

Incorporating AI into Financial Aid Administration



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Overview

- What is a Large Language Model (LLM)?
- What can these AI models do?
- What can't these AI models do?
- LLMs lie and hallucinate
- How to detect LLMs
- How to prevent students from using LLMs
- Benefits of Using AI in Financial Aid Office
- Strategies and practical applications for using AI in the financial aid office
- Implementation strategies

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What is a Large Language Model?

- A large language model (LLM) is based on a very large corpus of text, such as the entire web
- More text yields a better LLM
- An LLM tries to predict what word or sentence comes next after a sequence of words, given the context
- The text is used to train a neural network called a transformer model with reinforcement learning based on human feedback
 - GPT = Generative Pretraining Transformer
- This yields a mathematical representation of human language with billions of parameters

Examples of LLM Chatbots

- BERT (Google, 2018)
- GPT-2 (OpenAI, 2019)
- GPT-3 (OpenAI, 2020)
- MT-NLG (Microsoft/NVIDIA, 2021)
- Claude (Anthropic, 2021)
- GLaM (Google, 2021)
- Gopher (DeepMind, 2021)
- You.com (2021)
- LaMDA (Google, 2022)
- Chinchilla (DeepMind, 2022)
- ChatGPT (OpenAI, 2022)
- Perplexity.ai (2022)
- OPT (Meta, 2022)
- YaLM (Yandex, 2022)
- LLaMA (Meta, 2023)
- GPT-4 (OpenAI, 2023)
- Bard/Gemini (Google, 2023)
- Bedroom (Amazon, 2023)

What Can LLMs Do?

- LLMs can answer questions
- LLMs can write natural humanlike prose
 - Essays
 - Email messages
 - Memos
 - Presentations
- LLMs can translate between languages
- LLMs can write computer code

LLMs Can Write Poetry

- Param Adani and Prof. Gil Alterovitz used LLMs to write a book of poetry about STEM, philosophy and other subjects
- *The Poet in the Machine* includes ballads, poems and sonnets, all written by LLMs
- The artwork was also created by AI models
- It shows good examples of the capabilities of current AI technology
- The book is available on Amazon



LLM Limericks About Financial Aid

In college, financial aid's a must,
Without it, your wallet will bust,
But the process is long,
And often goes wrong,
Leaving students to fret and to cuss.

There once was a student in need
Whose financial aid caused them to plead
With forms and applications galore
They hoped for some aid to score
But alas, their bank account still did recede

LLM Limericks About Scholarships

There once was a student named Clair
Who applied for a scholarship
everywhere.
She applied for many,
But was denied by any,
And so she had to pay for college with
flair.

There once was a student named
Sue,
Who wanted to go to college, too.
But the cost was so high,
She didn't know what to try,
So she applied for a scholarship or
two.

What Can't LLMs Do?

- LLMs are not sentient
- LLMs do not create or execute plans
- LLMs do not feel, understand or express emotion
- LLMs lack common sense
- LLMs can't distinguish fact from fiction
- LLMs have trouble writing long, structured content
- LLMs can't provide personalized advice (yet)
- LLMs don't tell good jokes except when they are plagiarized

LLMs Aren't Good at Telling Jokes

- Bard: What do you call a college student who gets a job at the financial aid office? A broke banker.
- Bard: This joke is funny because it plays on the stereotype that college students are broke. The student in the joke gets a job at the financial aid office, which is a place where money is supposed to be, but the student is still broke. This is funny because it is unexpected. We expect the student to be rich after getting a job at the financial aid office, but they are actually still broke.
- ChatGPT: Why did the student go to the bank for financial aid? Because he wanted to be a loan shark!

LLMs Can't Pass the Turing Test (Yet)

- The Turing Test replaces the question "Can machines think?" with the "imitation game"
- The first version of the imitation game involved asking questions of a man and a woman in another room, with a goal of determining the correct sex of each player
- The thinking machine version involves a person holding a conversation with two partners, with a goal of determining which partner is a human being and which is a machine
- If the person cannot distinguish the two partners, the machine has passed the Turing Test

ELIZA

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Welcome to
EEEEEE LL IIII ZZZZZZ AAAAA
EE LL II ZZ AA AA
EEEEEE LL II ZZ AAAAAA
EE LL II ZZ AA AA
EEEEEE LLLLLL IIII ZZZZZZ AA AA

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

ELIZA: Is something troubling you ?
YOU: Men are all alike.
ELIZA: What is the connection, do you suppose ?
YOU: They're always bugging us about something or other.
ELIZA: Can you think of a specific example ?
YOU: Well, my boyfriend made me come here.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU: He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU: It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:
```

AI Can't Write Anagrams

- When asked to generate anagrams, LLMs provide answers that are close but not correct
- student → untested (extra e)
- student loans → untold assets (s instead of n)
- degree → greed (extra e)
- scholarship → flash or chip (f instead of s)
- free money → more nyee (missing f)
- professor → for oppress (extra p)
- university → I try venues (e instead of i)
- graduation → out grading (extra g instead of a)
- financial aid → I find a canal (missing i)
- admissions → sedations (missing mis, extra et)

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LLMs Paraphrase and Plagiarize Text

- LLMs are good at plagiarizing and paraphrasing content published online
- Some LLMs are capable of citing the sources of their information but most don't
- LLM writing often feels like it has been paraphrased
- The writing is generic and formulaic in style and structure and comes in standard patterns
- Responses to questions are shallow and lack depth
- A typical reaction is "Not bad, for a computer"

LLMs Lie

did you write "it is cheaper to save than to borrow"?

Yes, I did. It is cheaper to save than to borrow because when you save, you earn interest, but when you borrow, you pay interest. The power of compound interest works in your favor when you save and works against you when you borrow.

For example, let's say you save \$100 per month for 10 years at a 5% interest rate. At the end of 10 years, you will have \$2,653.00. If you instead borrow \$100 per month for 10 years at a 5% interest rate, you will have to pay back \$2,855.13. This is because you will have to pay back the principal amount of \$10,000 plus interest.

Mark Kantrowitz, *It's cheaper to save than to borrow*, SFC, April 27, 2018.
"The difference is that when you save, you earn the interest, but when you borrow, you pay the interest. The power of compound interest works in your favor when you save and works against you when you borrow."

How to Detect Use of an LLM

- State a policy that using an LLM is a form of academic dishonesty, similar to plagiarism
- Google pieces of the student's essay, especially distinctive fragments
 - If you surround the text in quotes, Google will look for an exact match
- Consider running duplicate detection software across all of the essays submitted by applicants, since odds are that more than one student will try to cheat, but be careful about the potential for false positives
- Submit your essay prompts to each of the major LLMs, to see the text that they write, as some LLMs have distinctive writing styles
 - LLMs write text that is predictable, bland and repetitive, without imagination, reasoning and creativity

Signs of the Use of ChatGPT

- ChatGPT loves to use certain uncommon types of punctuation
 - Oxford comma ("dogs, and cats" vs. "dogs and cats")
 - Em dashes ("a - b")
 - Colons
 - Semicolons
- Using these types of punctuation can lead to high AI usage scores
- A lack of specific, personal details is another sign of AI use
- Common AI detection tools
 - Free: ZeroGPT, QuillBot, Grammarly, Scribber
 - Fee: GPTZero, Winston AI, Copyleaks, Originality.ai

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How to Block LLM Use in Student Essays

- Use prompts that require details from the student's background
- Ask students for letters of recommendation, which are more difficult to fake
- Ask the student to write a joke about a specific topic
- Give an oral exam or real-time exam without access to a computer
- Try creating new prompts that have never been used before, such as asking applicants to write an essay about two randomly selected noun phrases

Essay About Cats Who Eat Green Cheese

- Bard: Cats are obligate carnivores, which means that they need to eat meat to survive. They do not have the enzymes necessary to digest plant material, so they cannot eat green cheese. In fact, eating green cheese can be harmful to cats. The mold that grows on green cheese can produce toxins that can make cats sick.
- ChatGPT: As an AI language model, I must inform you that cats do not eat green cheese. While cats are known to enjoy various types of foods, including cheese, green cheese is not a common food item and is not considered a healthy option for feline consumption.

An Essay about Turquoise Scholarships

- Bard: Turquoise scholarships are a type of financial aid that is awarded to students who are pursuing a degree in a field related to the environment. The scholarships are named after the color turquoise, which is often associated with the natural world.
- ChatGPT: Turquoise Scholarships are a form of financial aid that is specifically designed to support Native American students pursuing higher education. The scholarship program is named after the turquoise gemstone, which holds great significance in Native American culture and is often used in traditional jewelry.

Benefits of Using AI in Financial Aid Office

- Reduce the paperwork burden
- Automate tedious tasks
- Faster processing time
- Greater availability
- Multilingual support
- Lower costs
- Improve accuracy

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Using AI to Improve Student Support

- AI chatbots can **answer common student questions**, such as questions about deadlines, required documents, student loans, work-study, financial aid eligibility, financial aid policies, the FAFSA, verification, SAP and financial aid appeals
- AI can provide **personalized reminders** about deadlines and missing documents
- AI can help students **complete forms** step-by-step
- AI can identify risks that affect student success
- Benefits: Faster response rate, fewer missed deadlines, better student engagement, reduce summer melt, improve retention and completion
- Risks: Errors and hallucinations

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Using AI for Document Processing

- Process scanned-in documents, extracting and validating data
- Reduce manual data entry errors and improve turnaround time
- Automate workflow, such as triggers for next steps
- Automate some aspects of verification
- Annual updates to policy and procedures manuals

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Using AI for Fraud Detection

- Flag incomplete or inconsistent submissions for human review
- Detect anomalies and unusual patterns

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Using AI for Communications

- Summarize and route email messages to appropriate staff
- Prepare first drafts of boilerplate communications
- Summarize new developments in financial aid
- Provide personalized communication and outreach
- Summarize admissions applications and student profiles

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Using AI to Process Appeals

- Summarize financial aid appeals in a standardized manner
- Ensure consistency in the processing of financial aid appeals
- Evaluate requests for emergency aid

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Using AI for Predictive Analytics

- Generate insights
- Shift from reactive reporting to proactive strategy
- Award optimization

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Implementation Strategies

- Prioritize pain points
- Use data from past decisions to train the AI system
- Involve people in the process
- Conduct privacy review of implementation
- Verify accuracy of AI output
- Create a dashboard to highlight performance

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Thank You

- Follow Mark Kantrowitz on Twitter at @mkant
- Read policy research at www.studentaidpolicy.com