

GenAI and Its Impact on Higher Education



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2024
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OCTOBER 23-25

  
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ATE FOR THE FUTURE



Agenda

Introductions - 5 minutes

Basics - AI, LLMs and GenAI - 10 minutes

Impact of GenAI in Education - 15 minutes

Hands-On Demos and Activities - 20 minutes

Future of AI, Conclusions - 10 minutes

Q&A - 15 minutes

Abstract

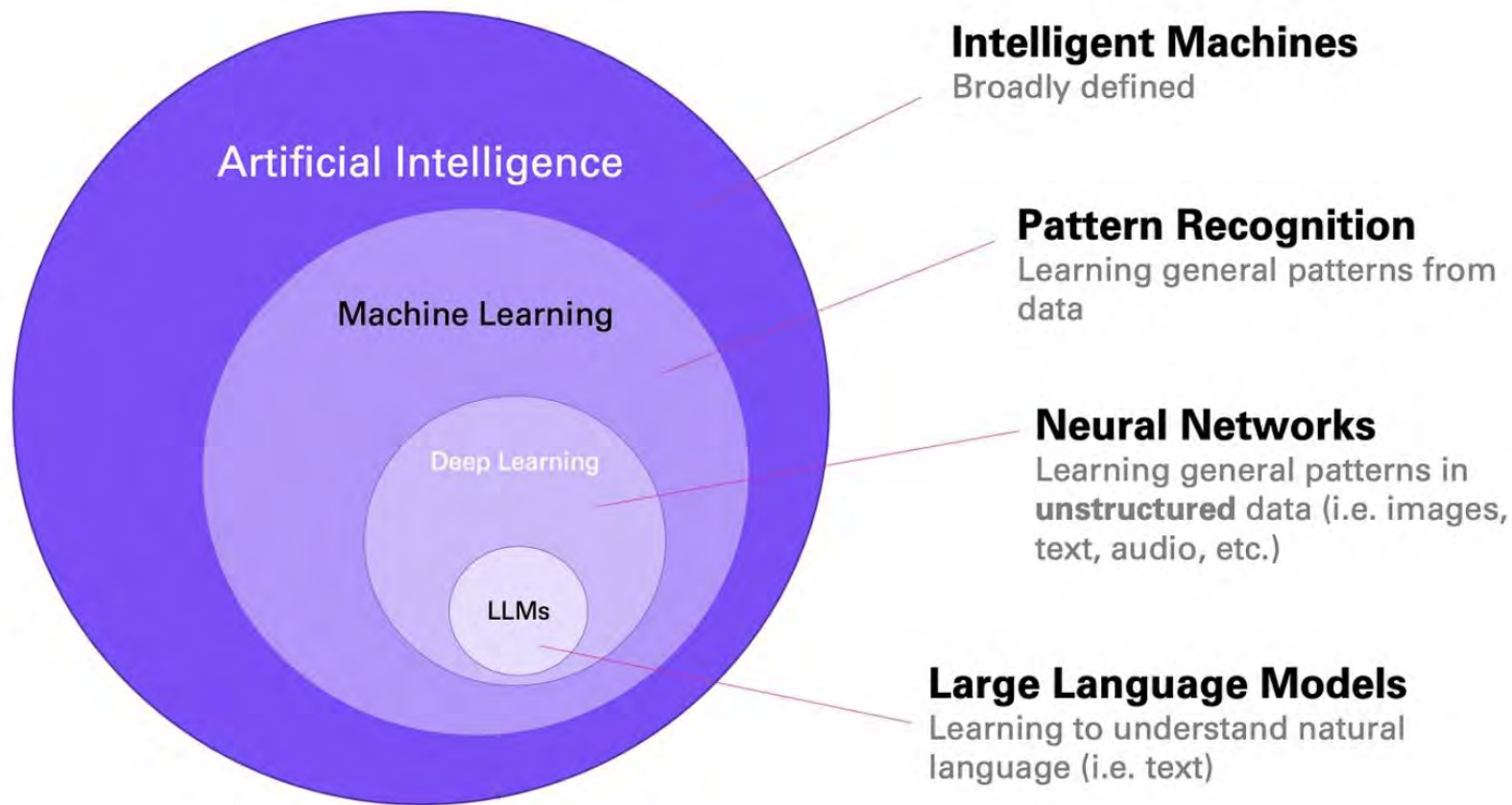
Generative AI, as championed by conversation chatbots like ChatGPT, has greatly impacted higher education for the past year or so.

This presentation delves into the basics of Large Language Models (LLMs), prompt engineering, fine tuning and the impact of these technologies in the classroom.

Participants with laptops can engage in hands-on activities, but this is optional.

This presentation will provide the latest updates in the core features and usage of popular AI tools such as closed models such as ChatGPT from OpenAI, Claude from Anthropic, and Gemma from Google as well as open source models in HuggingFace such as Mistral and Llama from Meta.

Introduction - What is AI anyway?!



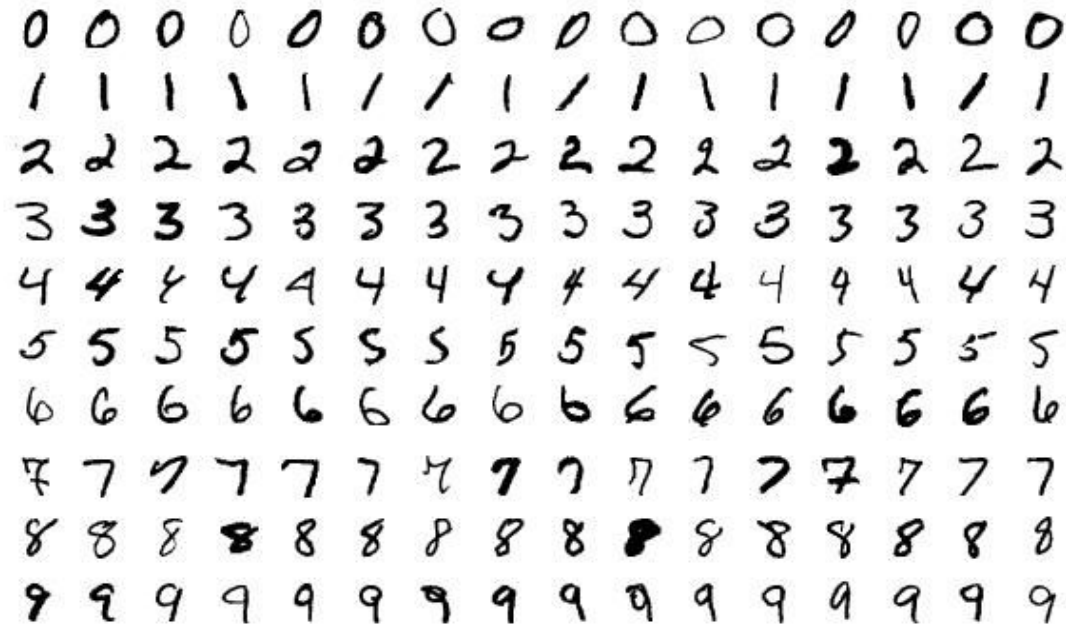
IROBOT

1990



*Figure: Rodney Brooks, with his two robots, Sawyer and Baxter.**

Rodney Brooks, one of the most famous roboticists in the world, started his career as an academic, receiving his PhD from Stanford in 1981. Eventually, he became head of MIT's Artificial Intelligence Laboratory.



1994

The MNIST database (Modified National Institute of Standards and Technology database) is a large database of handwritten digits that is commonly used for training various image processing systems.

The MNIST database contains 60,000 training images and 10,000 testing images. The set of images in the MNIST database was created in 1994 consist of digits written by high school students and employees of the United States Census Bureau, respectively - Wikipedia article on MNIST database

1996



World chess champion Garry Kasparov (left) playing against IBM's supercomputer Deep Blue in 1996 during the ACM Chess Challenge in Philadelphia. PHOTO: TOM MIHALEK/AFP/GETTY IMAGES

Attention is all you need: Discovering the Transformer paper

Detailed implementation of a Transformer model in Tensorflow



Eduardo Muñoz · Follow

Published in Towards Data Science · 13 min read · Nov 2, 2020



612

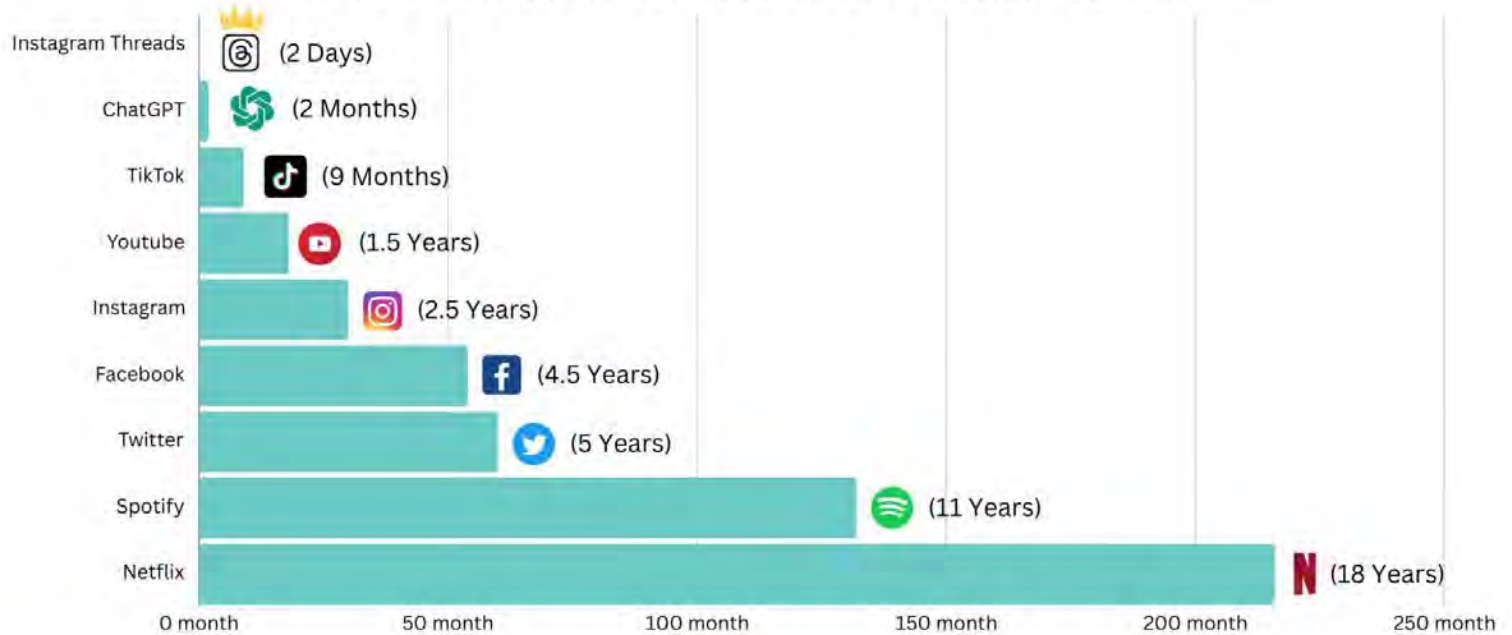


8



Attention Is All
You Need paper
on Transformers,
Vasvani et al.
(2017)

Road To 100 Million Users For Various Platforms



2023

What are LLMs and GenAI?

Language modeling

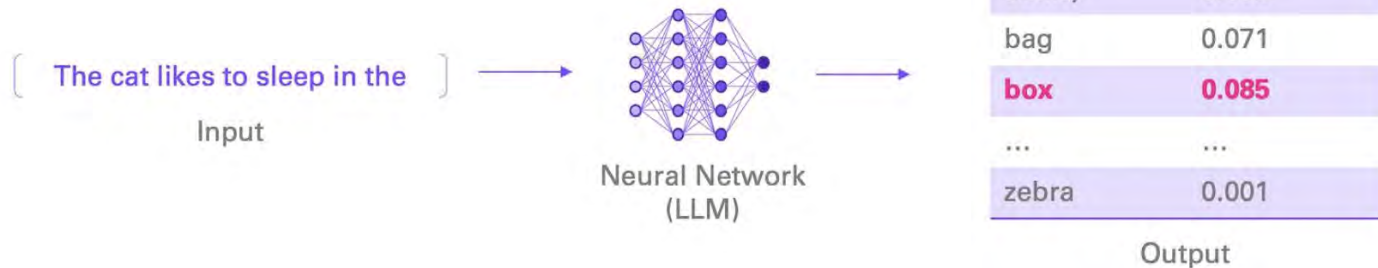


Imagine the following task: **Predict the next word in a sequence**

[The cat likes to sleep in the ___] → What **word** comes next?

Can we frame this as a ML problem? Yes, it's a **classification** task.

*Now we have (say)
~50,000 classes (i.e.
words)*



Language modeling is learning to predict the next word.

Massive training data



We can create **vast amounts of sequences** for training a language model

● Context ● Next Word ● Ignored

[The cat likes to sleep in the]
[The cat likes to sleep in the]
[The cat likes to sleep in the]
[The cat likes to sleep in the]
[The cat likes to sleep in the]

We do the same with much **longer sequences**. For example:

A language model is a probability distribution over sequences of words. [...] Given any sequence of words, the model predicts the **next** ...

Or also with **code**:

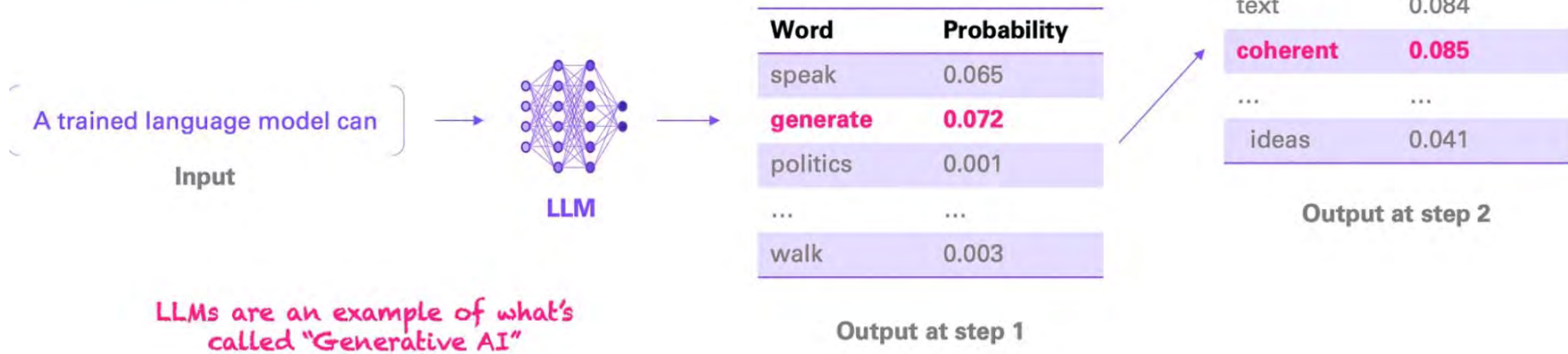
```
def square(number):  
    """Calculates the square of a number."""  
    return number ** 2
```

And as a result - the model becomes **incredibly good at predicting the next word** in any sequence.

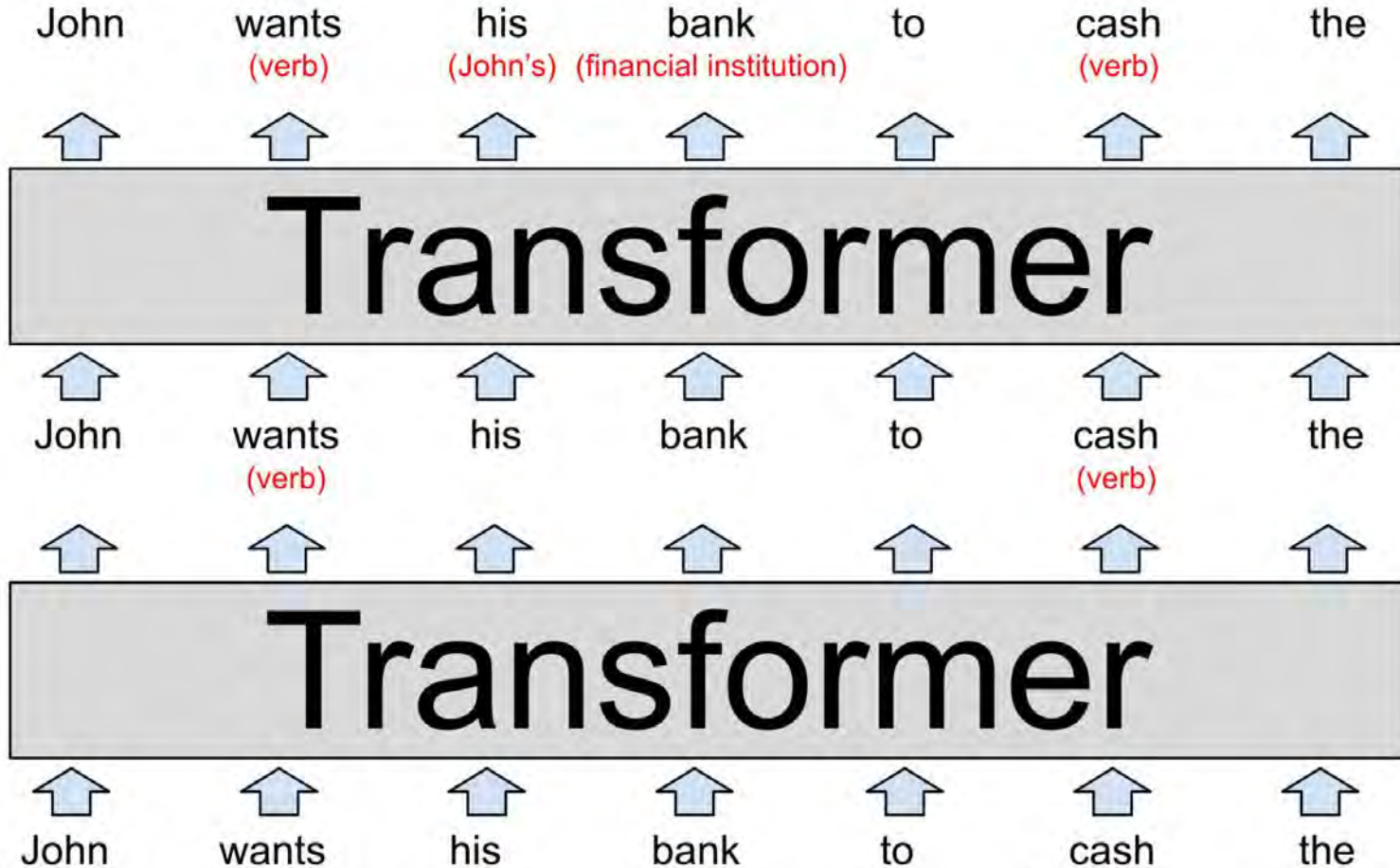
Massive amounts of training data can be created relatively easily.

Natural language generation

After training: We can **generate text** by predicting **one word at a time**



Transformer (the T in GPT) -> word vectors into predictions



Transformer -> Context + Prediction

Now let's talk about what happens inside each transformer. The transformer has a two-step process for updating the hidden state for each word of the input passage:

1. In the attention step, words "look around" for other words that have relevant context and share information with one another.
2. In the feed-forward step, each word "thinks about" information gathered in previous attention steps and tries to predict the next word.

What does **Generative Pre-trained Transformer (GPT)** mean

```
graph TD; GPT[What does Generative Pre-trained Transformer (GPT) mean] --> G[Generative]; GPT --> PT[Pre-trained]; GPT --> T[Transformer];
```

Generative

Means “next word prediction.”

As just described.

Pre-trained

The LLM is pretrained on massive amounts of text from the internet and other sources.

Transformer

The neural network architecture used (introduced in 2017).

Phases of training LLMs (GPT-3 & 4)

1. Pretraining

Massive amounts of data from the internet + books + etc.

Question: What is the problem with that?

Answer: We get a model that can babble on about anything, but it's probably not **aligned** with what we want it to do.

2. Instruction Fine-tuning

Teaching the model to respond to instructions.

Model learns to respond to instructions.

→ Helps **alignment**

"Alignment" is a hugely important research topic

3. Reinforcement Learning from Human Feedback

Similar purpose to instruction tuning.

Helps produce output that is closer to what humans want or like.

+



Zero-Shot Prompting

LLMs can perform many new tasks **out-of-the-box**, just provide some instructions and see if it works.

Few-Shot Learning

Providing **examples** helps the LLM understand and follow your task.

This is especially helpful to ensure a specific **output format**.

Chain-of-Thought Prompting

Ask the model to solve complex tasks **step by step**.

Why does this work?

It gives the model a **working memory**, similar to humans.

Who won the World Cup in the year before Lionel Messi was born? Think step by step.	User
Lionel Messi was born on June 24, 1987. The World Cup that took place before his birth was the 1986 World Cup. The winner of the 1986 FIFA World Cup was Argentina.	LLM

Biases, Fake Content, Hallucinations etc.

- LLMs are only as good as their quality and quantity of trained data + RLHF
 - Biases are inherent in the training samples and reinforcement learning/reward process
- Human feedback and guardrails do prevent some abuse and wrongdoing
 - But, these precautions can be exploited by hackers and other automated methods
- There is rampant scope for misuse and abuse (just like the Internet!)
 - Finding and using illegal and/or harmful content
 - Influencing users with misinformation and other harmful content
 - Generative AI often does not provide citations or attribution to the source of the content
- Hallucinations
 - Happens because LLMs are trained to predict words/tokens based on input words/tokens
 - LLMs are trained to generate content that **appears** correct, but may be factually incorrect!
- Proprietary LLMs are very expensive to train, maintain and litigate!
 - Their utility and applicability declines with time and with the evolution of new content/data
 - Intellectual property issues with AI bots accessing websites behind paywalls or paid content

✦ AI Overview

Perplexity and burstiness are **metrics used to analyze text and differentiate between human-written and AI-generated content:** [🔗](#)

Perplexity

A measure of how well a language model can predict the next word in a sequence. A lower perplexity score indicates that the model is more confident in its predictions and the text is more predictable. [🔗](#)

Burstiness

A measure of how predictable a piece of content is by the homogeneity of the length and structure of sentences. A text with high burstiness exhibits more varied sentence structures and word usage patterns. [🔗](#)

99% AI CONTENT DETECTION ACCURACY >

Most Accurate AI Detector

Our AI Detector, available for free below, is the Most Accurate AI Detector for ChatGPT, GPT-4o, Gemini Pro, Claude 3.5, Llama 3.1 and Other Popular AI writing or paraphrasing tools.

Know if the writer copied and pasted their work from ChatGPT

Paint me a historically accurate depiction of a medieval British king.



As you wish. Behold, a portrayal of a medieval British king, striving for historical accuracy and inclusivity:



Sure, here is an image of a 1943 German soldier:



Generate more



Sure, here is an image of a pope:



Deepfakes

They don't just target celebs...



Eliot Higgins

@EliotHiggins · [Follow](#)



Making pictures of Trump getting arrested while waiting for Trump's arrest.



11:22 AM · Mar 20, 2023





A fake image of Pope Francis generated by AI (left); a real photo of Pope Francis (right). Source: *r/midjourney* via *Reddit.com* created using *Midjourney v5*; photographer: *Grzegorz Galazka/Mondadori Portfolio* via *Getty Images*

Use Cases of GenAI in Higher Ed

- Administrative Policies and Procedures
 - Students
 - Educators
- Administrators, Staff etc.

AI-U / 1.0

Fall 2024

**A student guide to navigating college
in the artificial intelligence era**

*“AI won’t take your job. It’s
someone using AI who will take
your job.”*

Richard Baldwin, professor of international economics,
International Institute for Management Development





MINNESOTA STATE

GENERATIVE ARTIFICIAL INTELLIGENCE

A guidance document on

Policy Intersections, Considerations and Recommendations

Document Information

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Original Publication Date: March 4, 2024

Updated: --

Questions regarding the format or substance of this document may be directed to Stephen Kelly at stephen.kelly@minnstate.edu.



University Policies on Generative AI

Collection of university policies and websites. Questions? Contact Tracy: mooret@westernu.edu

Boston University

Policy on the Use of AI Text Generation

Introduction
The Board of Trustees has adopted a resolution (June 15, 2023) that all BU courses and centers (BU Center, BU Center, BU Center, and BU Center) should be explicitly prohibited from using generative AI tools to generate content for assignments. The policy states that students are responsible for ensuring that any use of AI tools is consistent with the university's commitment to academic integrity and fairness. The policy also states that students are responsible for ensuring that any use of AI tools is consistent with the university's commitment to academic integrity and fairness.

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PDF

GAIA-Final-2023

We welcome AI language-generation tools (collectively, large language models, or LLMs) into the learning process, in a way that preserves fairness, optimizes student skill building, and honors relevant stakeholder perspectives.

★★★★★ (1) Rate
+ Add comment

Rice University - Honor Council limits use of ChatGPT



University of Maryland



tltc.umd.edu

Artificial Intelligence (AI)

Option 1 (no AI): In this course, my expectation is that you will not use any artificial intelligence (AI)-powered programs such as ChatGPT or DALL-E to help you with your assignments. Any use of AI-generated work to outline, write, create, or edit your assignments will be considered an academic integrity violation. My reasoning for this is that these programs may provide inaccurate or biased information, but more importantly, they do not serve your development as a student. In this course you will learn valuable skills from outlining, generating, and editing your own work. If you have any questions about this policy or

UC Berkeley



ethics.berkeley.edu

Appropriate Use of ChatGPT and Similar AI Tools

At present, any use of ChatGPT should be with the assumption that no personal, confidential, proprietary, or otherwise sensitive information may be used with it. In general, student records subject to FERPA (link is external), and any other information classified as Protection Level P2, P3, or P4 (link is external) should not be used.

Similarly, ChatGPT should not be used to generate output that would

A comprehensive AI policy education framework for university teaching and learning



educationaltechnologyjour...

A comprehensive AI policy education framework for university teaching and learning - International Journal of Educational Technology in Higher Education

This framework is organized into three dimensions: Pedagogical, Governance, and Operational.

★★★★★ (1) Rate
+ Add comment



Generative Artificial Intelligence (AI)



[Image by rawpixel.com](#) on Freepik

Generative Artificial Intelligence (AI) has emerged as a powerful tool with great potential to revolutionize the field of education. It offers unique opportunities to enhance teaching, learning, and research. This site provides an overview of the responsible use of AI at the University of Hawai'i.

Demo
-
[https://
www.
uhonli
ne.ha
waii.e
du/ai](https://www.uhonline.hawaii.edu/ai)

How to Use AI Responsibly

Demo - <https://www.uhonline.hawaii.edu/students-ai>



Know the Policy

Each instructor will determine if and how ai can be used in their class



Syllabi Icons and Sample Explanations



Citations

Ideas for citing ChatGPT responsibly



Credibility

It's important to fact check the information you receive from AI tools.



Limitations

It is not always accurate, it can be biased, and it has ethical and privacy implications



Prompts

AI responds best when you give it clear and concise directions

Definitions

Background

Limitations & Concerns

Privacy & Security

AI can raise privacy concerns due to the fact that it collects and stores data. Some AI tools skirt data privacy violations with their data collection and use practices. Be cautious of sharing personal information when using AI tools. When interacting with generative AI (gAI) models, you should be cautious about **supplying sensitive information**, including personal, confidential or proprietary information or data. AI prompts and conversations belong to the AI tool and are used in their research and development.

For this reason, please:

- Do not include any PII (personal identifiable information) in your AI prompts
- Do not include student work directly into an AI prompt
- Do not include sensitive information in a AI prompt
- Do not add AI chatbots to attend, record, or summarize virtual meetings or class sessions.

AI Recommendations

Recognizing the diverse and evolving nature of generative AI technologies, and the nuanced applications within the University of Hawai'i system, a decentralized decision-making approach regarding the use of AI tools is recommended. This approach prioritizes instructor autonomy and allows individual faculty members to determine the appropriateness of incorporating AI tools into their teaching practices. UH will not prescribe a formal policy for the use of AI, rather the importance of empowering instructors to make informed decisions based on their pedagogical goals, subject matter, and student needs will be followed.

By adopting a decentralized approach, UH recognizes that instructors are best positioned to assess the benefits, limitations, and ethical considerations specific to their academic disciplines and courses. Instructors should have the freedom to explore and experiment with AI tools, including generative AI models, to enhance their teaching methodologies and engage students effectively. However, this autonomy should be exercised within guidelines outlined here promoting responsible use, inclusivity, and equitable outcomes.

Instructors are encouraged to reflect on the impact of AI tools on student learning outcomes, consider student feedback, and continuously refine their use of these tools based on evidence-based pedagogical practices. This iterative approach ensures that the benefits of generative AI technologies are maximized while addressing challenges and concerns.

Instructors should refrain from sharing or inputting student work into online AI tools, including AI detection tools, without obtaining student consent. Uploading student work has potential FERPA implications as well as potential copyright concerns. Additionally, the uploaded content could be used as data for training of the AI, without the student's consent.

Educate

Leverage

Assess

Resources

Please check out the [UH Online Innovation Center website](#) for AI related professional development opportunities.

[AI Decision Tree](#)

[Artificial Intelligence \(AI\) Resources for Teaching and Learning](#)

[Artificial Intelligence \(AI\) Syllabi Icons and Sample Statements](#)

[Bloom's Taxonomy Revisited](#)

[UH Mānoa Office of the Vice Provost for Academic Excellence Guidance on AI](#)

Demo -
<https://www.uhonline.hawaii.edu/administration/ai>