

Learners Speaking to Computers?

From CLEF to GPT

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Who am I?

- Senior lecturer in Digital Humanities
- Active at the Centre for Educational Linguistics, Centre for Digital Humanities, and in the Människa-Maskin-Samhälle group
- PhD project: Automated Text Analytics for Swedish English Classrooms
- Feedback on papers – Can the computer do it? (No)



A (very) Short Timeline of Talking to Computers

- AI coined in 1956 by John McCarthy
- First chatbot in 1964 - ELIZA
- A.L.I.C.E in 1995
- Watson! joins Jeopardy in 2011
- GPT-3 is released upon the world in 2020



Meanwhile, in language education...

CLEF (1983)

Computer-assisted
Lessons in
French

- Automated feedback for specific questions

“[...] a rarity nowadays, as most CALL programs incorporate nothing more than slick presentations followed by a few point-and-click-let's-move-on-quick exercises”

Clef Lesson 10 Exercise A: Adjective endings

Type the appropriate form of the adjective shown in the box.

bleu

Le pantalon est bleu

Attention, Graham. Le pantalon est un mot masculin.

Continue

Lesson 10 Grammar review

AGREEMENT OF ADJECTIVES

Adjectives must agree in gender and in number:

Le chien est petit. Elle est petite.

Les chiens sont petits. Elles sont petites.

Some adjectives have irregular forms:

blanc(s) blanche(s)

long(s) longue(s)

vieux(-) vieille(s)

Clear

Grammar Review Translation Lesson options Quit this Lesson Exit Clef



Production-Evaluation-Response Machines

- Student **produces** language
- Language is **evaluated**
- A **response** is provided

Often relied on a set of specific questions and hard-coded responses

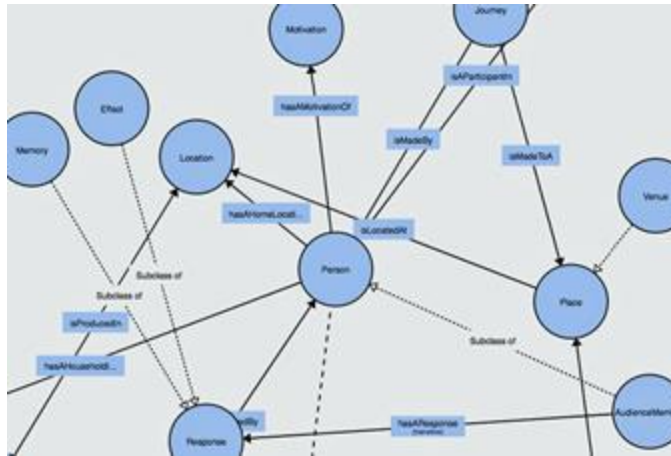


Knowledge base

Hard-coded knowledge, which a machine can reason from using logical inference.

“Intelligence” is **explicitly programmed** into the AI

- Database of of formal statements and rules for making inferences and inductions
- Heyday in the 1980s
- Expert systems (e.g, pharmaceuticals)
- Dead-end



The Cyc project has been working on this problem for about twenty years, and Cyc now contains about 1.5 million facts, or assertions. This is by far the largest collection of commonsense knowledge in the world. Cycorp, the company that produces Cyc, has about eighty employees, most of whom are ontologists, who spend their time adding to and improving the Cyc knowledge base (KB). While Cyc's KB contains a significant fraction of commonsense knowledge, and Cyc has in general made great strides towards its ultimate goal, it remains a work in progress. In particular, Cyc has yet to be successfully deployed in a commercial situation, and its development is still funded primarily by DARPA, the Defense Advanced Research Projects Agency. Cyc's KB is large enough now to answer a substantial percentage of randomly chosen commonsense questions, like "What color is grass?", "Do fish fly?", "What shape is the earth?". Cyc's natural language system can almost always translate Cyc's internal knowledge and thinking into English, but Cyc cannot yet understand most normal English sentences.

1. (#Sisa #SHurricaneAndrew #SHurricane)
2. (#\$genIs #SHurricane #SRainProcess)
3. (#\$relationAllExists #SeventOccursAt #SRainProcess #SRainyLocation)
4. (#\$genIs #SRainyLocation #SCloudyLocation)
5. (#\$disjointWith #SCloudyLocation #SSunnyLocation)

Figure 1. Five Example Sentences in CycL



Machine Learning

The alternative strategy: instead of explicitly delineating knowledge, the AI system is given the ability to identify patterns in raw data as to form *its own* knowledge. Machines learn from “experience”

The three central components of Machine Learning are:

- **Algorithm:** set of sequential rules/instructions to follow
- **Data:** (1) training data, (2) model data, (4) input data, (5) output data
- **Model:** made up of both the data (model data) and procedures for how to use the data to make a prediction on new data (prediction “algorithm”)



Artificial Intelligence

Any system that leverages human capacities for learning, perception, and interaction all at a level of complexity that ultimately supersedes our own abilities.

Machine Learning

A subset of AI that involves programming systems to perform a specific task without having to code rule-based instructions.

Deep Learning

A subset of ML where systems can learn hidden patterns from data by themselves, combine them together, and build much more efficient decision rules.



Large Language Models (LLMs)

- Deep Learning models
- Large amounts of “text-like” data
- What are they made from?
 - Model and algorithm => Architecture
 - Data = Text => Word embeddings

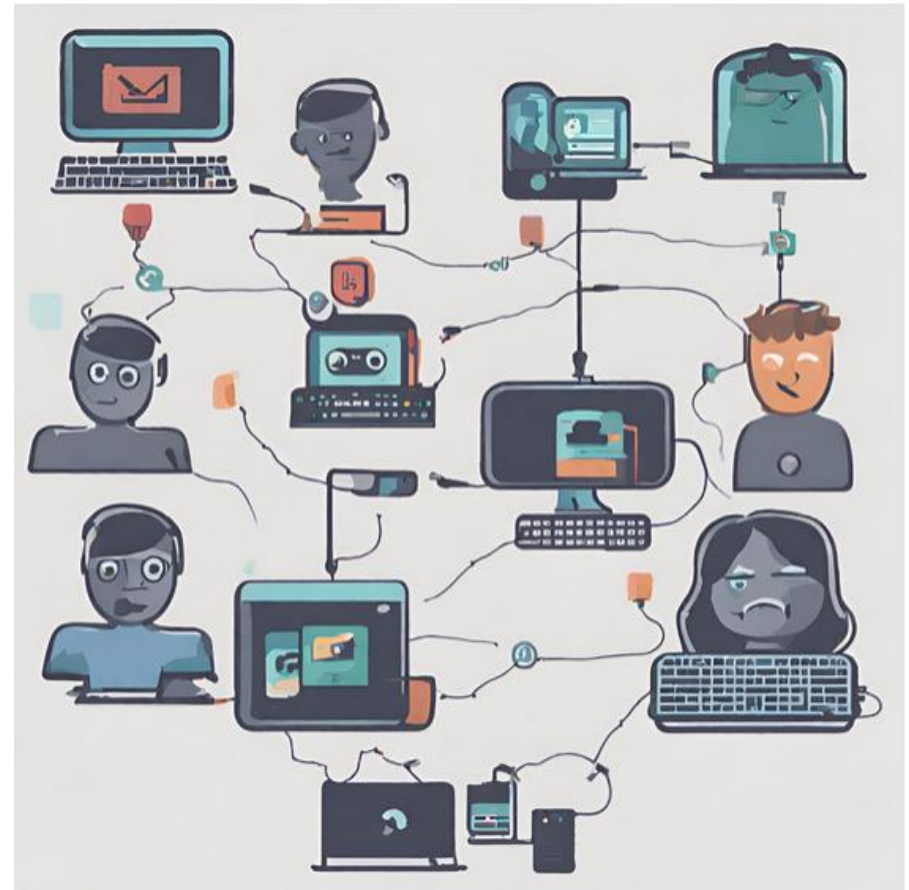
Large = Larger = Ridiculous size = The truly preposterous = LLM => The next LLM



What is ChatGPT?

Generative Pre-trained Transformer

- Generative?
 - Generates content
- Pre-trained Large Language Model
 - Trained on text-like data
- Transformer?
 - Looks at words in context...
 - ...in parallel



How do we use GPT?

- Setup
- Prompt
 - (optional) Model answer
- Interpret output

So, in practice?



GPT in Language Learning

Results: Our findings revealed three technological affordances: timeliness, ease of use, and personalization; and five pedagogical uses: as interlocutors, as simulations, for transmission, as helplines, and for recommendations. Chatbots appeared to encourage students' social presence by affective, open, and coherent communication. Several challenges in using chatbots were identified: technological limitations, the novelty effect, and cognitive load.

Huang, W., Hew, K. F., & Fryer, L. K. (2022). Chatbots for language learning—Are they really useful? A systematic review of chatbot-supported language learning. *Journal of Computer Assisted Learning*, 38(1), 237–257. <https://doi.org/10.1111/jcal.12610>



GPT for Information Retrieval?

Classroom experiment by Jessica Cail (2023)

- Used ChatGPT to generate literature reviews for a topic, including citations
- Annotated resulting papers:
 - GREEN: This information is accurate, the source exists, and its findings match what the AI says. I will incorporate this info into my draft.
 - YELLOW: This information is accurate, the source exists, and its findings match what the AI says, but it is not relevant enough to my paper to include in my draft.
 - RED: This information is inaccurate or this source doesn't exist.





Do you want to use AI for IR?

RAGs

- Retrieval-Augmented Generative AI
- Uses an information layer between the AI and the user

Perplexity: <https://www.perplexity.ai/>



GPT for Language Level Alignment

Can you revise the following extract of the news article for the ages 9 - 10 who do not understand medical terms?

After seven years of research, Chinese scientists say they have identified a unique group of cells that contributes to the ageing process and might be mitigated with everyday vitamin C supplements.

The cell subtype surrounds the motor neurons in the spinal cord and is believed to accelerate the ageing process, making it a factor in the shuffling gait common among the elderly, according to an unedited paper published by the peer-reviewed journal Nature on October 31.

ChatGPT Poe

Scientists in China have been studying for a really long time, about seven years, and they made an interesting discovery. They found a special group of cells that play a role in how our bodies age. They think that if we take vitamin C every day, it might help slow down the effects of these cells.

These special cells are found around the motor neurons in our spine. Motor neurons are like messengers that help our body move and do different activities. These cells around the motor neurons can make us age faster. That's one reason why older people sometimes walk with a shuffling gait, which means they take small, slow steps.

The scientists talked about their discovery in a special journal that other scientists read and check to make sure everything is correct. They explained that these cells are a factor in why older people age faster and have trouble walking.

The scientists hope that by understanding these cells better, we can find ways to slow down the aging process and help people stay healthy and active for longer.

Zadorozhnyy A, Lai WYW. ChatGPT and L2 Written Communication: A Game-Changer or Just Another Tool? *Languages*. 2024; 9(1):5.
<https://doi.org/10.3390/languages9010005>



GPT as a Peer-Tutor

- Not very good at writing
- Quite good at helping others write

” ChatGPT primarily assisted with lower-order language skills, such as basic vocabulary and grammar, while providing less support for advanced language skills, such as writing logical and authentic essays.”

- Experienced as a motivator for **self-revision**

Xiao Y, Zhi Y. An Exploratory Study of EFL Learners' Use of ChatGPT for Language Learning Tasks: Experience and Perceptions. *Languages*. 2023; 8(3):212. <https://doi.org/10.3390/languages8030212>



1979, Internal IBM Memo

A COMPUTER
CAN NEVER BE HELD ACCOUNTABLE

THEREFORE A COMPUTER MUST NEVER
MAKE A MANAGEMENT DECISION

GPT as Conversation Practice

Let's role-play a conversation between a customer and a salesperson at a clothing store. I'll be the customer, and you'll be the salesperson. Our conversation will focus on describing clothing items, asking for sizes, and discussing prices. You start

Salesperson: Good morning! Welcome to our clothing store. How can I help you today?

I would like to buy a pair of classic shoes

Salesperson: Of course! We have a great selection of classic shoes. What color and style are you looking for? And do you know your size?

I have a beige linen costume, what would you advise?

Salesperson: A beige linen costume would go well with a pair of light brown or **tan leather shoes**. We have some stylish loafers and elegant oxfords that would complement your outfit perfectly. Would you like to see some of the options in your size?

Zadorozhnyy A, Lai WYW. ChatGPT and L2 Written Communication: A Game-Changer or Just Another Tool? *Languages*. 2024; 9(1):5. <https://doi.org/10.3390/languages9010005>



Group activity: Evaluating ChatGPT for Role Play

- Observers and students
 - One student reads ChatGPT's parts
 - One student provides the answers
- Prompt ChatGPT with a roleplay scenario

Tried and true classics:

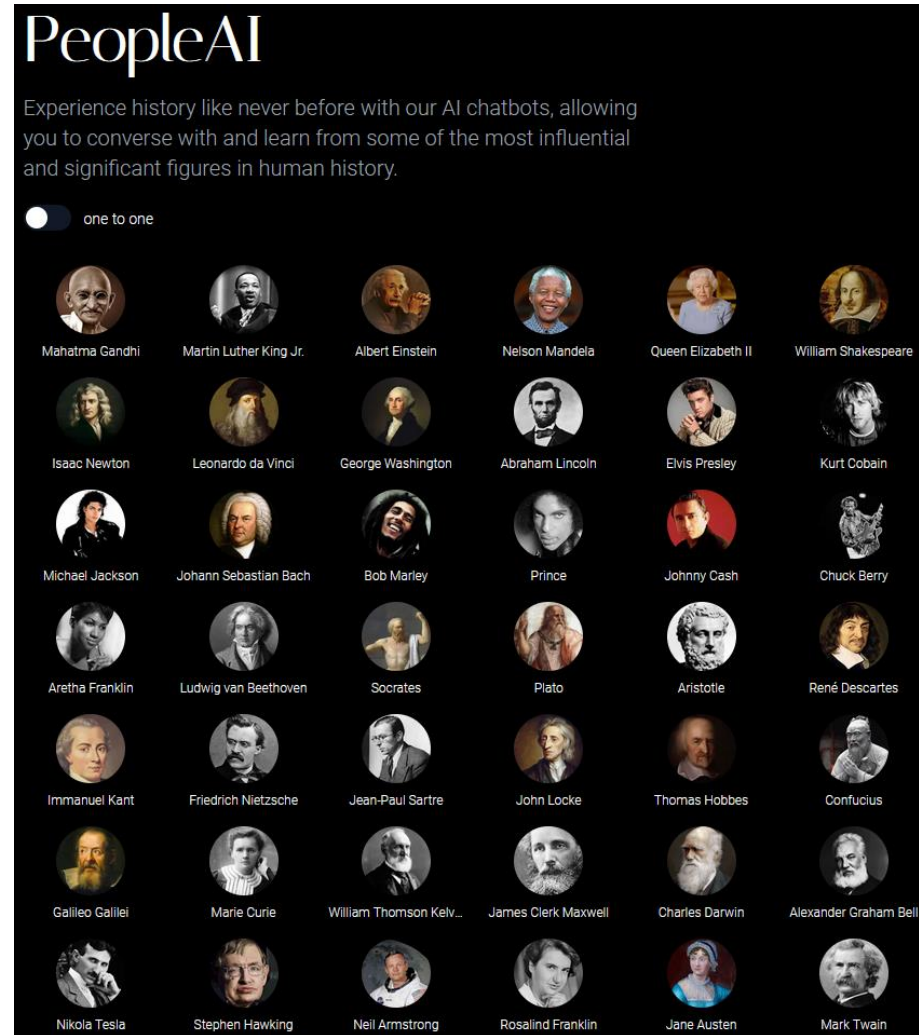
- Ordering at a café
- Going to the movies
- Asking for directions

Let each scenario play for around X minutes, then discuss how to alter the prompt with the observer. Make sure to change roles between scenarios!



Talking to History: People AI











































<https://peopleai.app>



PeopleAI

Experience history like never before with our AI chatbots, allowing you to converse with and learn from some of the most influential and significant figures in human history.

one to one

 Mahatma Gandhi	 Martin Luther King Jr.	 Albert Einstein	 Nelson Mandela	 Queen Elizabeth II	 William Shakespeare
 Isaac Newton	 Leonardo da Vinci	 George Washington	 Abraham Lincoln	 Elvis Presley	 Kurt Cobain
 Michael Jackson	 Johann Sebastian Bach	 Bob Marley	 Prince	 Johnny Cash	 Chuck Berry
 Aretha Franklin	 Ludwig van Beethoven	 Socrates	 Plato	 Aristotle	 René Descartes
 Immanuel Kant	 Friedrich Nietzsche	 Jean-Paul Sartre	 John Locke	 Thomas Hobbes	 Confucius
 Galileo Galilei	 Marie Curie	 William Thomson Kelvin	 James Clerk Maxwell	 Charles Darwin	 Alexander Graham Bell
 Nikola Tesla	 Stephen Hawking	 Neil Armstrong	 Rosalind Franklin	 Jane Austen	 Mark Twain



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Aretha Franklin

American singer, songwriter, and pianist

Hi, I am Aretha Franklin, the Queen of Soul. I am known for my powerful vocals and my contributions to the civil rights movement through my music.



Hi Aretha! I am learning English. What do you think would be a good thing for us to discuss so that I can practice?



Oh, that's wonderful to hear! How about we discuss the power of music and its ability to bring people together? It's a topic that is close to my heart, and I believe it can be quite inspiring. What do you think?



I like music. Do you want to pick a song for us to listen to together and talk about?



Absolutely! How about we listen to my song "Respect"? It's a classic that became an anthem for the civil rights and feminist movements. I would love to hear your thoughts on the song and its message. Let's enjoy it together!





Hi! I am writing about you for a school project for 3rd grade. How would you like to be introduced?



How delightful to hear that I am being studied by young minds! For your 3rd-grade project, you could introduce me as Friedrich Nietzsche, a German philosopher who questioned traditional values and believed in the concept of the "Übermensch." I hope that sparks curiosity and philosophical pondering among the young scholars.



What is the übermensch?



The Übermensch, or overman, is a central concept in my philosophy. It refers to individuals who have transcended traditional values and morality to create their own values based on their own unique perspective and will to power. The Übermensch is not bound by societal norms or constraints but instead embraces their own power and potential to shape their own destiny. In essence, the Übermensch is a symbol of self-overcoming and self-actualization.



Could you explain it easier?



Imagine the Übermensch as a person who is not afraid to be truly themselves, to think for themselves, and to create their own path in life. They don't just follow what everyone else does or says is right; instead, they listen to their own inner voice and values. The Übermensch is like a trailblazer, paving their own way in the world based on their own unique perspective and strengths.



What is a trailblazer?



Ah, a trailblazer is someone who leads the way by doing something that has not been done before or by taking a new and innovative approach. They are like pioneers, exploring uncharted territories and setting new standards or paths for others to follow. A trailblazer is not afraid to challenge conventions and push boundaries in pursuit of their goals or ideals.



Group activity: Evaluating People AI

Same groups as before

Try conversations with individual bots

Try a dinner party

Questions:

- Is the conversation appropriate?
- Is the support adequate?
- Is the content relevant?
- Would this fit with your needs?




How it works:

- Model is provided with a “system prompt” describing the role
- Within the context of that conversation the role is maintained
- Might have access to specific materials concerning the person played


Can we do this ourselves?



Certainly! (But they want money)

<  **New GPT**
• Draft

Create **Configure**



Name

Name your GPT

Description

Add a short description about what this GPT does

Instructions

What does this GPT do? How does it behave? What should it avoid doing?

Conversation starters

Knowledge

If you upload files under Knowledge, conversations with your GPT may include file contents. Files can be downloaded when Code Interpreter is enabled



Current stance?

Q1: What is the general state of scientific research on the use of ChatGPT in education?

The general state of scientific research on the use of ChatGPT in education is limited due to the recent implementation of this application in the educational setting, being still in its initial stages. A total of 12 relevant articles were collected for a systematic review, all published in the year 2023. This is because the use of ChatGPT in the educational setting is a relatively new practice, since its launch occurred at the end of 2022, so there has not been enough time to conduct long-term studies and collect meaningful data on the impact on education until the first months of the following year [26].

In terms of geographic focus, a greater representation of studies belonging to the Asian continent was observed. The predominance of research from Asian countries may be related to the early adoption of technology in these regions and their focus on educational research. Other factors such as the availability of research funds and collaboration between university institutions may also influence these data. It should also be noted that in different countries, the use of this tool has been banned in educational centres [25].

In relation to the methodology used in the selected articles on the impact of ChatGPT in education, a high predominance of theoretical articles stands out, as opposed to qualitative and/or quantitative studies. This may be possible because the development and implementation of artificial intelligence technologies in education, such as ChatGPT, are still at a relatively early stage, so the exploration of the possibilities and challenges presents a mainly theoretical approach before conducting empirical research [10].

Montenegro-Rueda M, Fernández-Cerero J, Fernández-Batanero JM, López-Meneses E. Impact of the Implementation of ChatGPT in Education: A Systematic Review. *Computers*. 2023; 12(8):153. <https://doi.org/10.3390/computers12080153>



Summary?

- Development is extremely rapid
- As any other method?
- As a skillset?
- ...is this a fad?

We need your help





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