

Teaching with AI: Synergising Productivity and Pedagogy

Zahid Asghar, School of Economics, Quaid-i-Azam University, Islamabad



Zahid Asghar



[Generative AI in a Nutshell)
(<https://blog.crisp.se/wp-content/uploads/2024/01/generative-AI-in-a-nutshell.png>)





What are you?

- **What are you? Explain in one sentence to a 10 year old.**
- **What are you? Explain in two sentences to a university student.**
- **What are you? Explain to a university teacher.**
- **What are you? Explain to an economics research scholar.**



Some more prompting

What role could and should generative AI play both in and on the classroom in supporting effective, engaging and active learning for university students?

What challenges AI poses to the traditional role of the teacher in the classroom?

What challenges AI poses to academic integrity and evaluation of students?

International Relations GPT

How do nuclear capabilities shape the strategic calculus of both Pakistan and India?



What will Iqbal say to youth about use of Social Media

Allama Iqbal, known for his deep reflections on spirituality, selfhood (*Khudi*), and societal progress, would likely have a nuanced view of social media's impact on youth. Here's what he might say:

1. Distraction from Purpose:

Iqbal would likely be concerned about social media's ability to distract youth from their true purpose. He often emphasized the need for deep self-reflection and personal growth, and he might view the constant scrolling and superficial interactions



New Wave of Technology

- What does the wave of technology mean for humanity?
- Historical discoveries: **Fire, the wheel, printing press, steel, harnessing electricity**
- Transformation of human civilization through technological advancements

Advanced AI and biotechnology

- **Benefits: Unlock secrets of the universe , Cure diseases, Create a healthier, sustainable world**



The Dangers

- Manipulating DNA: implications for individuals and ecosystems
- **Choice: Unparalleled possibilities vs. unimaginable perils**
- Exponential speed of change in technology (e.g., LLMs)

The Rise of AI

- **Four years ago, no one believed in LLMs, now everyone talks about them**
- Future: Superintelligence in the next decade?
- **Question: How do we respond?**



The Dilemma

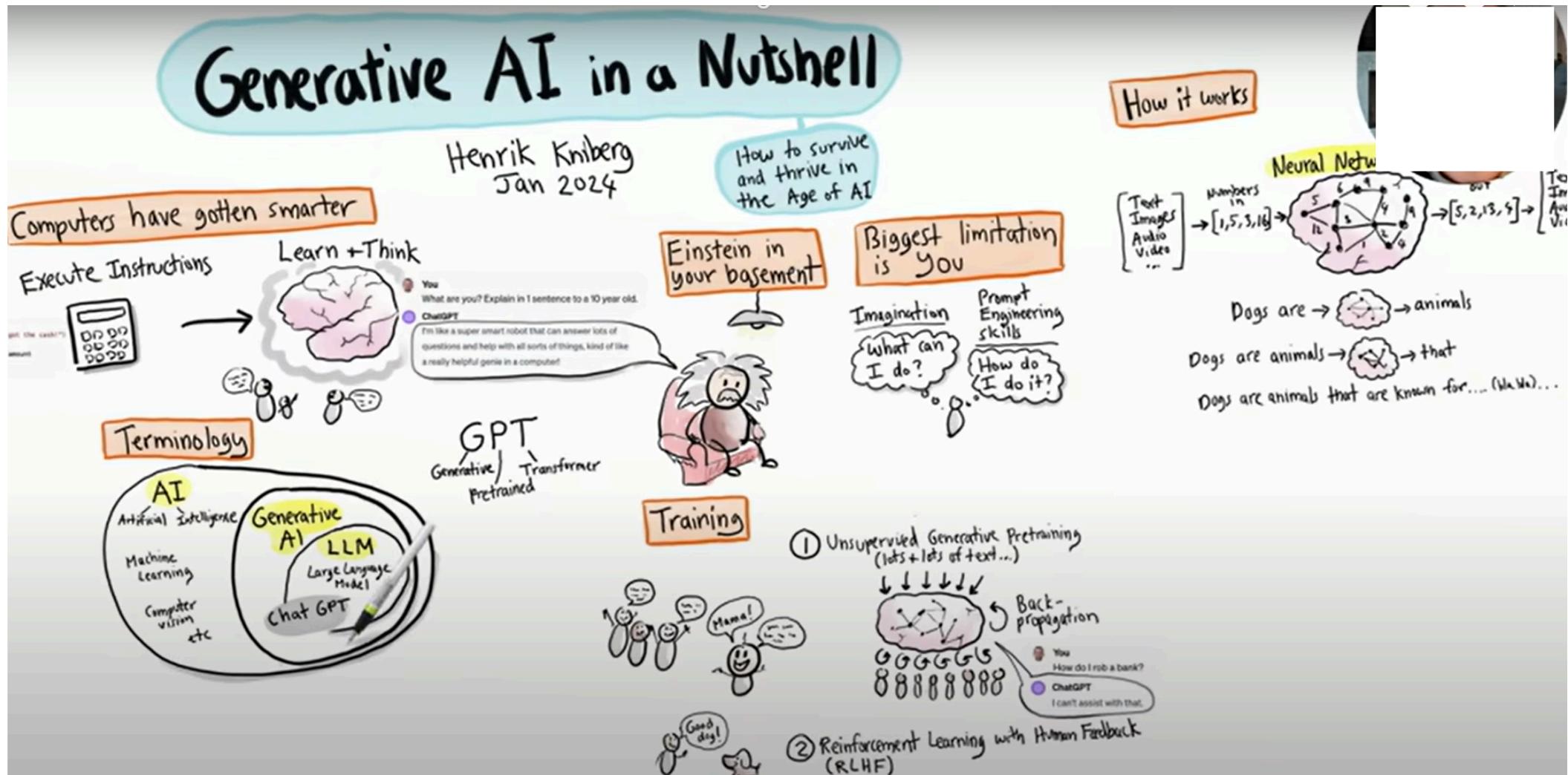
- Replicating our unique intelligence
- The Luddite reaction: fears, bans, moratoriums
- Challenge: balancing immense benefits and potential perils

The Containment Problem

- Technology spreads exponentially, nearly impossible to stop
- Examples: Industrial Revolution, AI, Synthetic biology
- Inventions cannot be uninvented; knowledge proliferates



Generative AI in a Nutshell

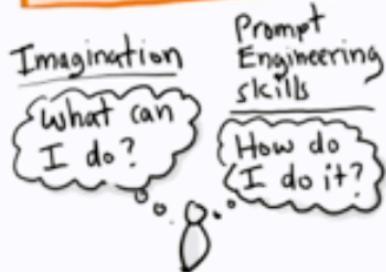


Generative AI in a Nutshell - how to survive and thrive in the age of AI

Einstein in your basement

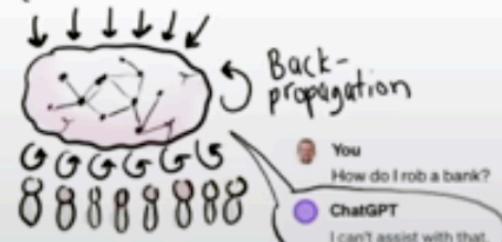


Biggest limitation is You

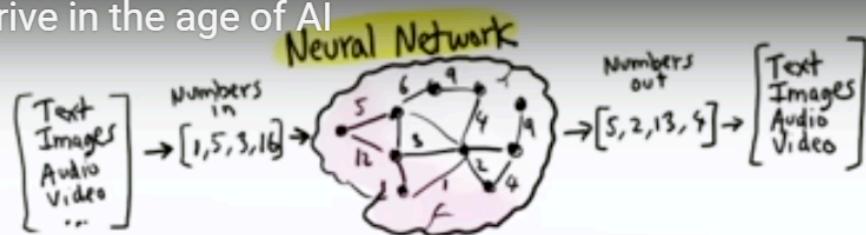


Training

① Unsupervised Generative Pretraining
(lots + lots of text...)



② Reinforcement Learning with Human Feedback
(RLHF)

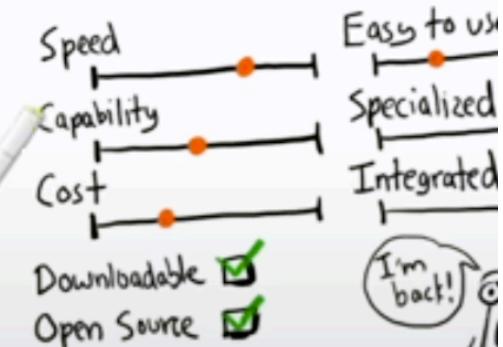
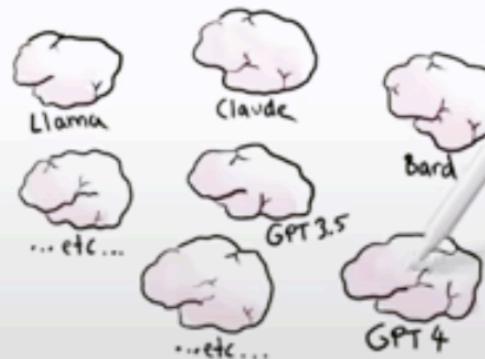


Dogs are → animals

Dogs are animals → that

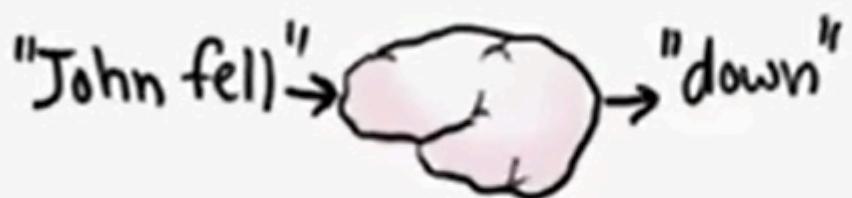
Dogs are animals that are known for... (bla bla)...

Models, models everywhere

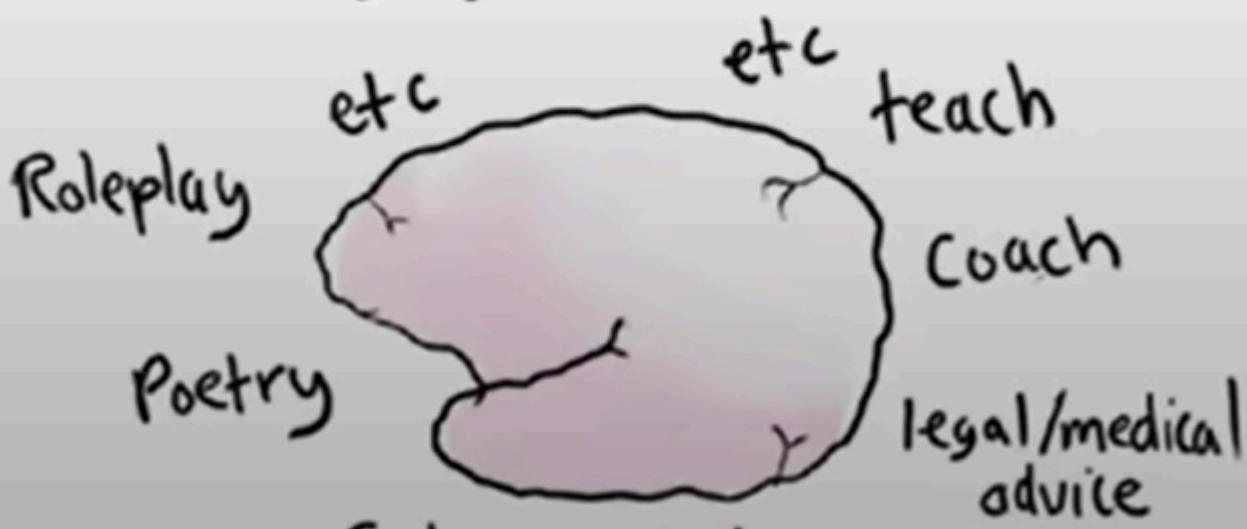


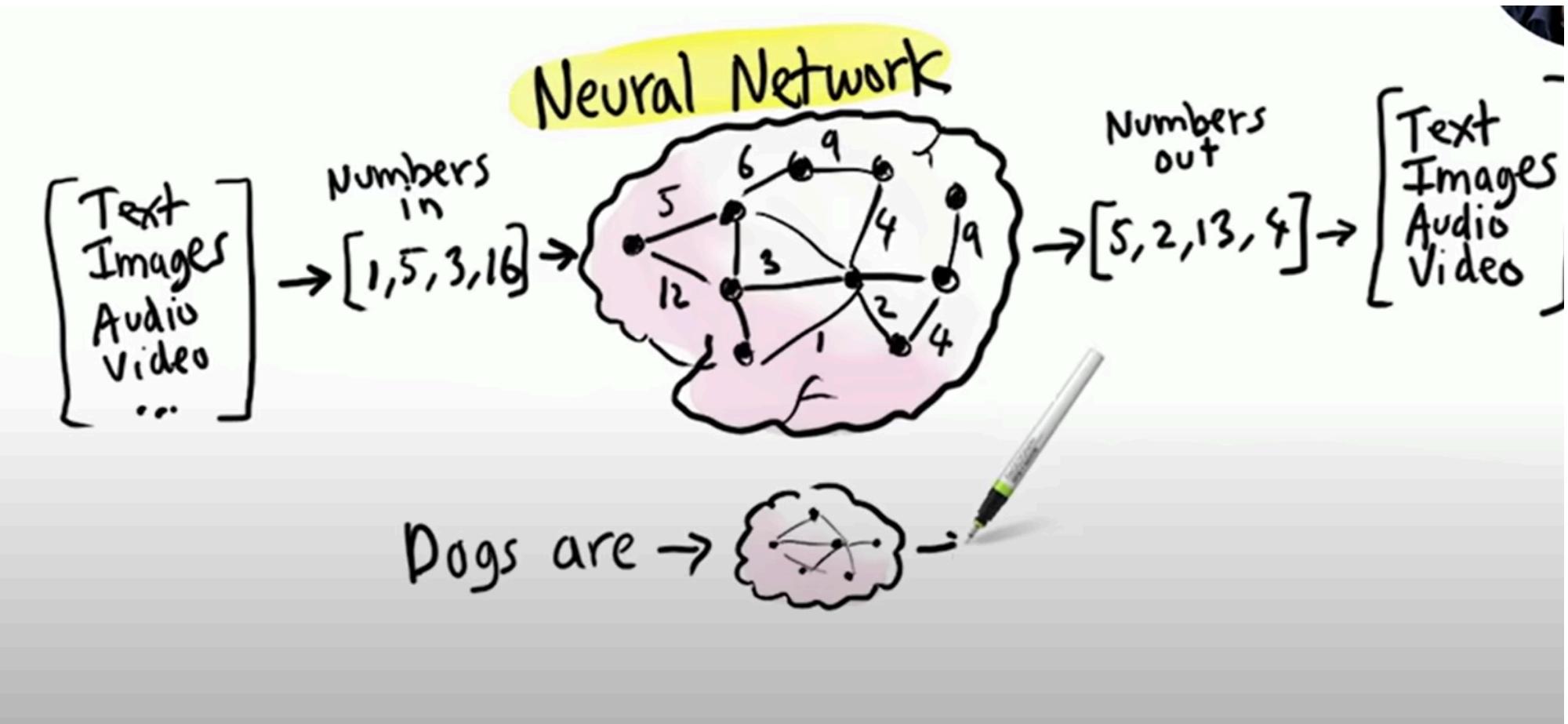
Emergent Capabilities

Small model



Large model





Generative AI in a Nutshell

Henrik Kniberg
Jan 2024

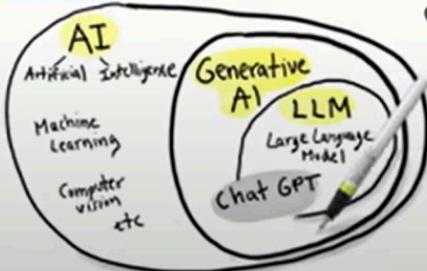
Computers have gotten smarter

Execute Instructions

Learn + Think



Terminology



GPT
Generative / Transformer
Pretrained

How to survive
and thrive in
the Age of AI

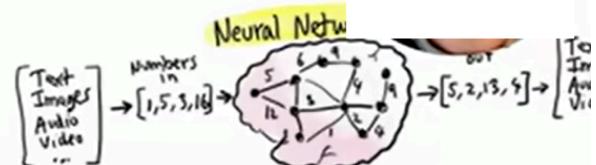
Einstein in
your basement



Biggest limitation
is YOU

Imagination
What can
I do?
Prompt
Engineering
skills
How do
I do it?

How it works



Dogs are → animals

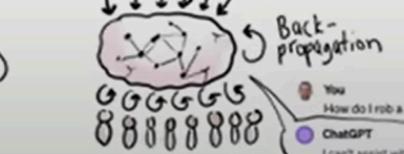
Dogs are animals → that

Dogs are animals that are known for... (Na Na)...

Training



① Unsupervised Generative Pretraining
(lots + lots of text...)



② Reinforcement Learning with Human Feedback
(RLHF)

You
How do I rob a bank?
CHAGPT
I can't assist with that.

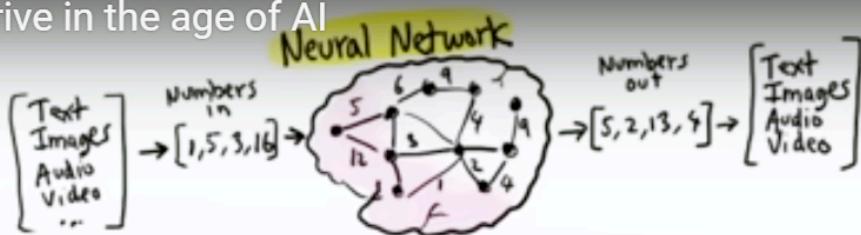
Generative AI in a Nutshell - how to survive and thrive in the age of AI

Einstein in your basement



Biggest limitation is You

Imagination
What can I do?
Prompt Engineering skills
How do I do it?



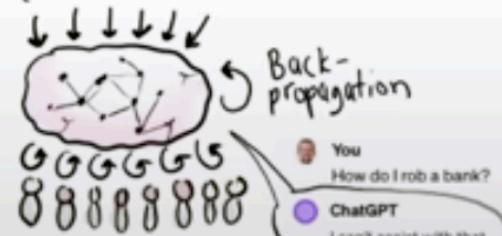
Dogs are → animals

Dogs are animals → that

Dogs are animals that are known for... (bla bla)...

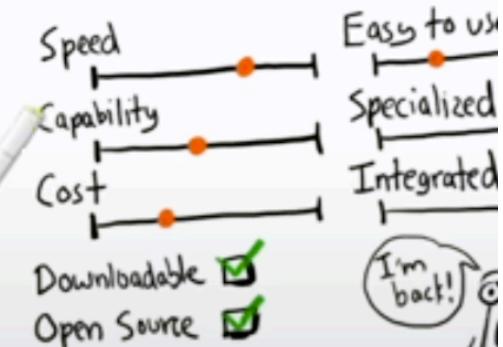
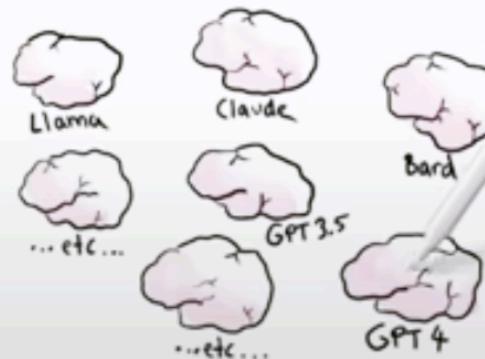
Training

① Unsupervised Generative Pretraining (lots + lots of text...)



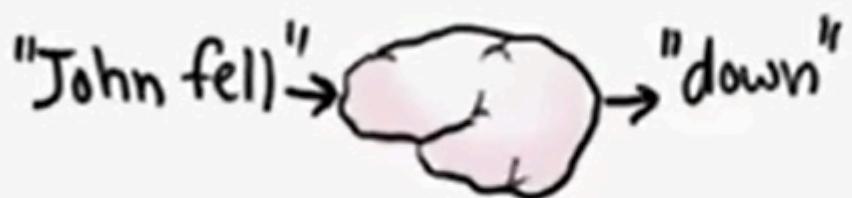
② Reinforcement Learning with Human Feedback (RLHF)

Models, models everywhere

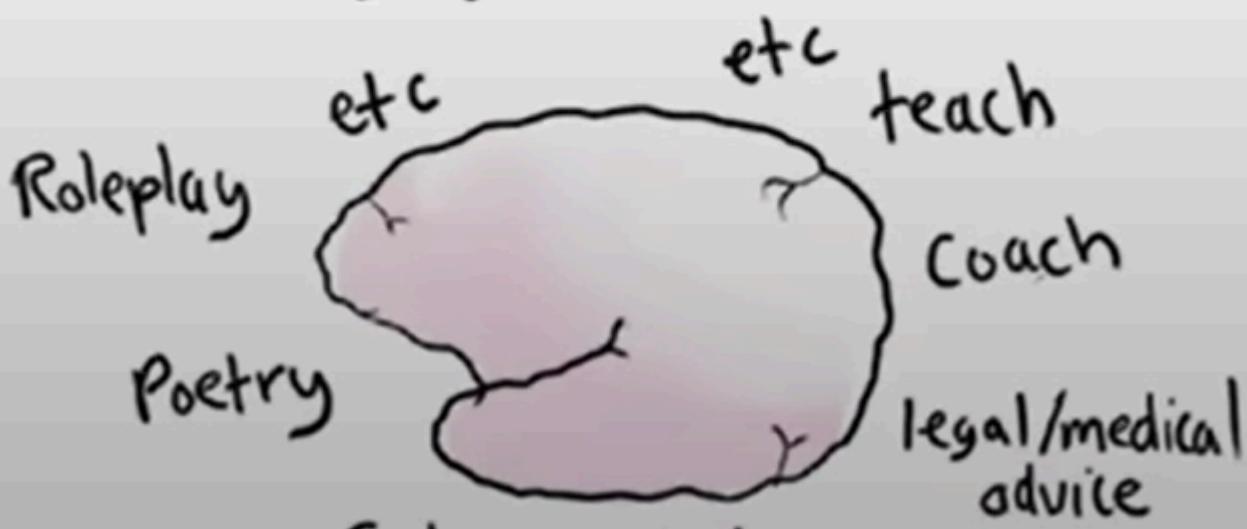


Emergent Capabilities

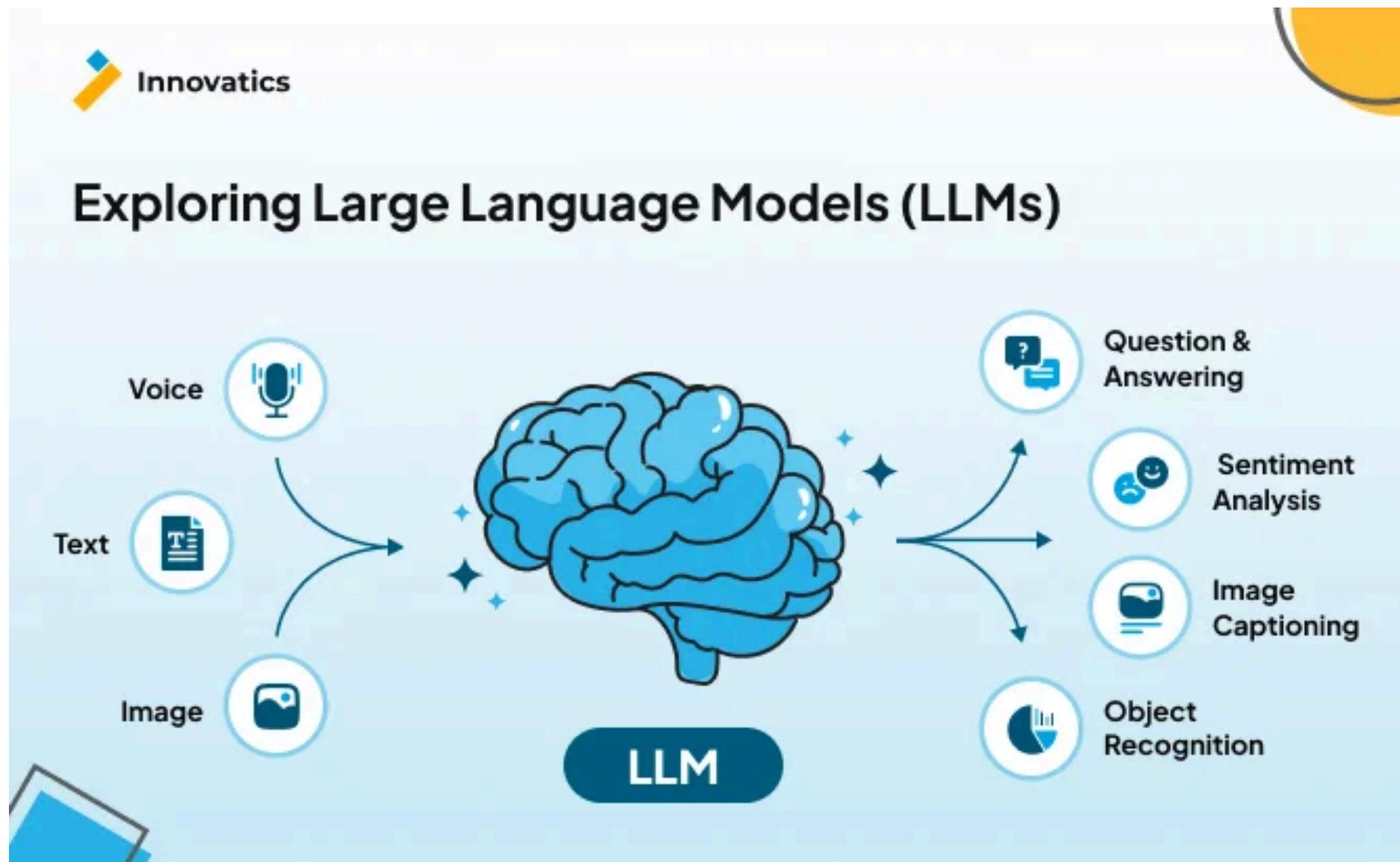
Small model

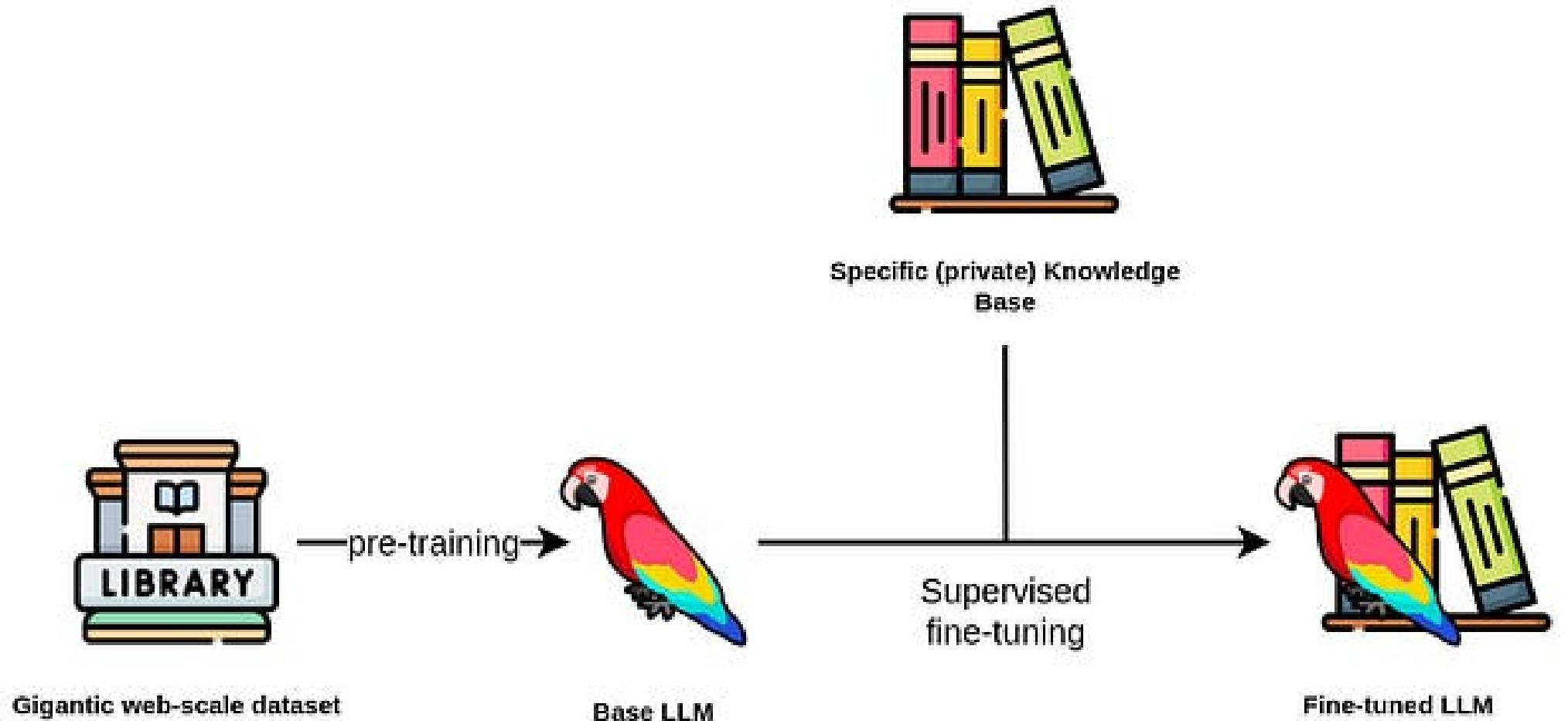


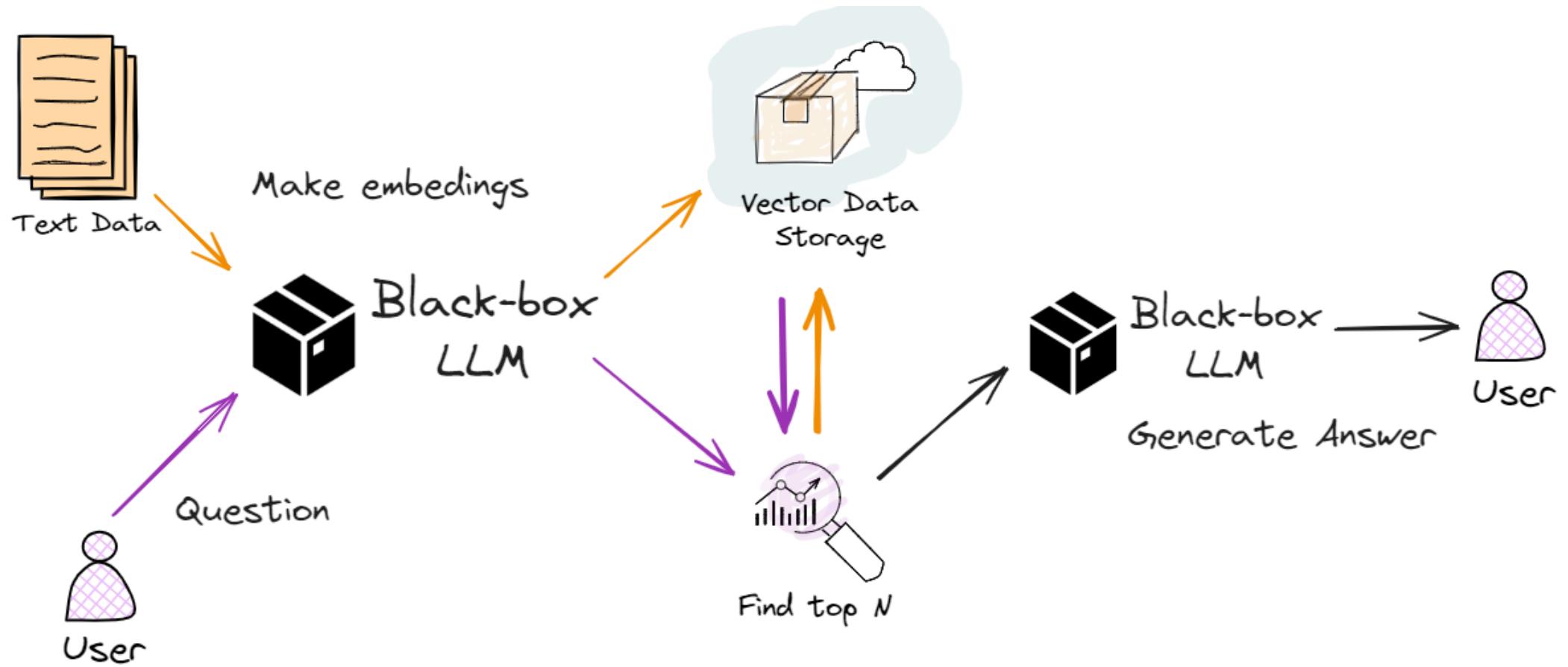
Large model



LLMs







Generative AI in a Nutshell

Zahid Asghar



Generative AI in a Nutshell

Prompt Engineering/Design

Bad prompt

You Give me an agenda for a workshop

Good prompt

You Give me an agenda for a workshop

task context

I'm meeting a leadership team at an europocean consulting firm.

The goal of the workshop is figure out how they can use AI.

They are new to it. We have 4 people for 4 hours.

Good prompt

You Give me an agenda for a workshop

questions

Feel free to ask me any clarifying questions first.

Iterate!

prompt → response
updated prompt → response

Followup prompt → response

Better communication skills overall

Better prompt engineering skills = Better results

Study, Practice, Learn

Autonomous Agents with tools

Here Be Dragons

Mission

want miss to do that basement...

prompt → response

updated prompt → response

Followup prompt → response

Side effect

Better communication skills overall

Computers have gotten smarter

Execute Instructions

Learn + Think

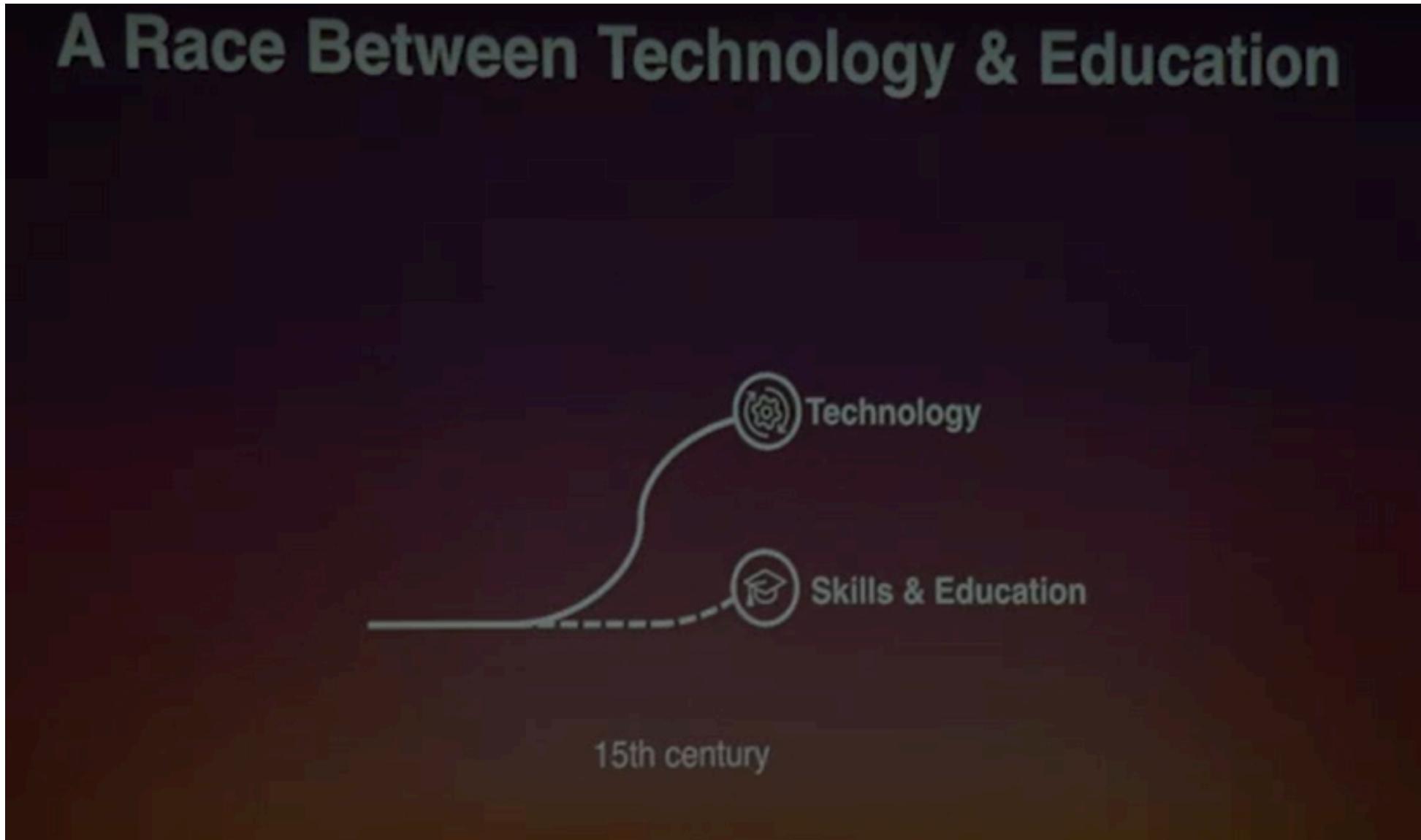
What are you? Explain in 1 sentence to a 10 year old.

ChatGPT

DD DD DD DD DD

DD DD DD DD DD</

Race between Education and Technology



The Impact of AI on Education

- AI is increasingly becoming a part of educational and professional landscapes.
- **The core issue is not just preventing cheating but recognizing that AI can accomplish college-level tasks.**
- Graduating students who can write only as well as AI seems like a recipe for unemployment.
- **Even if you can prevent cheating, the real problem is that AI can do college-level work.**



AI as a Partner in Learning

- AI can help accelerate achievements both in educational settings and beyond.
- **Educators need to guide students to be better thinkers, particularly in how they use AI.**
- AI is becoming a new, powerful partner, in both the classroom and the real world, that can accelerate accomplishment and achievement.
- **It is the job of educators to help students become better thinkers. Our new job is to help them become even better thinkers with AI.**



The Role of AI in Idea Generation

- AI can assist in generating ideas, refining questions, and clarifying thought processes.
- Humans still need to iterate and prototype, but AI can generate a high volume of ideas, which humans often struggle with.

The best way to have a good idea is to have lots of ideas. Humans will need to continue the process of prototyping, testing, and iterating, but humans consistently struggle to produce large quantities of different and new ideas.'



AI's Role in Education: Practical Applications

- **AI can help with routine educational tasks such as grading, creating assignments, learning outcomes of a lecture and managing student interactions.**
- Answering emails? Summarizing documents? Grading papers? Creating new assignments, activities, or assessments?

Your job is changing,& an AI collaborator could make it better & easier. Upload an existing syllabus and ask for improvements, or start with a new course description or learning outcomes.



Ethical Challenges and Considerations

- While AI detection tools exist, they are not foolproof, and reliance on them alone could have unintended consequences.
- **The rise of AI demands a reevaluation of academic standards and integrity.**

Reducing cheating is good, but we also need to rethink our standards, what we are really hoping to teach, and what academic integrity will mean in this new era. More students will use AI if they have motive, means, and opportunity.



AI in Grading and Assignments

- AI can help make grading more efficient and consistent, but it also changes the nature of what grades represent.
- **The use of AI in education should aim to prepare students for real-world skills, not just academic performance.**

Can grading become a tool to prepare students with better real-world skills? The traditional days of grading responses to prompts are over. Since all of us will be thinking in dialogue with AI...



Future Implications and the Role of AI

- AI's integration into education is inevitable and can be beneficial if used properly.
- **Students and educators need to learn how to collaborate with AI to enhance learning outcomes.**

Banning AI from the classroom will backfire, just as Wi-Fi kill switches did. Graduates without the ability to think, write, and work with AI will be at a serious disadvantage for future jobs.



Embracing AI in Education

- AI offers both challenges and opportunities; educators need to guide students in using AI effectively.
- The focus should be on enhancing critical thinking and leveraging AI as a tool for better learning outcomes.

Building AI feedback into assignments can increase motivation, learning, and agency. The point to all of these is not predictive accuracy, but feedback to help us think.



Comming Wave & Jobs

- “**AI offers vast tools for augmenting workers and enhancing work. We must master these tools and make them work for us.**” David Autor
- As per David Autor, the problem is that older models assumed technology ” might raise some boats more than others, but wouldn’t lower any boats. However, as digital technology transformed the globaly economy there was “lots of evidence people were made worse off.”



The Future of Education with AI

The Future of Education with AI

- “AI in Education: A New Era of Learning”
- “The Positive Potential of AI in Education”
- “AI as a Catalyst for Educational Transformation”
- “Empowering Teachers and Students with AI”
- “The Cheating Crisis: AI Threatens Education”
- “AI in Education: Undermining Learning?”
- “AI as a personal tutor”
- “AI as a teaching assistant”



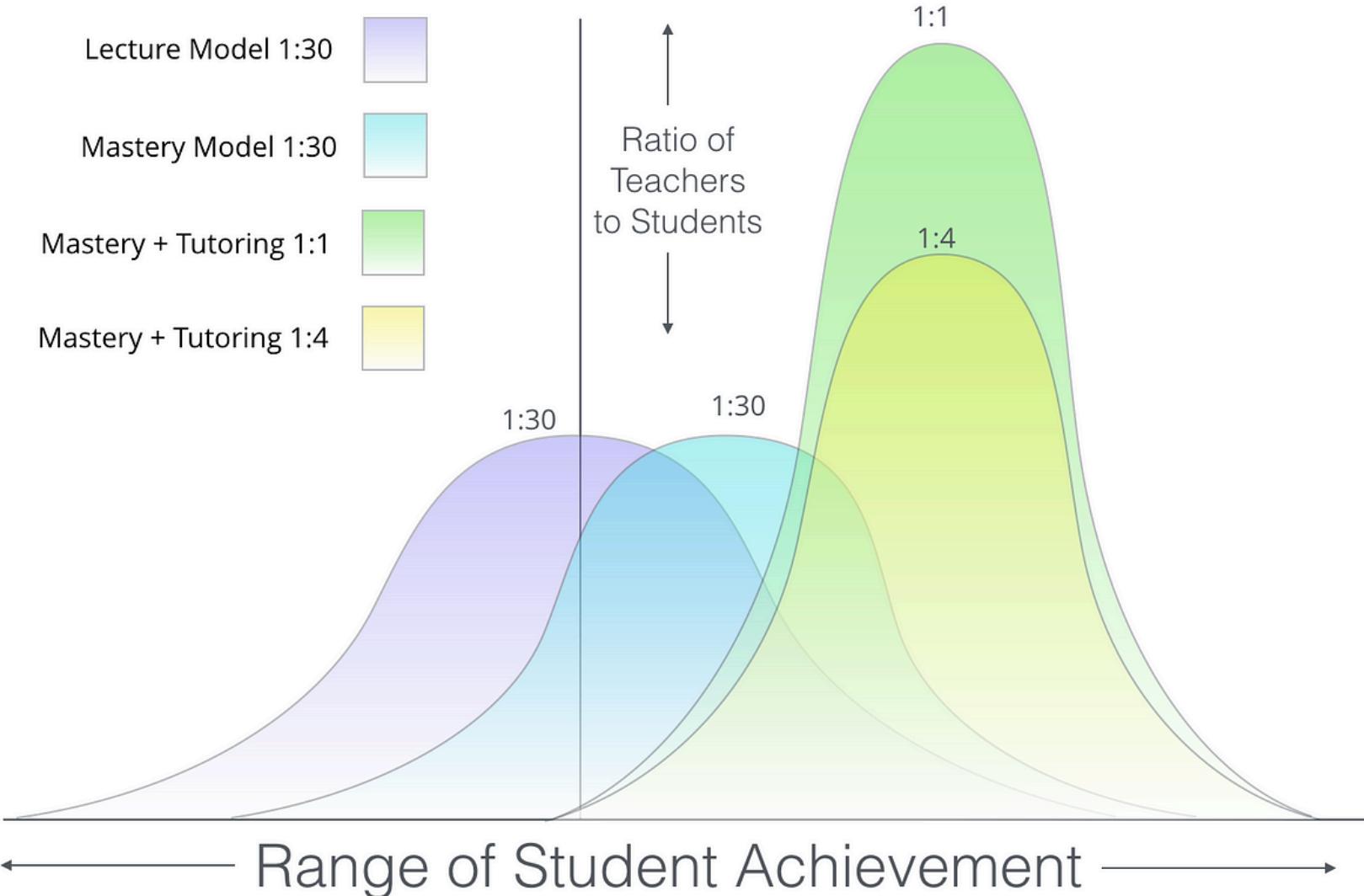
AI Tutoring : Khanmigo , Connigo



- “Benjamin Bloom’s 2 Sigma Study”
 - “1-to-1 Tutoring: Two Standard Deviation Improvement”
 - “Unlocking Potential: From Average to Exceptional Students”
 - “AI Tutoring: A Scalable Solution to the 2 Sigma Problem”
- “Introducing Khanmigo: Your Personal AI Tutor”
- “Enhanced Learning Experience: Socratic Conversations”
- “AI Assistance in Math, Programming, and Literature”
- “Empowering Students with Personal Coaching”
- “Guidance, Academic Support, and Career Counseling”
- “AI-Powered Coaching for Every Student”



Two Sigma Problem



AI Writing Coach

- “Collaborative Writing with AI Assistance”
- “Enhancing Writing Skills: AI-Student Collaboration”
- “Feedback, Guidance, and Improvement in Writing”

Reading Comprehension

- “Interactive Reading Comprehension with AI”
- “Analyzing Texts, Answering Questions, and Providing Insights”
- “Enhancing Critical Thinking and Analysis Skills”



- “AI in the Classroom: Indo-Pak History Lesson”
- “AI-Powered Teaching Assistant for Teachers”
- “Lesson Planning, Explanation, and Progress Monitoring”
- “Transformative Potential of AI in Education”
- “Enhancing AI Capabilities for a Magical Learning Experience”
- “Combining Human Intelligence with AI for Educational Advancement”



Paul Samuelson as your Assistant

Give a learning outcomes on consumer theory lecture in 3 points with 15 words for each point

Differentiate between Marshallian and Hicksian demand function, restrict response to 50 words

Explain it in little detail, restrict response to 100 words

Give some mathematics

Provide a real life example

Give slides on Marshallian and Hicksian demand function with learning outcomes



The 3 Principles of a Learning Accelerator



Blended Learning

A mix of digital and face-to-face teaching methods to create a flexible learning experience.



Personalization

Personalization focuses on customizing the learning experience to the unique needs and goals of individual learners.

Text to image

Prompt : Create an image for QAU students sitting as a community learners in a classroom.



Zahid Asghar

Zahid Asghar



Old vs New Model



Yet, our educational institutions have not evolved much. **We still put people in lecture halls for one-size-fits-all teaching**, and many companies only offer a couple of days of training per year. This model is outdated.

Things not discussed

- Customised advanced tools: Policy Advisor, Fiscal Policy Advisor, Economics Expert,...
- **Coding, Mathematics, Data Analysis ...**
- Technology's Impact on Humanity

Containment: Can We Do It?



- Navigating the Coming Wave
- **AI and Wars**
- How Ukraine countered largest every military deployment of Russia
- **AI and the Future of Work**



Prompt

You are hiring a “waiter” The typical daily wage rate is PKR 800. You have 2 candidates. Person 1: Has 1 year(s) of experience in this role. Requests PKR 1100. Person 2: Has 0 year(s) of experience in this role. Requests PKR 900. Who would you hire? You have to pick one.

Explain Solow Growth model to an undergraduate student in 70 words.

Simulate the Solow growth model and plot the results in a four chart.



Resources

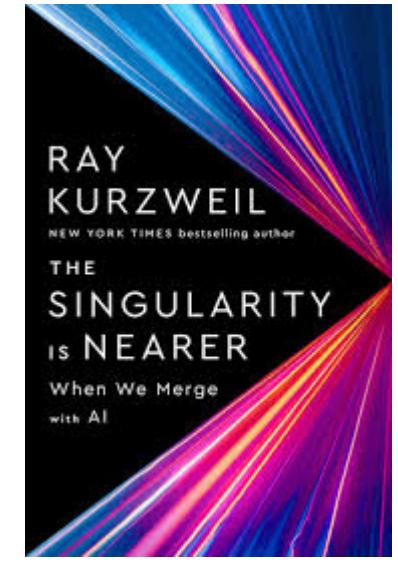
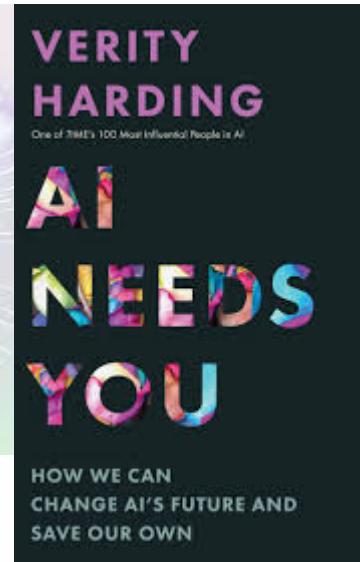
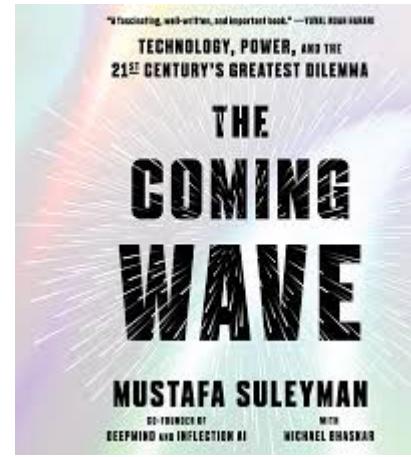
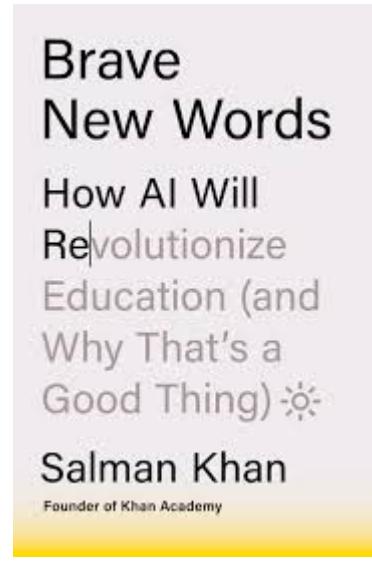
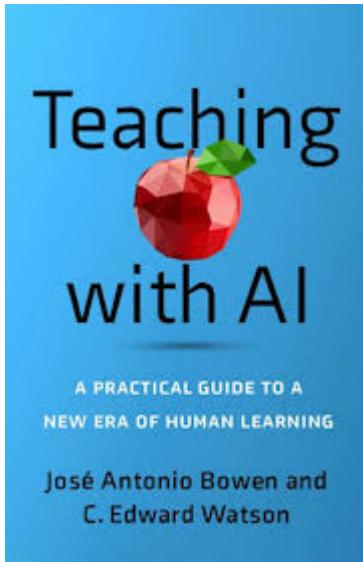
Zahid Asghar



- Re-inventing Education for the Digital Age | David Middelbeck
| TEDxMünster
- AI for Economists: Prompt & Resources
- Teaching Naked Teaching with AI
- What is Prompt Engineering
- Policy Advisor
- Fiscal policy advisor
- Economics expert
- Tutor me
- Duolingo
- R for economics and Econometrics



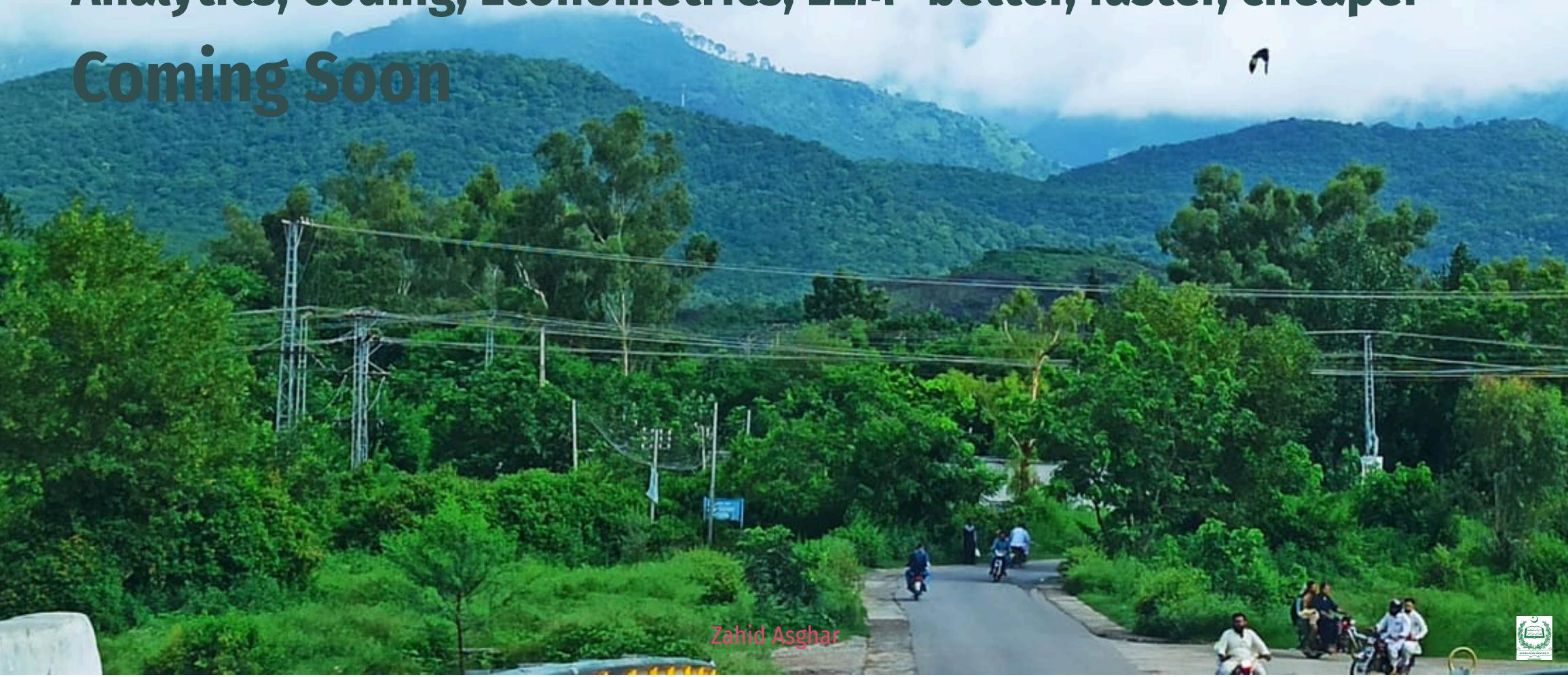
Books I found useful in 2024



The one I failed to get **Co-Intelligence: Living and Working with AI** but an interesting source of learning through videos and podcasts.

**One Day-Workshop on Advanced Use of Generative AI
(including Fiscal Policy Advisor, Economics Experts AI tools ...) for Economics Research, Ideation, Research Questions, Assessing Fitness of Paper for Specific Journal, Advanced Data Analytics, Coding, Econometrics, LLM- better, faster, cheaper**

Coming Soon



Conclusion

Education needs to catch up with technology. There are many ways for us to contribute, whether as teachers, parents, students, or colleagues. Together, we can help build the education system of the future, one that is personalized, flexible, and better suited to the challenges of the 21st century.

Thank you for your attention.

