



TUFTS UNIVERSITY
DECEMBER 2023
TEACHING SYMPOSIUM

THE IMPACT OF
ARTIFICIAL
INTELLIGENCE ON
EDUCATION AT TUFTS

This event is supported by a grant from the Davis Educational Foundation established by Stanton and Elizabeth Davis after Mr. Davis' retirement as chairman of Shaw's Supermarkets, Inc.

TODAY'S SCHEDULE

Keynote Address (JCC 270) 9:30 am
Cynthia J. Alby, Georgia College
Sparking Curiosity: Transforming Teaching & Learning with AI



Break & Student poster viewing (JCC 280) 11:00 am

Video: Tufts Student Perspectives on AI 11:15 am

Faculty Panel 11:20 am



Lunch & Student poster viewing (JCC 280) 12:20 pm

Interactive Sessions 1-2 pm

Discussion with Dr Cynthia Alby (JCC 280)

Learning Lab – Play Space with AI (JCC 265)



JOIN A CONVERSATION TODAY



- If you were to describe your experience with AI in education using a book, movie or song title, what would it be?
- Share a question you've asked Generative AI (one unrelated to your professional life!)
- What is a hope you have for the future of AI in teaching & learning at Tufts?
- Share a quote from today that resonated with you.



TUFTS AI LEARNING COMMUNITY

STAFF SUPPORTING FACULTY & STUDENTS, LEARNING & TEACHING

Tufts
EDUCATIONAL
TECHNOLOGY
SERVICES

Experimental College

AS&E STUDENTS

Arts and Sciences, Engineering,
SMFA at Tufts

Community Standards

Tufts
UNIVERSITY

School of Dental Medicine



StAAR Center

Tufts

Technology
Services

TischLibrary

Tufts

Center for the
Enhancement of
Learning & Teaching

Tufts

School of
Medicine

Educational Affairs

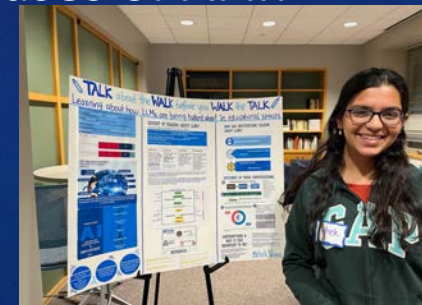
https://www.zotero.org/groups/2268491/celt_articles

FALL 2023 AI @ TUFTS

- **Workshops:** DON'T PANIC - The Hitchhiker's Guide to AI this fall, ETS's Introduction to AI: Understanding & Using AI in Your Course, ETS's AI & Assessments & Round 2, MedEd
- **Roundtables:** AI & Ethics, STEM Courses, Humanities & Writing Focused Courses, Teaching Graduate and Professional Students, How is AI impacting those of us teaching large lectures?
- **Panel: Student Perspectives on AI**
- **Speaker:** Mona Sloane, "AI & the Student Experience" organized by Tufts Student Life
- **Learning communities:** staff, COLT "souped up AI"&"A picture I worth 1000 words"
 - Sign up Now for this spring - [Teaching with AI Learning](#)
- **Conversations in faculty meetings, departments & 1-1**
- **Online Resources:** CELT, TTS Guidelines for use of Generative AI, ETS teaching guide, Libraries resource guide, Teaching@Tufts articles
- **Students & faculty experimenting with & reflecting on uses of AI in courses across the curriculum**

Student Posters in Room 280

<https://provost.tufts.edu/celt/events/fall-2023-ai-series/>



Who is here today

Arts & Sciences & SMFA	36
Engineering	12
TUSM	32
Dental	10
Nutrition	7
Fletcher	5
Vet	5
TTS, Libraries & Staff	23
Students	3

How we are participating

In Person	76
Zoom	56





ARTIFICIAL INTELLIGENCE,
LEARNING SCIENCES AND
TUFTS EDUCATION

Cidgem Talgar

Vice Provost for Education

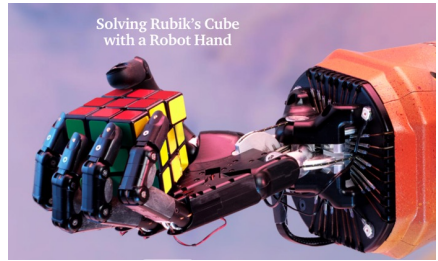
Evolution of Large Language Models



OpenAI is an AI research and deployment company. Our mission is to ensure that artificial general intelligence benefits all of humanity.



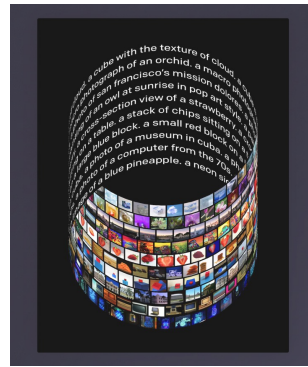
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Solving Rubik's Cube with a Robot Hand
Neural networks trained to solve the Rubik's Cube with a human-like robot hand.

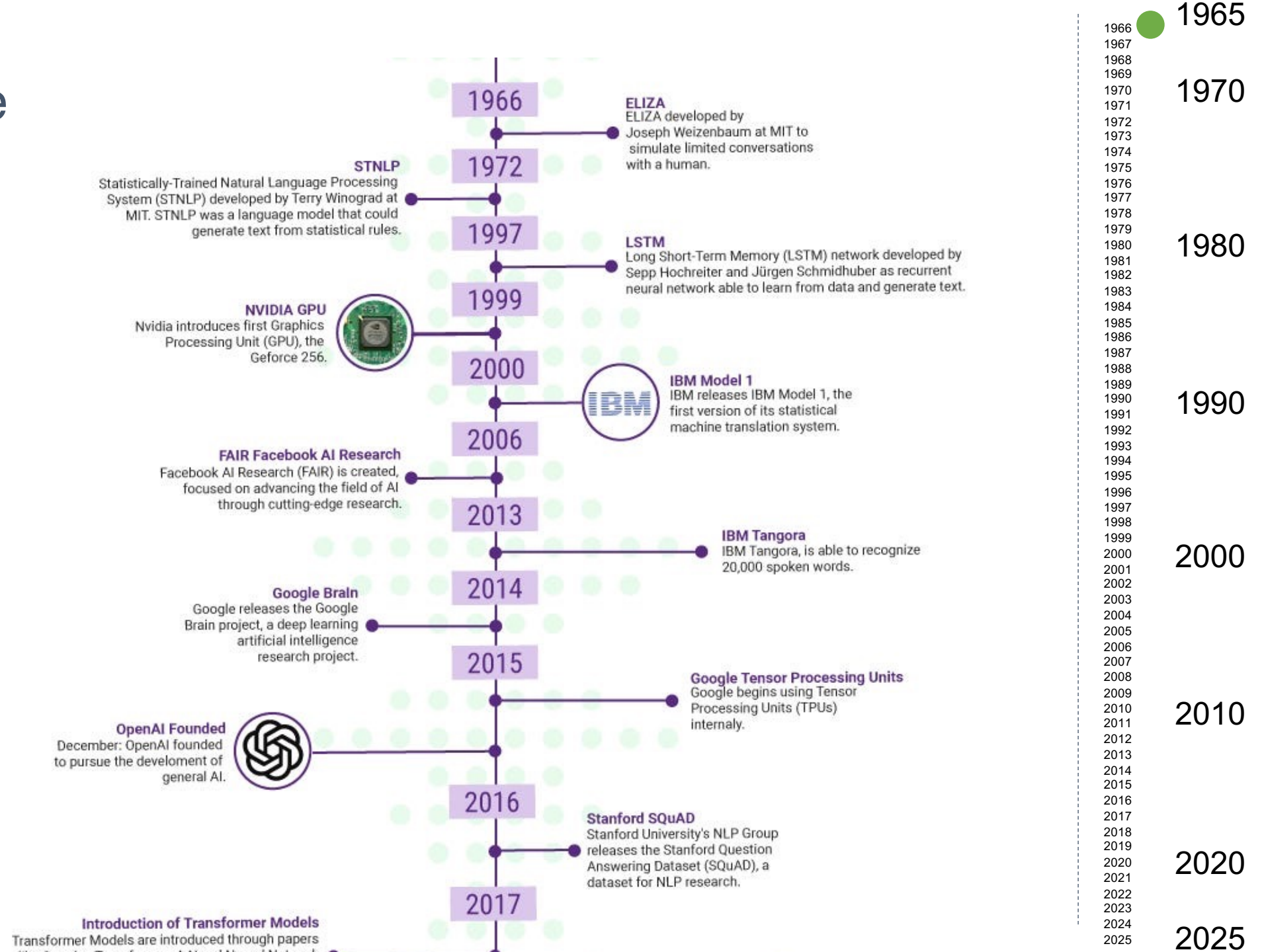


Neural network that generates music

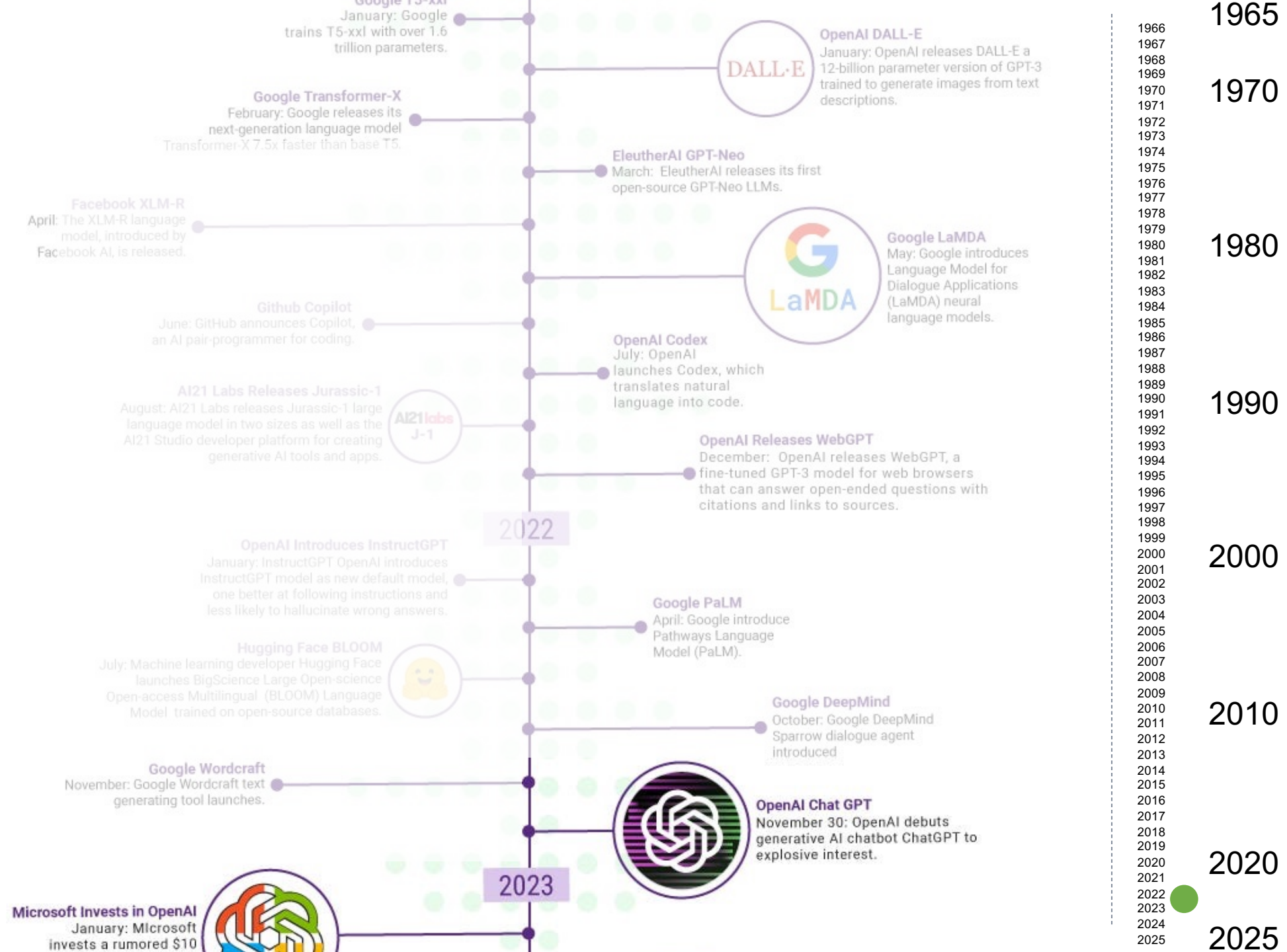


Neural network that generates images from any text

Evolution of Large Language Models

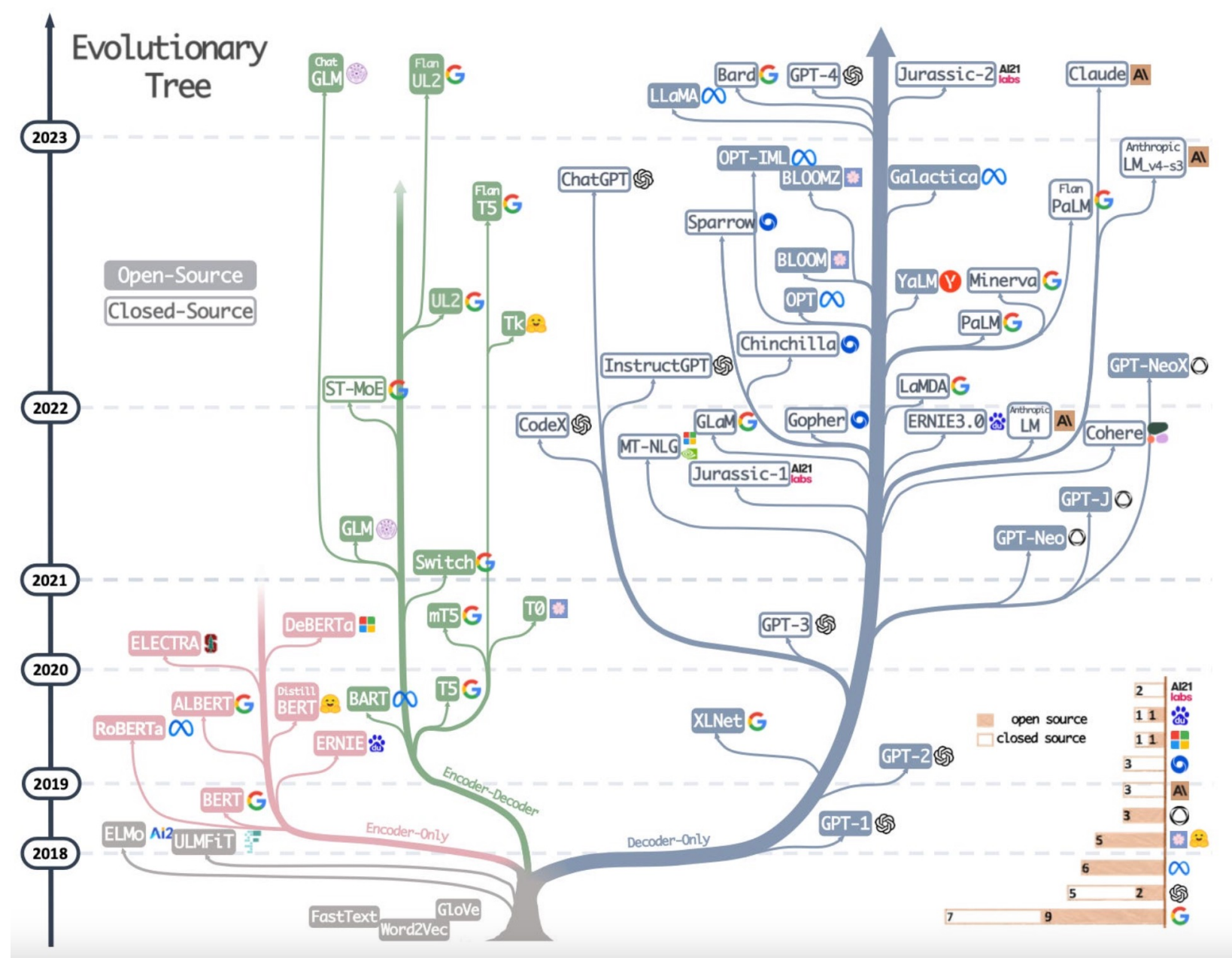


Evolution of Large Language Models



<https://synthedia.substack.com/p/a-timeline-of-large-language->

Evolution of Large Language Models



The evolutionary tree of modern LLMs via <https://arxiv.org/abs/2304.13712>.

Disruption Across Industries

CUSTOMER SERVICE

Real-time support with automated responses to human inquiries

E-COMMERCE

Provide product recommendations and support for online shoppers

TRANSPORTATION

Provide real-time traffic updates and navigation assistance

LEGAL SERVICES

Provide legal advice, document generation, and research support

CONTENT CREATION

Generate articles, summaries, & other forms of content (e.g. journalism)

Information & Research

Communication & language

Personal & Professional Dev

Technical Skills

Planning and Problem Solving

HEALTHCARE

Provide health information, advice, and support for patients

MARKETING

Generate marketing campaigns and product descriptions

FINANCE

Provide financial advice, portfolio management, and investment recommendations


GAMING


Generate interactive storylines and provide in-game assistance

EDUCATION

Personalized learning experiences, tutoring, and administrative support in the education sector


APPLICATION TO COLLEGE

 Assistance with writing college applications

 Assistance for international students



APPLICATION TO COLLEGE


 Assistance with writing college applications


 Assistance for international students




LEARNER JOURNEY

 **Personalized Learning**
answering their questions in real-time and providing feedback


 **Student Support**
offering tutoring, early-counseling, direction to resources

 **Educational content generation**
summaries, study materials, and question-answer sets


Research Support
generating reports and summaries, and conducting data analysis.

 **Language Acquisition**
learn a language by providing real-life conversations & translations

Administrative Support
grading and record keeping, to increase efficiency and reduce workload

 **Accessibility**
providing voice-enabled interfaces and translation services

APPLICATION TO COLLEGE


 Assistance with writing college applications


 Assistance for international students




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POST-GRADUATION (LIFELONG LEARNING)

 Life Design
Seeking meaningful pathways for impact

 Navigating future learning needs
Understanding new skills one needs, finding learning opportunities



APPLICATION

- DEIJ Assistance with writing college applications
- DEIJ Assistance for international students



LEARNER JOURNEY

- DEIJ Personalized Learning answering their questions in real-time and providing feedback
- DEIJ Student Support offering tutoring, early-counseling, direction to resources
- DEIJ Educational content generation summaries, study materials, and question-answer sets
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- DEIJ Accessibility providing voice-enabled interfaces and translation services

POST-GRADUATION (LIFELONG LEARNING)

- DEIJ Life Design Seeking meaningful pathways for impact
- DEIJ Navigating future learning needs Understanding new skills one needs, finding learning opportunities



Implications for Higher Education

RAPIDLY CHANGING LEARNING ENVIRONMENT

Opportunity to build more effective and impactful learning environments based on the learning sciences

Concerns about ethical use of information and the validity of that information

Curiosity around the role of higher education

INCREASED HUMAN-ROBOT INTERACTIONS

Integration of AI into university experience (curriculum, co-curriculum) so students can build cross-cutting hybrid integrative skillset

INCREASED SPEED & ABUNDANCE OF INFORMATION

SUPPORTING OUR STUDENTS as they navigate over-information by providing structure and opportunities to BUILD KEY SKILLS IN INFORMATION LITERACY

BIAS

ALGORITHMIC BIAS

The algorithms used by ChatGPT can perpetuate existing biases in society, such as gender and racial biases, if they are not properly designed and tested.

DATA BIAS

ChatGPT is trained on large amounts of text **data**, which may contain **biases and stereotypes**. This can result in the generation of biased responses

DEMOGRAPHIC BIAS

ChatGPT's training data may not be representative of diverse demographics, leading to biases based on race, gender, and cultural background

CONTEXTUAL BIAS

ChatGPT may generate responses that are biased towards certain perspectives or opinions based on the context in which it is used.

CONCEPTUAL BIAS

ChatGPT may exhibit biases towards certain concepts, such as political beliefs, that are prevalent in its training data.

REAL-WORLD BIAS

ChatGPT's performance may be impacted by real-world biases and limitations, such as the availability of diverse training data.

PREJUDICED LANGUAGE

ChatGPT may generate responses that contain prejudiced language or expressions, which can be harmful to individuals and groups.

NEXT STEPS @ TUFTS

- 1) Evolving teaching practice based on learning science
- 2) Reimagining outcomes to better prepare learners
- 3) Advancing the institutions impact across learning environments

FACILITATING ADOPTION & INTEGRATION

CONCERN OVER ADOPTION

INDIVIDUAL LEVEL

CREATING SPACE FOR INNOVATION

COMING ALONGSIDE FACULTY & STUDENTS

CREATING A NETWORK OF INNOVATION

COMMUNITY BASED LEARNING

BUILDING COMPETENCY FRAMEWORKS

ACADEMIC INTEGRITY

INSTITUTIONAL LEVEL

BUILD INNOVATIVE PROGRAMS

CONVERSATIONS AROUND PROGRAMMATIC OUTCOMES

BUILDING DATA INFRASTRUCTURE

DATA GOVERNANCE AND GUIDELINES AROUND ETHICAL USE OF INFORMATION



SPARKING CURIOSITY: TRANSFORMING TEACHING & LEARNING WITH AI

Keynote Address by Cynthia J. Alby,
Georgia College

Many of us are feeling overwhelmed on multiple fronts. What if we can change the narrative of AI from a burden to a path to re-enchanting teaching and learning for both you and your students? With AI's advanced algorithms and adaptive tools, we can tailor educational experiences to enhance learning outcomes and student engagement like never before. AI offers nearly limitless opportunities for co-exploration, higher order thinking, active learning, and engagement. In this session, I will show you how AI can make it possible to easily incorporate more case studies, examples, games, and simulations (all evidence based strategies for deep learning) tailored to your content and your students. Discover how it can support learning for all students, but especially English language learners and students with special needs. In this presentation, I'll share how I've used AI successfully myself and how others are using it to reinvigorate their courses. Get ready to enjoy AI.

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VIDEO – STUDENT PERSPECTIVES ON AI

PANEL - STUDENT PERSPECTIVES ON AI

**Tufts Student Perspectives on AI:
Excerpts from student panel, November 2023**

PANEL – FACULTY PERSPECTIVES ON AI

Meera Gatlin, Public Health and Community
Medicine

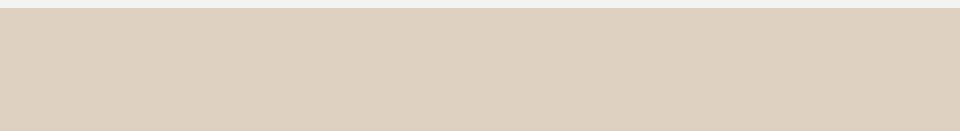
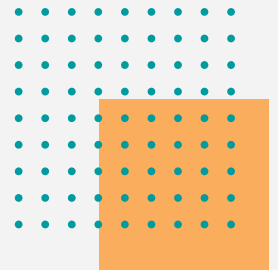
Rebecca Shakespeare, Urban &
Environmental Policy & Planning

Erica Kemmerling, Mechanical Engineering



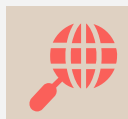
AI and Active Learning in Veterinary Public Health

Meera Gatlin DVM, MPH, Dipl. ACVPM
Cummings School of Veterinary Medicine at Tufts University



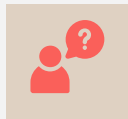


DVM/MPH Integration Seminars (Fall 2023)



1. Current Events

Current Events Exploratorium



2. Disease Eradication

Think-Pair-Share



3. Government 101

Concept Mapping



4. Journal Club (AMR)

The Socratic Opponent

Usage of AI was always optional/low stakes and we used either ChatGPT (free) or Anthropic Claude (free)





Themes and Lessons Learned



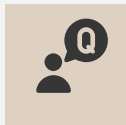
Usage

Graduate student use of and comfort with AI



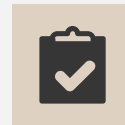
Spectrum of Learning

Conceptual understanding to critical thinking



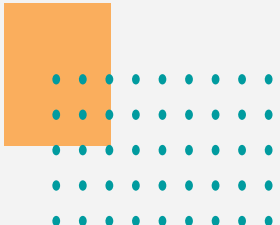
Value of Prompts

Human-derived so GIGO & Recognizing AI limitations



How to use AI?

Cautious incorporation & Transparent attribution

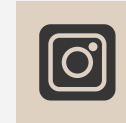
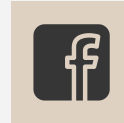




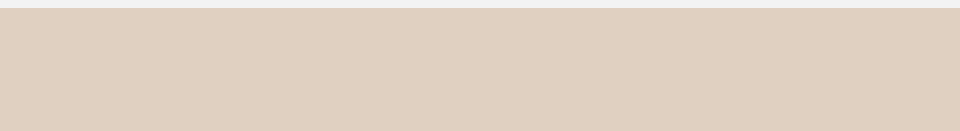
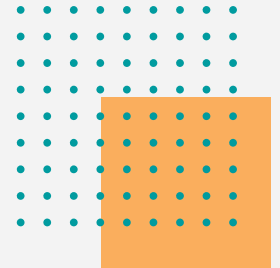
Thanks

Do you have any questions?

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yourwebsite.com



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In-Class Experimentation

Context

- 40+ person required graduate class, mostly first year students
- Syllabus statement:

“Use GAI tools (like ChatGPT) cautiously. They may be constructive for brainstorming, searching, synthesizing, organizing information, and/or getting started with writing...Writing is a core competency in the class, and we ask that you focus on developing your own written communication skills and do not use GAI-generated text in assignments, discussion posts, and worksheets you submit. ”

ChatGPT vs. Discussion Board Prompt

Students host weekly discussion board, posting synopsis of class and discussion questions. They then present the discussion at the start of the next class.

After discussants presented the prior week's discussion, we:

- Primed ChatGPT 4.0 with prior week's synopsis.
- Posed student discussion questions: *How do Mumford's and Kotkins's perspectives differ on why Rome fell? How do you think these perspectives are shaped by the context in which the authors lived? Can you give an example of how your context affects or influences the explanations you might give to current events in your city/cities?*
- Refined into discussion post (250 words), include a quote, written from student perspective.

Debrief

- Perspective & Bias
- Impact on Creativity
- Potential Uses
- Source of GAI corpus
- Syllabus GAI policy & Citations

“Having this do our work won’t let us be the radicals we are”

ChatGPT 4 ▾

Subject: Bridging Ancient Rome with Modern Boston: A Community Organizer's Reflection

Hello classmates,

I recently stumbled upon a quote by Jane Jacobs, a prominent urbanist and activist, who remarked, **“Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody.”** This sentiment resonates deeply with my experiences as a community organizer in Boston's diverse neighborhoods.

Mumford's emphasis on Rome's spiritual and moral decay feels ever relevant. In neighborhoods from Beacon Hill to Roxbury, the spirit, unity, and participation of communities have been instrumental in determining their resilience and wellbeing.

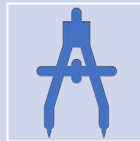
Text generated by ChatGPT-4, September 25, 2023.
OpenAI, <https://chat.openai.com/>

Generating scenarios for activities & assessments

- Brainstorming subject-specific cases for course topics
- Quality: Hit or Miss
- Helpful when creativity is low



“I need a scenario where students will answer a spatial question about a topic related to biking or public transportation use that will require a **spatial join.**”



“Can you please make 5 examples of times where you would use **TWO vector overlay analyses**? The vector overlay analyses to choose from are: [list of analyses]”



CHATGPT IN A MANDATORY UNDERGRADUATE ENGINEERING COURSE

ERICA KEMMERLING

DECEMBER 12, 2023

TUFTS TEACHING SYMPOSIUM

ME51 COURSE DETAILS

- Required course for junior-level mechanical engineers
- Around 80 students per year
- Subject matter: fluid mechanics and convective heat transfer (physics describing the motion of liquids and gases and the energy they transport)

OVERALL AI LEARNING GOALS

- Determine ChatGPT's current level of aptitude with course material
- Predict whether ChatGPT is well-equipped to help with a new engineering task
- Practice prompting ChatGPT in a way that is most likely to give a helpful result

CUSTOM HOMEWORK ASSIGNMENTS

- **Assignment: Write and solve an open-ended problem relating the course material to your own life with the help of ChatGPT**
- Motivation
 - Research shows students learn better when they relate to the course material
 - Previous iterations of personalized problems produced positive results
- Learning Goals
 - Engage in engineering brainstorming with ChatGPT
 - Connect fluid mechanics and/or convection to life outside of school
 - Practice applying fluid mechanics and heat transfer concepts and calculations

GOOD SAMPLE PROBLEM:

HA

You

here is a bit about myself and my interests:

I am from Lebanon and I am 21 years old. I am interested in computers, especially gaming computers. In my free time, I watch videos about computers or I game.

Problem Statement:

Design a heat sink system for the gaming laptop that optimizes heat transfer through convection. Consider the following aspects in your design:

1. **Material Selection:** Choose a material for the heat sink that balances cost, weight, and thermal conductivity. Explain your choice.
2. **Heat Sink Design:** Propose a design for the heat sink. This should include the shape and dimensions of the fins, considering factors like surface area, air flow, and space constraints in a laptop.
3. **Air Flow Analysis:** Analyze how air moves through your heat sink design. Discuss how laminar or turbulent flow will affect the heat transfer rate. Consider the impact of fan placement and speed on this airflow.
4. **Thermal Analysis:** Using the principles of heat convection, calculate the rate of heat transfer from the laptop's CPU to the air. Assume reasonable values for the temperature of the CPU, the ambient air, and other necessary parameters.

RIDICULOUS SAMPLE PROBLEM:



ChatGPT

Fantastic! Let's incorporate your passion for fusion and love for playing the viola into a fluid mechanics homework problem.

Title: Convection Heat Transfer in a Fusion Instrument Cooling System

In the vibrant city of Paris, you find yourself deeply engrossed in the world of fusion energy research while cherishing your moments playing the viola. One day, you decide to combine your interests by designing a cooling system for a fusion instrument (let's call it the "FusionViola") to ensure optimal performance. The FusionViola has a cylindrical core with a diameter of 15 cm and a length of 50 cm, containing a plasma at a temperature of 150 million degrees Celsius.

1. Apply the principles of fluid mechanics to calculate the heat generated within the FusionViola per unit length due to the fusion reaction.
2. Considering the FusionViola operates in a concert hall with an ambient temperature of 20°C, calculate the rate of convective heat transfer from the instrument's surface to the surroundings.
3. Determine the temperature distribution across the FusionViola's length after 30 minutes of continuous operation, assuming steady-state conditions.

STUDENT FEEDBACK

“I **do not completely trust ChatGPT** so I had to double check things that it said”

“I think ChatGPT did shine in this assignment because even though it **didn't know how to approach every detail... it knows a surprising amount about a huge variety of subjects**”

“The AI is **very good at sparking thoughts and critical thinking** in me, more so than actually providing me with exactly what I asked for”

“[GPT] is quite adept at following directions and returning sensible input...however it's **not great at providing technical details**”

“[GPT] is a **great brainstorming tool** for me, I have other final projects where I have to design my own problem and... [will use GPT] to see the viability of my ideas”

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TODAY'S EXIT TICKET



<https://tinyurl.com/Dec2023ExitSurvey>