

Introduction to AI for bioinformatics

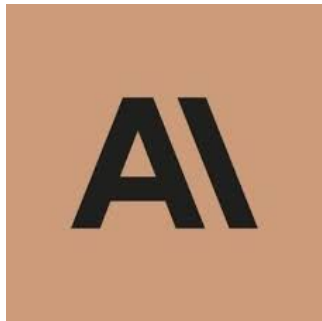
Phil Ashton, 20/05/24

My introduction to ChatGPT(3.5)



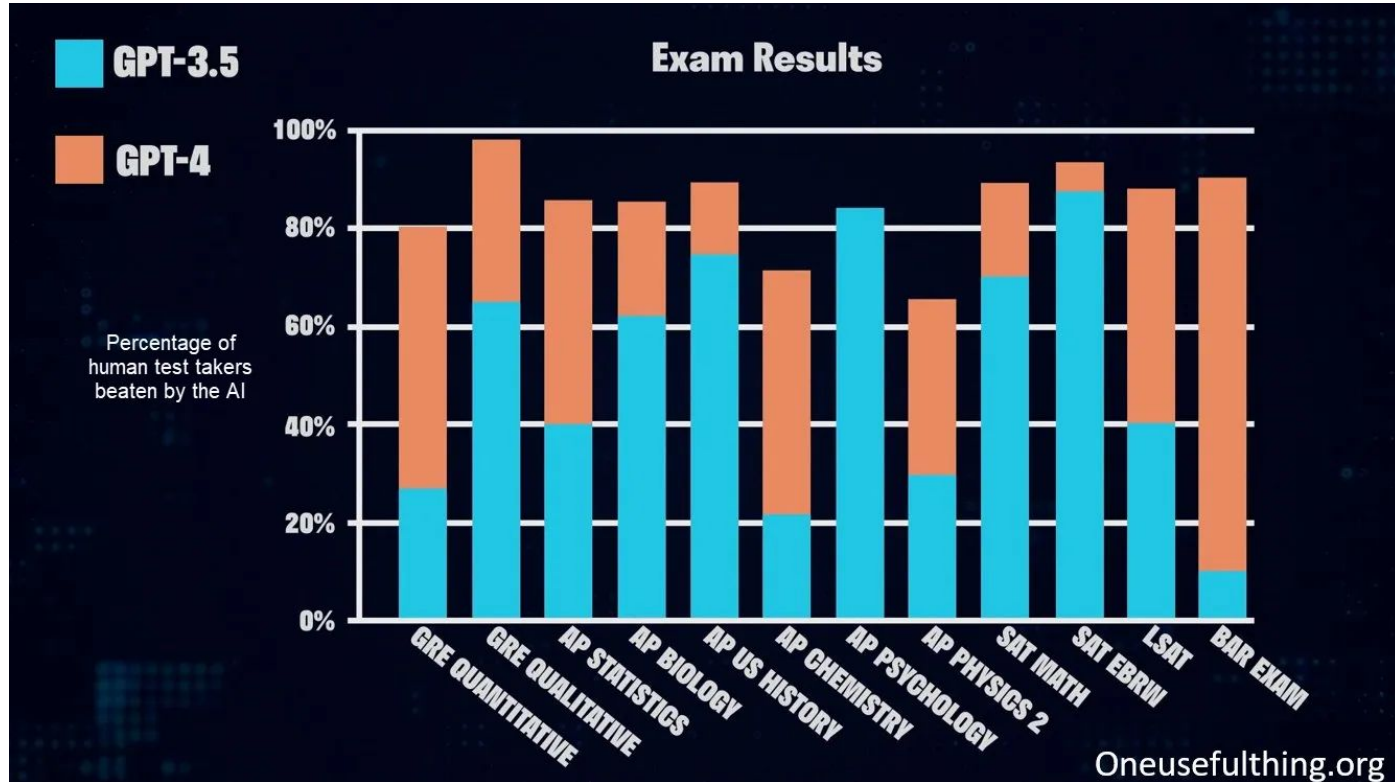
Companies, models, products

- Companies
 - OpenAI, Anthropic, Alphabet/Google
- Models
 - GPT-4, Claude 3 Opus, Gemini
- Products
 - ChatGPT, Claude, Bing Chat,



Alphabet

Difference between models



Options for access to GPT-4 without paying (much)

1. Bing chat, Creative

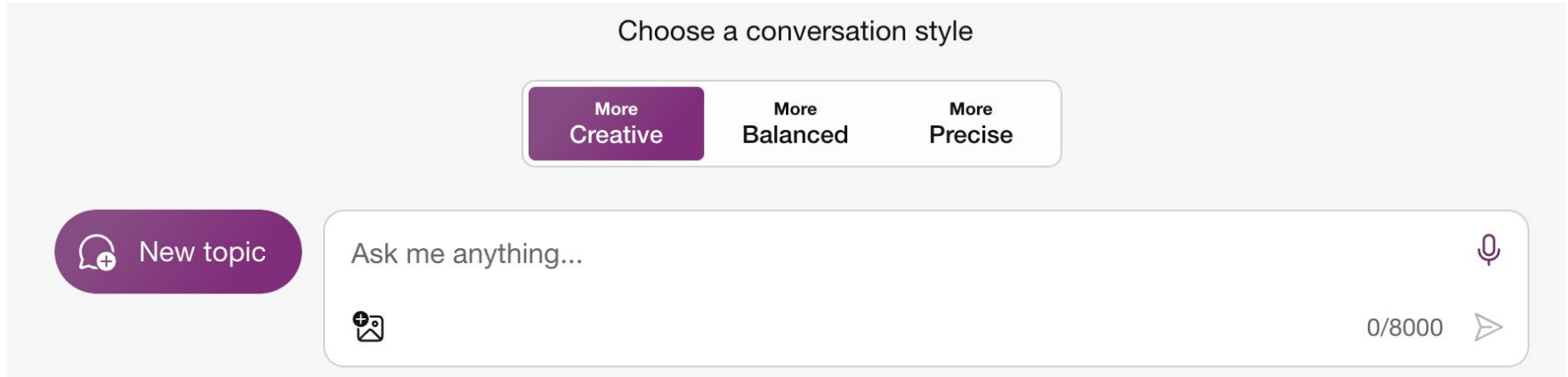
Choose a conversation style

More Creative More Balanced More Precise

New topic

Ask me anything...

0/8000

The image shows a screenshot of the Bing Chat interface. At the top, there's a header "Choose a conversation style" with three buttons: "More Creative" (highlighted in purple), "More Balanced", and "More Precise". Below this, on the left, is a purple button with a speech bubble icon and a plus sign, labeled "New topic". To the right of this is a large white input box with the placeholder text "Ask me anything...". Inside the input box, there's a small icon of a document with a plus sign. On the right side of the input box, there's a microphone icon and a character count "0/8000" next to a right-pointing arrow icon.

2. OpenAI - GPT4 API

AI capabilities

1. If you debate with an AI, they are 87% more likely to persuade you to their assigned viewpoint than if you debate with an average human.
2. GPT-4 helps people reappraise a difficult emotional situation better than 85% of humans.
3. GPT-4 generates startup ideas that outside judges find to be better than those of trained business school students.
4. 149 actors playing patients texted live with one of 20 primary care doctors or else Google's new medical LLM. The AI beat the primary care doctors as rated by “patients” and doctors.

AI techniques

- There are no magic words
- Give context - who are you, persona for AI, audience.
- Give examples to work from
- Chain of thought
 - “First, outline the results; then produce a draft; then revise the draft; finally, produced a polished output”

Things I use it for

- Copy editing
 - You are a
 - Make this more concise and impactful (ChatGPT)
 - Give me 5 ways of rephrasing this sentence
- Breaking writers block
- Coding.
- Teaching me.
- Github Copilot (in Visual Studio Code)
 - Auto complete on steroids.

Example of what it taught me

“Independent RFs were trained for each experiment, using a set of default regression hyperparameters from Breiman (73), on a repeated cross-validation approach with different random number generator (RNG) seeds. One hundred repetitions of threefold cross-validation (CV) with 10 different intra-fold RNG states each were used, for a total of 3000 experiments per input set.”

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10745691/>

Future perspectives

- Artificial training data
- Reaching out for info it doesn't know?
 - <https://www.newyorker.com/science/annals-of-artificial-intelligence/how-will-ai-learn-next>
- “Agents”

Discussion Questions

- Is AI a career opportunity or a career threat for people like us?
- What areas of bioinformatics could see the most significant transformation?
- What are the ethical considerations of using AI for bioinformatics?
- What are the risks of relying on AI for bioinformatics?
- What training or skills do bioinformaticians need to take advantage of the AI revolution?