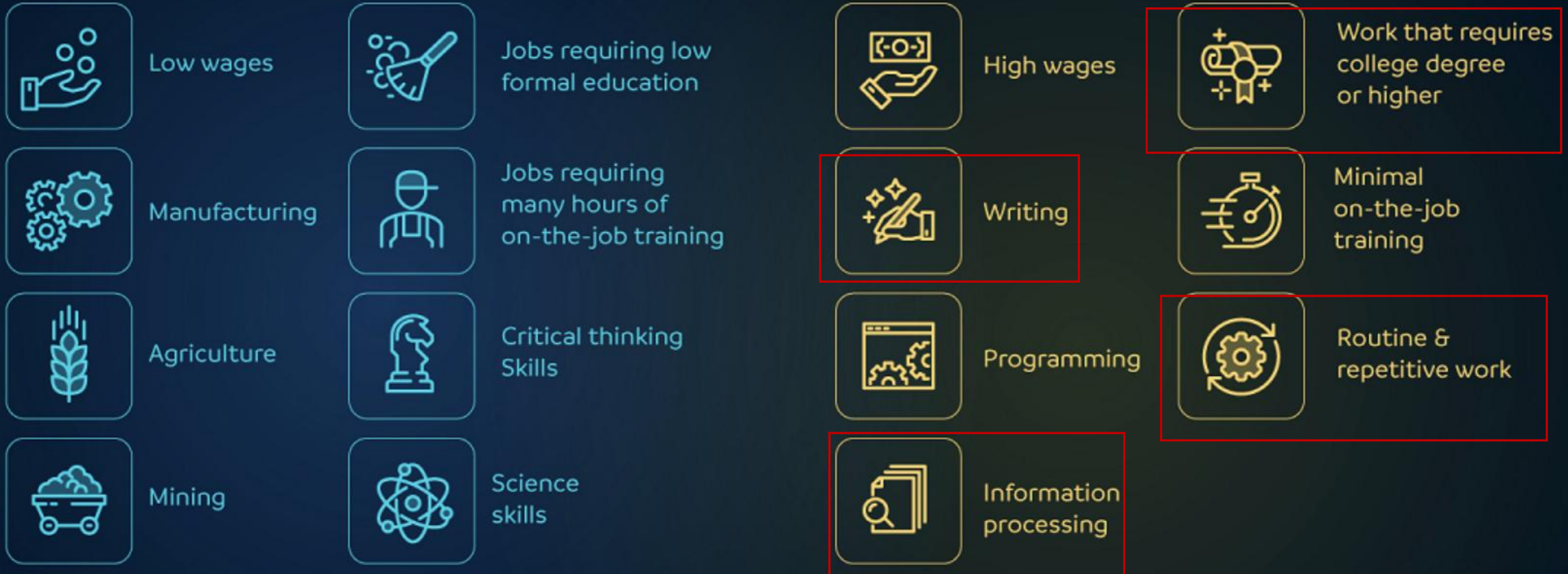
# What makes **your** job exposed to GPT?

Exposure: potential economic impact

● Low Exposure



High Exposure



High exposure means 50% or more of that job will be done, or aided by AI

# OpenAI's Recommendation for Government Focus



Prepare for  
economic  
disruption



Reform education  
policy



Reform worker  
training policy



Reform safety  
net programs

# Study Results on Job Market Impact of AI

- <https://www.visualcapitalist.com/cp/which-jobs-artificial-intelligence-gpt-impact/>

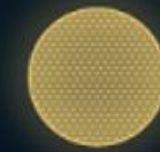


High expose means 50% or more of that job will be done, or aided by AI

# What **jobs** are exposed to GPT?

## ● Low Exposure

- Athletes
- Automotive Repairers
- Cement Masons
- Cooks
- Pile Driver Operators
- Stonemasons
- Tire Repairers and Changers
- Dishwashers
- Carpenter Helpers



## ● High Exposure

- Interpreters + Translators
- Survey Researchers
- Writers and Authors
- Public Relations Specialists
- Tax Preparers
- Mathematicians
- Blockchain Engineers
- Proofreaders and Copy Markers
- Accountants and Auditors

High exposure means 50% or more of that job will be done, or aided by AI

# Image Generation

- Karate Cat
- Spiderman as a pig
- Realistic, drawing, girl
- A female worker sat opposite an AI robot , both on a laptop
- Wide angled selfie surfboarding in space with a spacesuit



# Demo ChatGPT Prompt

I am attending a 2 day executive leadership summit on the role of AI and its impact on sponsored research. The audience will be senior leadership with basic knowledge of the topic, we want to have thought provoking questions that allow for in depth discussion

Write me a short story inspired from the movie “Hunger Games” except I want you to make it with a cat theme, replace humans with cats and use cat like names and references

I want to apply for a proposal to NSF I have a background an undergraduate in Astrophysics with a Ph.D. in Space science, I want to team up with a research from the field of educational statistic, what could we, with our combined skillsets be most suited for, and why?

[Real Proposal to play with](#)

[bunce\\_nsf\\_proposal\\_2011\\_rejected.pdf \(wordpress.com\)](#)

from here [Sample NSF Proposals | John Bunce \(wordpress.com\)](#)