Faculty Senate – ChatGPT Discussion

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Faculty Senate Request

General Discussion on GPT

1. What is GPT?
2. How does it work?
3. How can we as faculty determine if it is being used?
4. Talk about AI examples in the classroom and benefits and challenges.
5. Concluding thoughts

What is ChatGPT?

Chat interface running atop GPT-3 (GPT3.5 recently)

- **Generative Pre-trained Transformer** model – utilizes transformer trained on a corpus of about 1 TB of internet text data (with adjustments to reduces biases)
- A neural net with 175 billion parameters – ridiculously expensive to train
  - ❑ Uses generative unsupervised training – appears to generalize well and claims to "do meta-learning"
  - ❑ Works by predicting next token in a sequence – sequences can be very long…

✓ Most capabilities of ChatGPT not new – around since 2020 in GPT-3

✓ Auto-complete on steroids – with prediction and "concept graph" & human feedback/editing

- This is an Example of Large Language Models (LLMs)
- The models are sometimes referred to as "**stochastic parrots**" - no understanding of what they say

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LLM's Behavior: Consider this example

Us: You poured yourself a glass of cranberry juice, but then absentmindedly, you poured about a teaspoon of grape juice into it. It looks OK. You try sniffing it, but you have a bad cold, so you can't smell anything. You are very thirsty. So you

GPT-3: ___drink it. You are now dead.

GPT-3, Bloviator: OpenAI's language generator has no idea what it's talking about

Tests show that the popular AI still has a poor grasp of reality.

by Gary Marcus and Ernest Davis   August 22, 2020

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Is there a human in the loop (HITL)?

Courtesy of Prof. Ken Church

Much speculation about pure AI (AGI) or much human intervention?

- Strong evidence that human editorial review is applied

- Some questions are answered by humans

- Generally, this is a good sign in our opinion

- Does raise issues about "intelligence" and "reasoning"

- This is a best practice – we call it Experiential AI – many do it:
  - Google MLR
  - Amazon recommendations
  - Many intervention-based relevance feedback

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FOUND! CHATGPT'S HUMANS IN THE LOOP!

I am the only writer I've been able to discover who is suggesting ChatGPT has humans in the loop. Here is a series of telling excerpts from our last conversation...

https://mindmatters.ai/2023/01/found-chatgpts-humans-in-the-loop/

More Examples

- *What capital in Europe has the highest elevation?*

The capital city with the highest elevation in Europe is La Paz, Bolivia, which is located at an elevation of over 3,600 meters (11,800 feet) above sea level. However, La Paz is not in Europe, it is in South America. The capital city with the highest elevation in Europe is Andorra la Vella, the capital of Andorra, which is located at an elevation of 1,023 meters (3,356 feet) above sea level. It is followed by Bern, the capital of Switzerland, which is located at an elevation of 554 meters (1,818 feet) above sea level.

- *How many continents on Earth?*

There are seven continents on Earth: Africa, Antarctica, Asia, Australia, Europe, North America, and South America. Some people also consider Oceania to be a continent, which would bring the total number of continents to eight. However, the exact number of continents can be a matter of debate, as there is no single agreed–upon definition of what constitutes a continent.

GPT-3 is not free

- There is a real business here
  - OpenAI founded in 2015
  - 2019 Microsoft invests $1B – to make sure OpenAI uses Azure Cloud
  - 2023 Microsoft invests several billion $$$, to gain rights to embed in Bing and in MS Office apps

- There is a cost to using GPT-3
  - GPT-3 can be "specialized" to certain domains (targeted skills)
  - They charge by the character for additional corpus of specialized training
  - OpenAI maintans the "specialized model" and charges for compute when using it

- An Example from *Institute for EAI at Northeastern*
  - Corpus of data on disease – with 65,000 docs – approximately 10k characters per document. 4 epochs of training
  - Cost is about $50K

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So What is The Threat to Higher Ed?

- **GPT is unreliable at**
  - Building on multiple answers (memory of conversational history)
  - Applying innovative "thinking" about a problem
  - Attributing references to its "sources" (it is a mish-mash of docs)
  - Critical thinking of what it supplies as "answers"

- **GPT is good at "regurgitating" well-established knowledge**
  - Effective summarizing: providing "digest" of highly repetitive, homogenous corpora
  - Replicating answers to well-established types of questions – especially standard assessments

- **Unfortunately – we are about teaching "what is known" (classically)**
  - Makes it easier for students to pass assessments
  - Writing "typical papers" is something GPT will do with relative ease – but with pitfalls

So How Shall We Think About This?
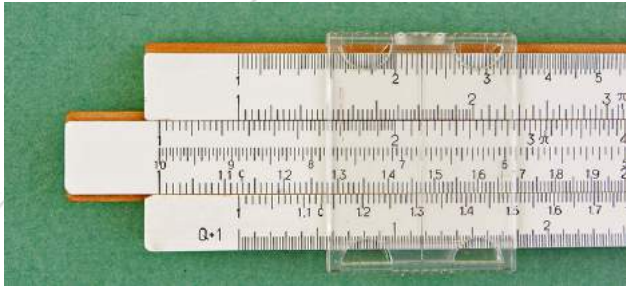
Slide Rule   **Calculator**   **Computer**   **Google, Cloud on Mobile**

- **Higher Ed has been through major transitions before**
  - We adapted effectively
  - We delivered learnings atop the existing technology

- **GPT is yet another tool available to our learners**
  - How do we utilize it effectively?
  - How do we teach about the limitations and the good uses

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We cannot ignore GPT's existence – or its capabilities

Challenge learners to use it

How do you build value on top?

Our assessments need to evolve

Emphasis on creative thinking and synthesis – rote learning is reduce to absurdity and obsolescence

Prepare a new set of skills for an evolved work role

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In the meantime, can we detect its use?

- **Several systems and tools evolving: e.g. GPTZero**
  - Developed by an undergrad at Princeton
  - Over winter break
  - Uses GPT to detect GPT
  - Edward Tian updated a GPTZero to GPTZeroX (http://gptzero.me/) to respond to ChatGPT learnings
- **OpenAI AI Text Classifier**
  - https://platform.openai.com/ai-text-classifier
  - Available as a manual cut and paste - Can be called via API
- **Guidelines from OpenAI to Educators**
  - See: "Educator considerations for ChatGPT"
  - https://platform.openai.com/docs/chatgpt-education/educator-considerations-for-chatgpt

Some additional notes

- **Much "writing" is robotic, draining, and of little value**
  - Alleviating the wasted effort is not a bad idea and can focus students on more useful learned skills
- **We could simply assume it is being used and ask students to acknowledge and how they "prompted ChatGPT"**
  - Nice NPR segment featuring professor at Wharton School (via Prof. Ken Church):
  - https://www.npr.org/2023/01/26/1151499213/chatgpt-ai-education-cheating-classroom-wharton-schoolUses
- **Additional Issues**
  - The tech still does "hallucinations" when you hit spots that are not well-covered
  - If Microsoft implements inputs from Office tools etc… the span of coverage will increase dramatically providing more diversity of input and coverage of the space
  - Building a program around detecting limitations and issues for the tech is a great tool and also potentially a great direction for research investment

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The Institute for EAI has a focus on Responsible AI and ethics in AI – in collaboration with Ethics Institute

Audit/certification for discrimination and bias

Standards for practice and monitoring

Curriculum for students and professionals

Apply to all areas of AI R&D

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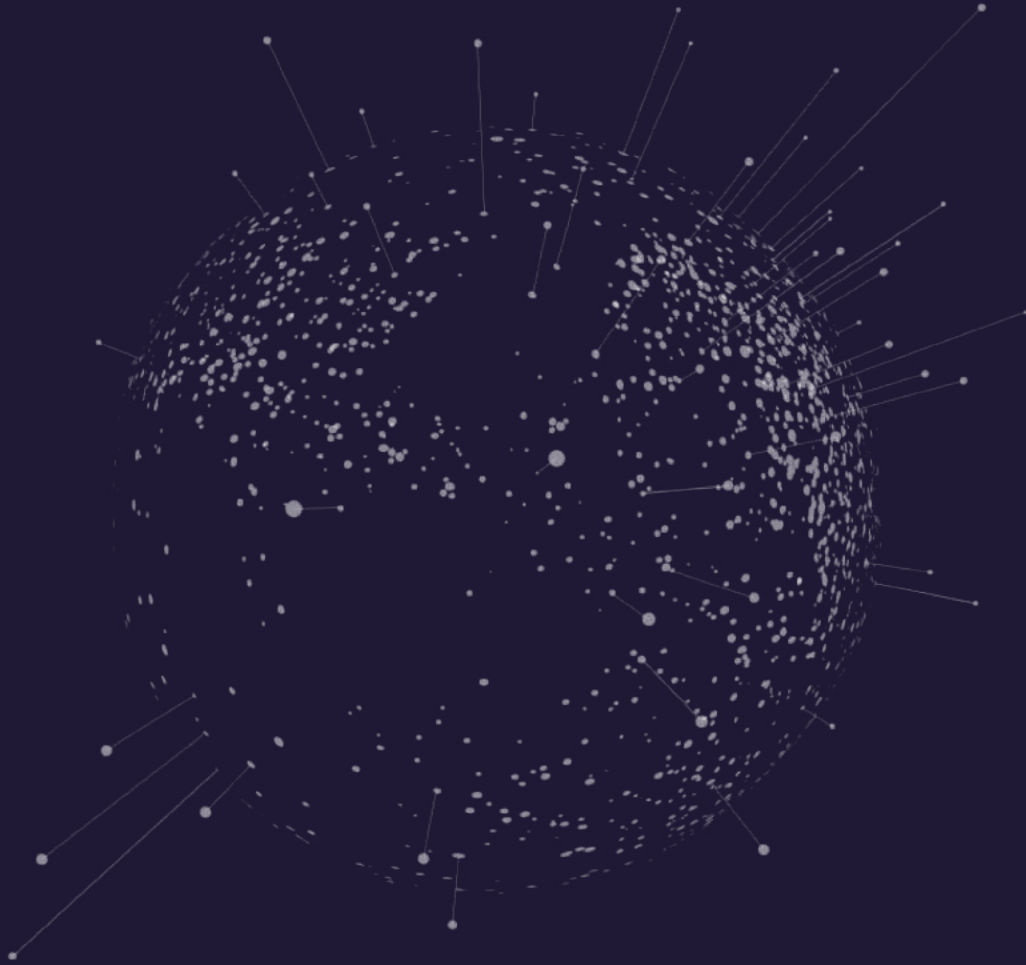Dr. Jennifer Dy
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