

The Personal Tutor

A Vision for the use of LLMs in School Education

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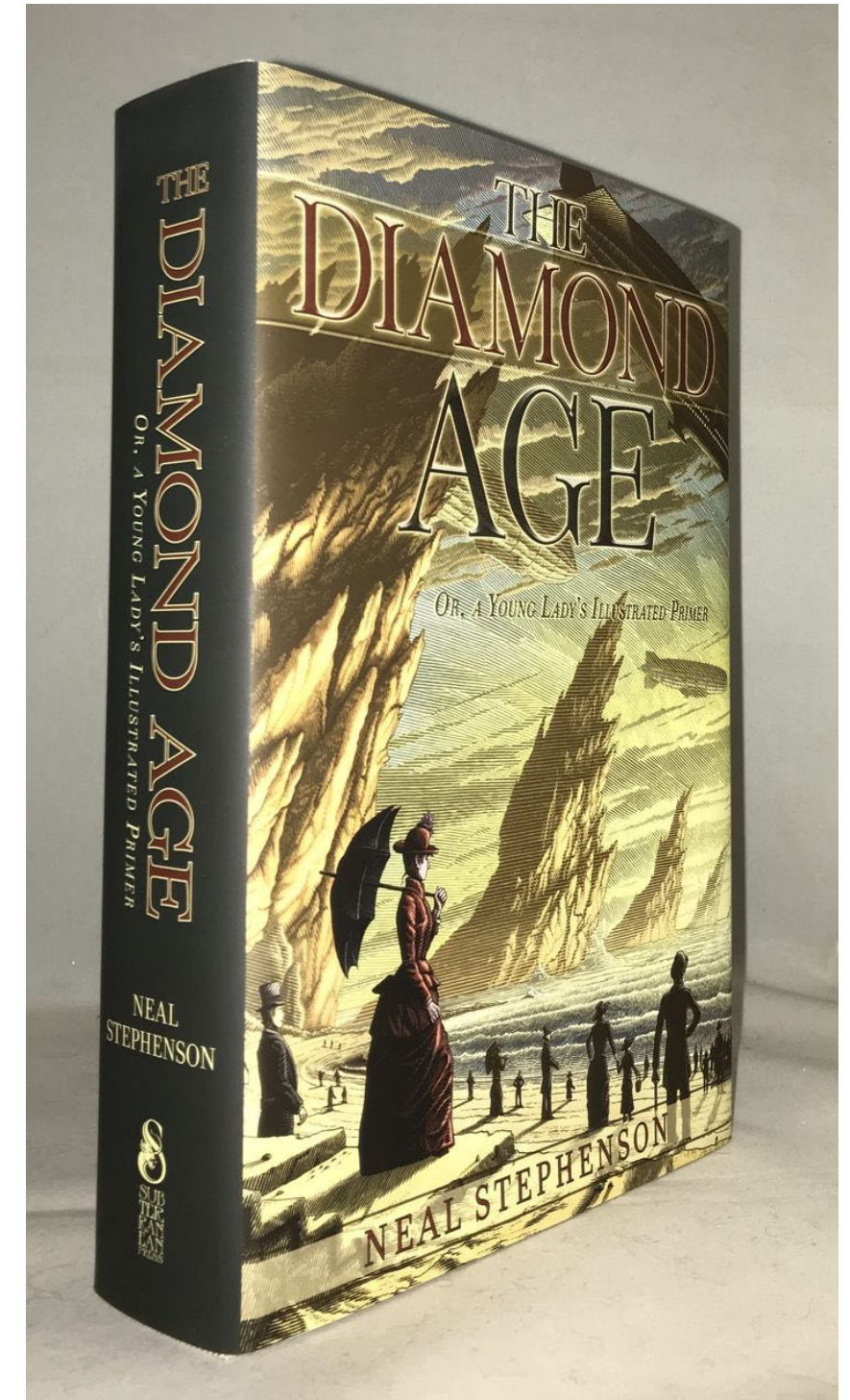
Too much science fiction in your head?

How we could use language models in school

- AI and education: How language models like Chat-GPT can help students ask and answer personalized questions
- Language models as a research tool: How an intelligent search with Google, Wikipedia and Chat-GPT provides personalized and further information
- Language models as conversation partners: How chat GPT can serve as an active learning tool that encourages student interest and immersion
- Language models and enlightenment: How to reduce discomfort and continue the enlightenment project by understanding how language models work
- Language models and critique: How to avoid passive or deceptive use of language models and teach AI literacy to teachers and students
- [Zu viel Science-Fiction im Kopf – Wolfgang Nejdil @ Süddeutsche Zeitung](https://www.L3S.de/zu-viel-science-fiction-im-kopf/)
(12.09.2023)
<https://www.L3S.de/zu-viel-science-fiction-im-kopf/>

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A Young Lady's Illustrated primer

“The Diamond Age: Or, A Young Lady's Illustrated Primer” by Neal Stephenson is a science fiction novel set in a future world transformed by nanotechnology. The story revolves around a young girl named Nell.

Nell and her brother Harv live with their mother in the Leased Territories, a slum area in an otherwise highly developed world. Harv manages to steal a bootleg copy of the Primer, meant to teach young neo-Victorians to be subversive enough to innovate and keep their phyle dominant.

The primer is a personalized and interactive book which maps Nell's experiences onto archetypal folk tales, with plots and details appropriate for her age, covering different themes like responsibilities and navigating complex social structures (“Princess Nell and the Castle”) or the power of collective action and cooperation.

The Primer helps Nell to learn basic skills like reading, as well as more advanced skills including programming and combat. The Primer adapts to her personal situation and can answer any question posed by Nell. Through its tales, suggestions and guidance, the Primer helps Nell to seek and realize many more experiences, moving her much beyond her initial environment.



What would it take to build an Illustrated Primer?

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Creating an **Illustrated Primer** similar to the one in Neal Stephenson's *The Diamond Age* would involve several key components. While I can't directly replicate it, I can outline the essential features you'd need to build a similar educational tool:

1. **Adaptive Content:** The Illustrated Primer adapts to the reader's needs, just like Nell's version. You'd need an AI system that dynamically adjusts content based on the user's age, interests, and learning pace.

2. **Interactive Storytelling:** Incorporate engaging narratives, like the tales within the Primer. These stories should teach practical skills, ethics, and critical thinking.

3. **Multimedia Integration:** Combine text, images, and interactive elements. The Primer uses visual cues to enhance learning. Consider animations, videos, and interactive diagrams.

4. **Programming and Problem-Solving:** Include lessons on coding, problem-solving, and creativity. Nell learns programming from the Primer; your version should offer similar opportunities.

5. **Personalization:** The Primer tailors content to the user. Implement algorithms that analyze user behavior and adjust content accordingly.


6. **Accessible Hardware:** Develop a device (like the Primer) that's portable, durable, and user-friendly. It should withstand rough handling and adapt to different environments.

Remember, creating an Illustrated Primer involves a blend of technology, education, and storytelling. While I can't directly build it, I hope these guidelines inspire your own creative journey! 🌟📖🔧 1 2

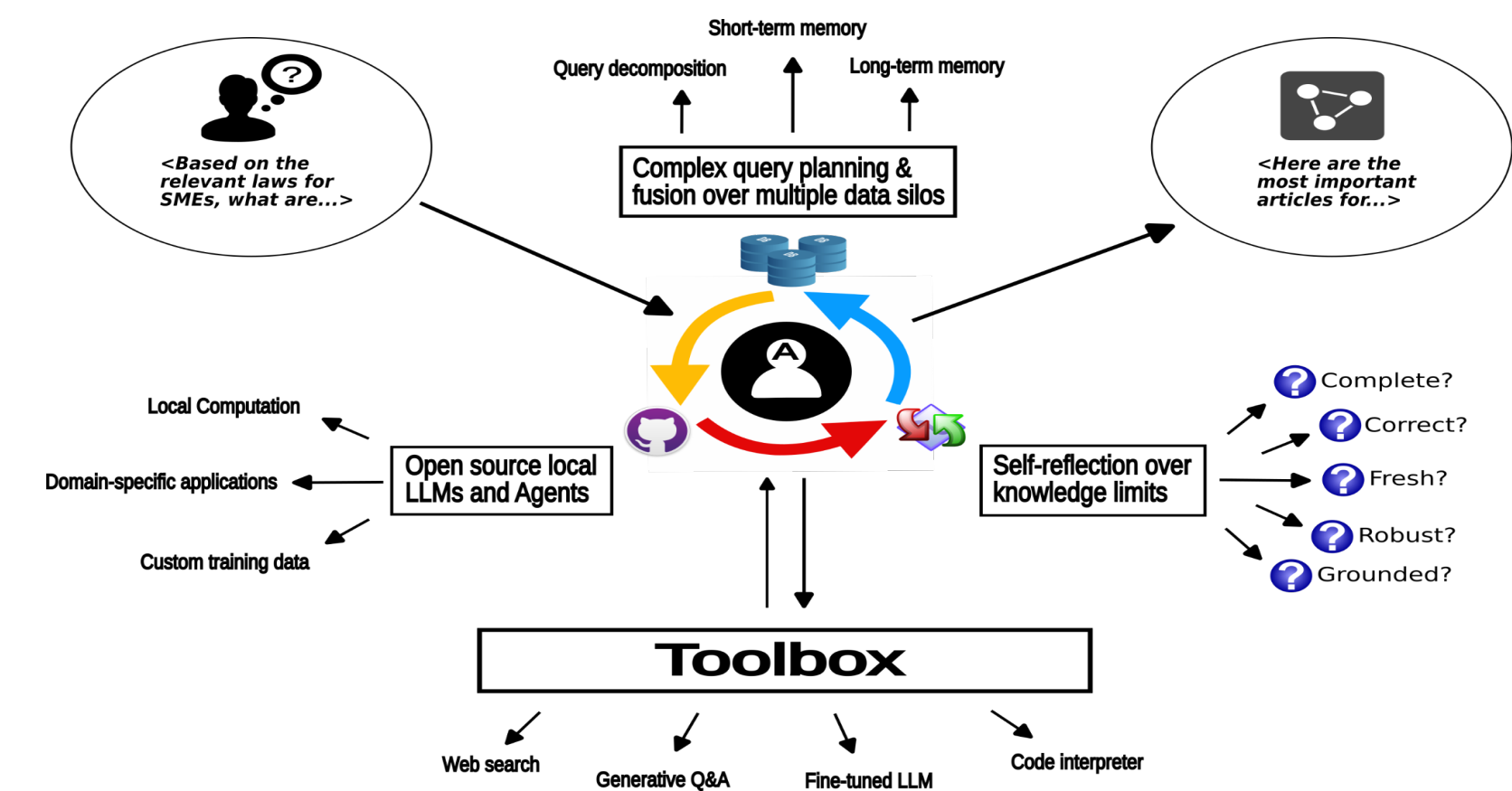
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17 von 30



- An agent-oriented architecture (included from recent proposal)



- Personal interaction with the learner, including long-term memory, web search, and other tools
- Teaching goals and motivating narratives, personalized to the student

Adressing Diversity at School (a BMBF project proposal)



- LLMs as personal tutors for pupils that support students in learning
- Such an LLM needs to consider:
 - Personal diversity profiles
 - Current learning tasks
 - Learning progress in relation to the objectives
- Example tasks:
 - Offer texts in language styles of varying difficulty that adapt to the pupil's personal environment
 - Translate materials into more accessible modalities and other languages
 - Generate questions/hints for the gradual introduction into complex contexts



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Outline

Highlights

Abstract

Keywords

1. Introduction

2. Current research and applications of languag...

3. Opportunities for innovative educational tech...

4. Key challenges and risks related to the applic...

5. Further issues related to user interfaces and f...

6. Concluding remarks

CRediT authorship contribution statement

References

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Learning and Individual Differences

Volume 103, April 2023, 102274



Commentary

ChatGPT for good? On opportunities and challenges of large language models for education

Enkelejda Kasneci^a , Kathrin Sessler^a, Stefan Küchemann^b, Maria Bannert^a, Daryna Dementieva^a, Frank Fischer^b, Urs Gasser^a, Georg Groh^a, Stephan Günemann^a, Eyke Hüllermeier^b, Stephan Krusche^a, Gitta Kutyniok^b, Tilman Michaeli^a, Claudia Nerdel^a, Jürgen Pfeffer^a, Oleksandra Poquet^a, Michael Sailer^b, Albrecht Schmidt^b, Tina Seidel^a, Matthias Stadler^b...Gjergji Kasneci^c

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Highlights

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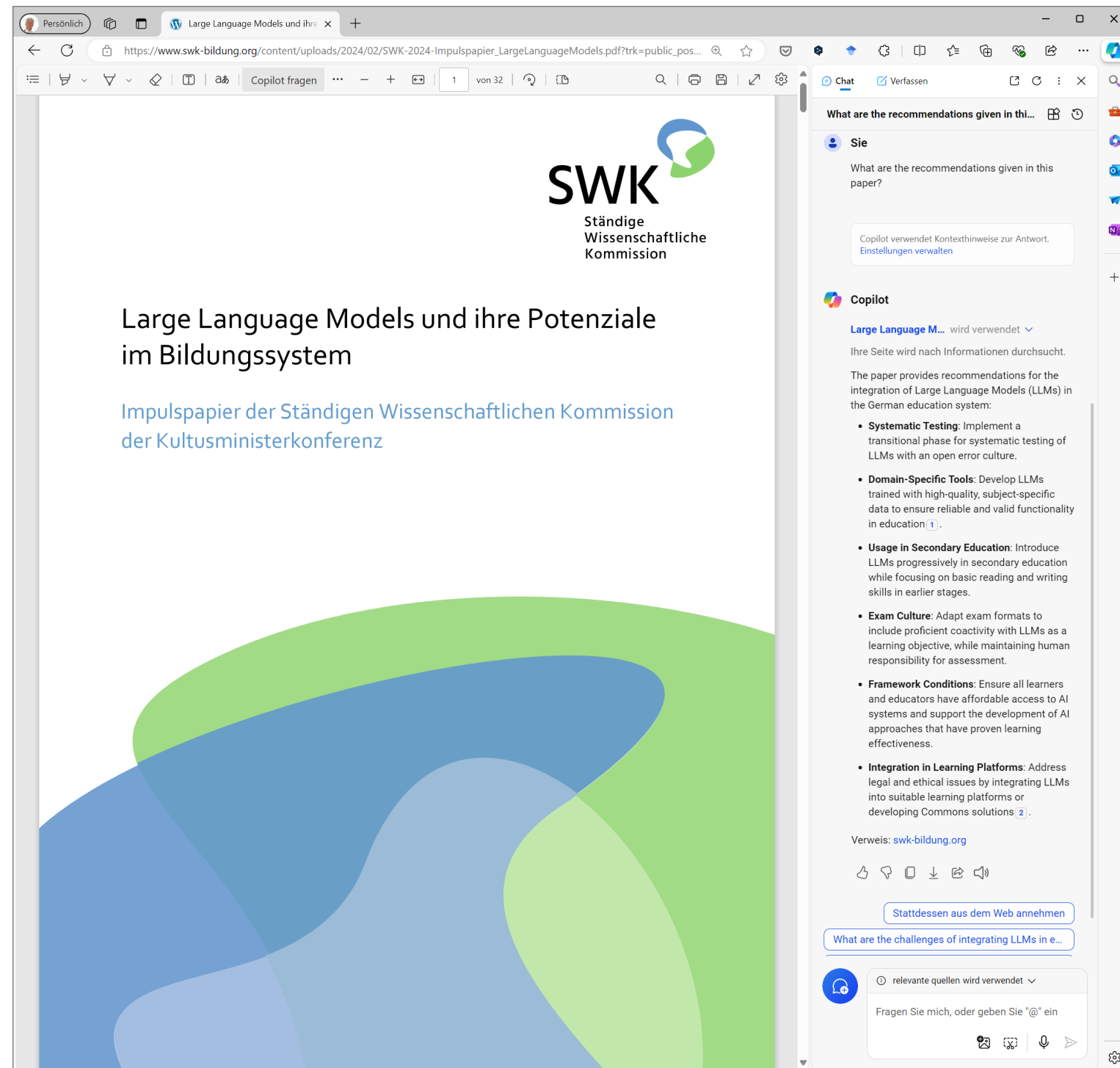
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LLMs and their potential in school education



The paper provides recommendations for the integration of Large Language Models (LLMs) in the German education system:

- **Systematic Testing:** Implement a transitional phase for systematic testing of LLMs with an open error culture.
- **Domain-Specific Tools:** Develop LLMs trained with high-quality, subject-specific data to ensure reliable and valid functionality in education.
- **Usage in Secondary Education:** Introduce LLMs progressively in secondary education while focusing on basic reading and writing skills in earlier stages.
- **Exam Culture:** Adapt exam formats to include proficient coactivity with LLMs as a learning objective, while maintaining human responsibility for assessment.
- **Framework Conditions:** Ensure all learners and educators have affordable access to AI systems and support the development of AI approaches that have proven learning effectiveness.
- **Integration in Learning Platforms:** Address legal and ethical issues by integrating LLMs into suitable learning platforms or developing Commons solutions.

<https://www.kmk.org/de/kmk/staendige-wissenschaftliche-kommission/veroeffentlichungen.html> , January 2024

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TECHNOLOGY

Will Chatbots Teach Your Children?

New A.I. tools could enable a Silicon Valley dream: bots that customize learning for pupils. Prior attempts have not lived up to the hype.

By Natasha Singer



PRINT EDITION

January 17, 2024, Page B1

July 23

TECHNOLOGY

A.I. Can Write Poetry, but It Struggles With Math

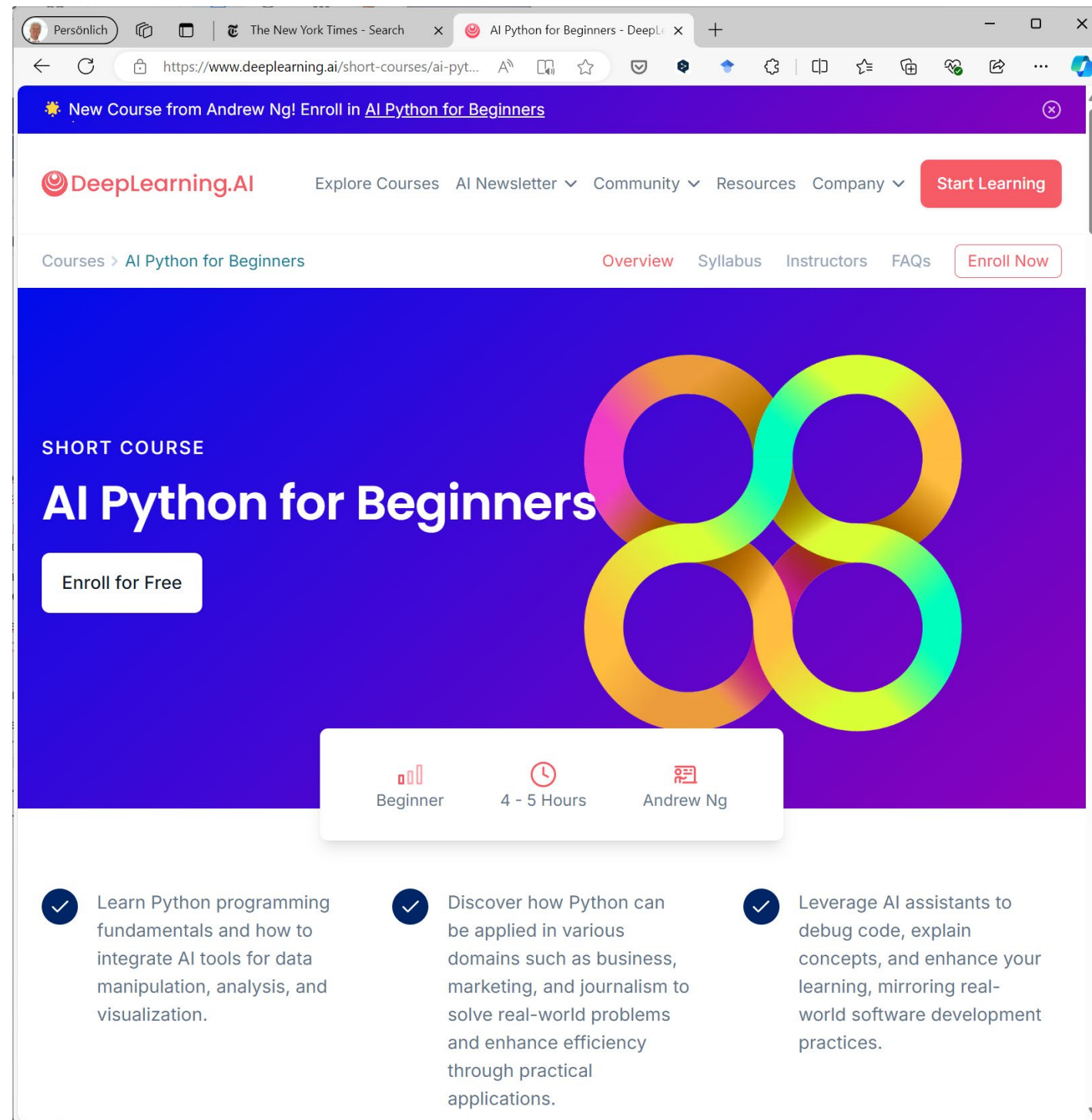
A.I.'s math problem reflects how much the new technology is a break with computing's past.

By Steve Lohr



PRINT EDITION When It Comes to Math, A.I. Is Dumb | July 23, 2024, Page B1

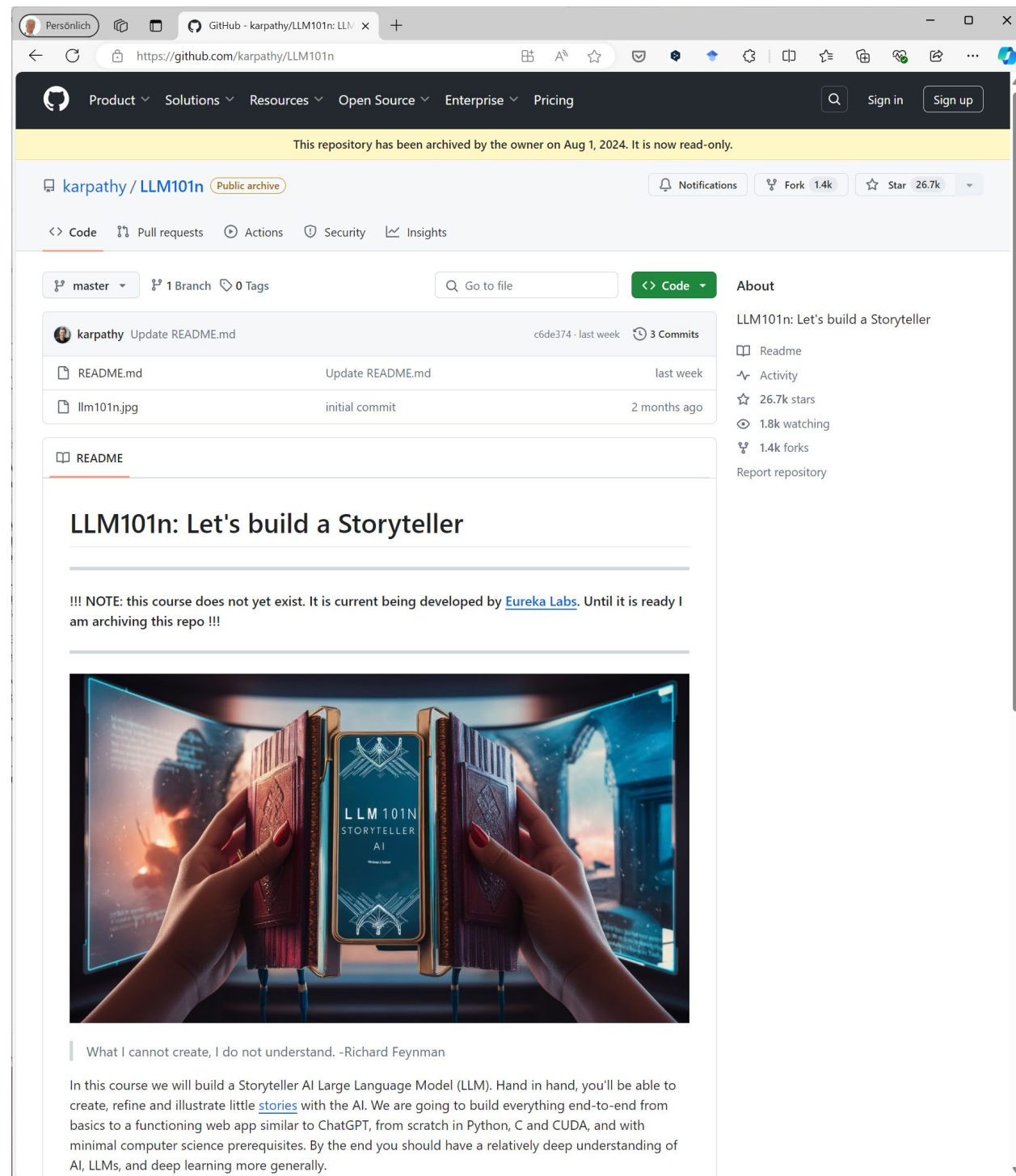
Learning to code with AI



Andrew Ng @ deeplearning.ai

- Former Stanford professor and Coursera co-founder.
 - Pioneer of MOOCs and ImageNet for computer vision.
 - Founder and CEO of deeplearning.ai, a platform for learning and applying deep learning.
 - Vision: democratize deep learning and enable AI innovation.
-
- **AI Assistant** for a Python introductory course to debug code, explain concepts, and generally help the learner as a „more experienced programmer“

LLM101n: Let's build a Storyteller



Andrej Karpathy @ Eureka Labs:

- Eureka Labs: Started a new AI & Education company called Eureka Labs @ 2024
- Previously: Sr. Director of AI at Tesla, leading the Autopilot vision team, and being a founding member at OpenAI
- Academic: Taught the first deep learning class at Stanford (CS 231n), PhD focused on neural networks and their applications
- **AI-Enhanced Education:** Eureka Labs aims to provide an ideal learning experience by combining high-quality course materials with an AI Teaching Assistant, designed to guide students like a subject matter expert.

Build your own (simple) tutor using NotebookLM



1. **Source Integration:** Upload and manage various document types (Google Docs, PDFs, web URLs).
2. **AI-Generated Summaries:** Automatically generate concise summaries and key insights from your documents.
3. **Question Answering:** Ask questions about your content and receive contextually relevant answers.
4. **Insight Generation:** Identify and highlight important points, making connections between different documents.
5. **Collaborative Note-Taking:** Share and collaborate on notebooks with others easily.
6. **Privacy-Focused:** Ensures user data privacy by not using personal data to train the AI.
7. **Audio Overview:** Listen to AI-generated summaries to enhance your learning experience.

