

IT1244

Artificial Intelligence: Technology & Impact

Week 3 Tutorial 1

HI, IM KAI RONG!

about me:

- Year 3 Data Science and Analytics
- Took IT1244 AY24/25 Semester 1
- Interest: XAI, Machine Learning, Data Visualization
- Workshop Head @ NUS Statistics and Data Science Society (SDS) & Curriculum Head @ NUS Product Club
- 1st time teaching IT1244 (Ur feedback helps me improve!)
- Looking forward to learning together this semester



HOW CAN I ASSIST YOU?

Coursework Help

Please message me on Telegram @kaiironglee for any questions you have about the course.

You can also leave comments on Coursemology and I will reply to you when it's my turn. (Week 5,8,11)

Consultations

If you need something more than just “messages” (e.g. project), let me know on tele asking for a consultation and we can sort a slot out!

Interest

If you would like to chat about Data Science/ Machine Learning/ AI/ Uni Courses or anything you're curious or interested about, give me a text! I am happy to discuss ideas or maybe answer any questions you have.

HOW I WILL CONDUCT TUTORIALS

1. Recap of concepts

2. Pollev Questions

3. Discussion of tutorial questions

MY TUTORIAL STYLE:

I really value interactions! I'll try to make the tutorials as engaing as possible so you have fun learning AI!

On your end, if you could try to ask / answer one question in each tutorial, I'll be very happy! 😊

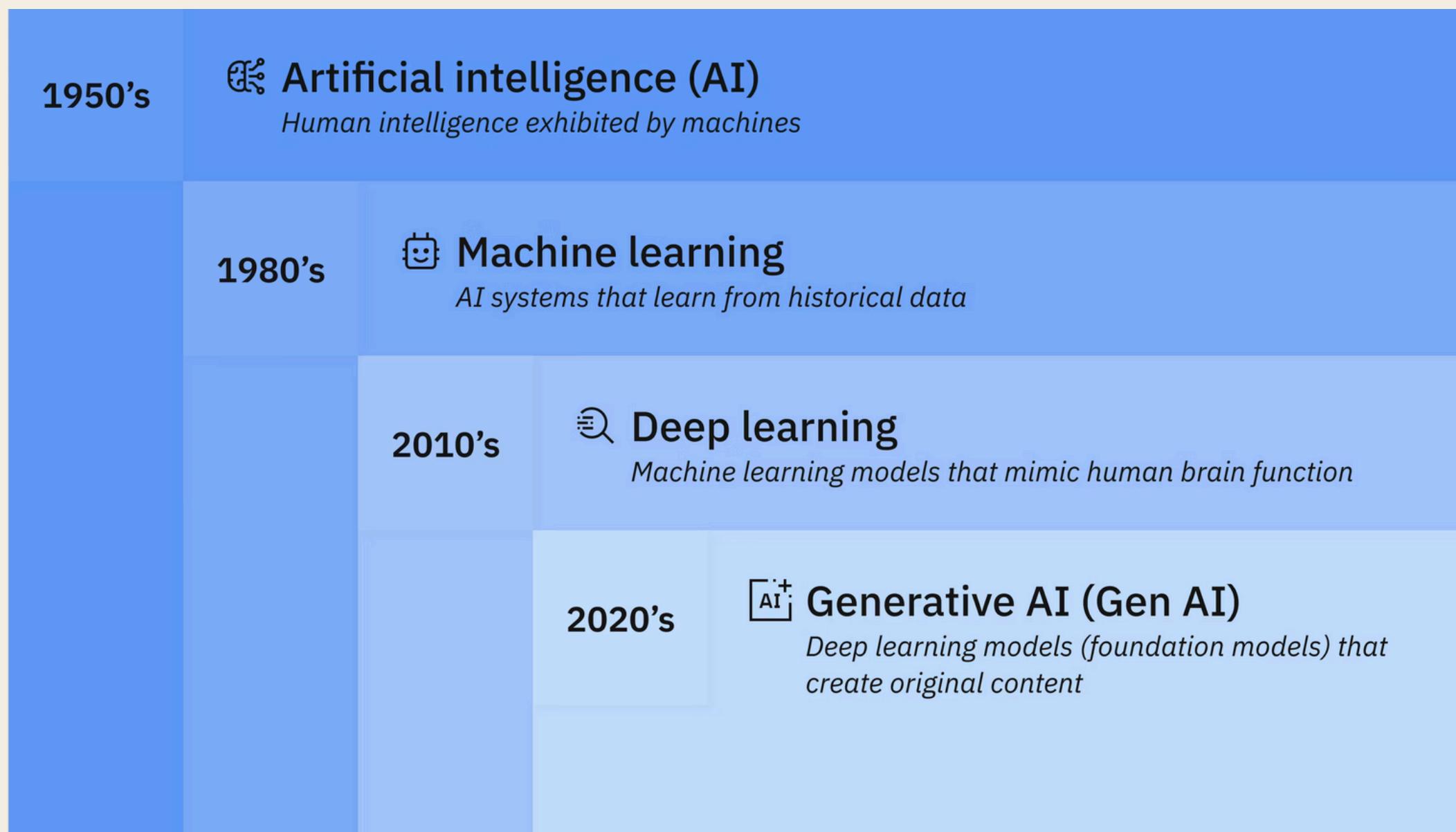
SO... WHAT IS AI?

What my mom (and most people) think AI is



SO... WHAT IS AI?

Not wrong! But there's more to that...



- **AI:** Machines that simulate aspects of human intelligence (hence called Artificial Intelligence)
- Enable systems to:
 - a. Perceive the world
 - b. Learn and reason from data
 - c. Make decisions and act
 - d. Operate with some level of autonomy

Q: Which layer would you classify our best friend ChatGPT?

QUICK CONCEPT RECAP (WEEK 1)

Landmark Achievements:

- 1997 – Deep Blue vs Kasparov
- 2005 – DARPA Autonomous Vehicles
- 2011 – IBM Watson (Jeopardy)
- 2016 – AlphaGo
- 2019 – OpenAI Five / AlphaStar
- 2020 – AlphaFold

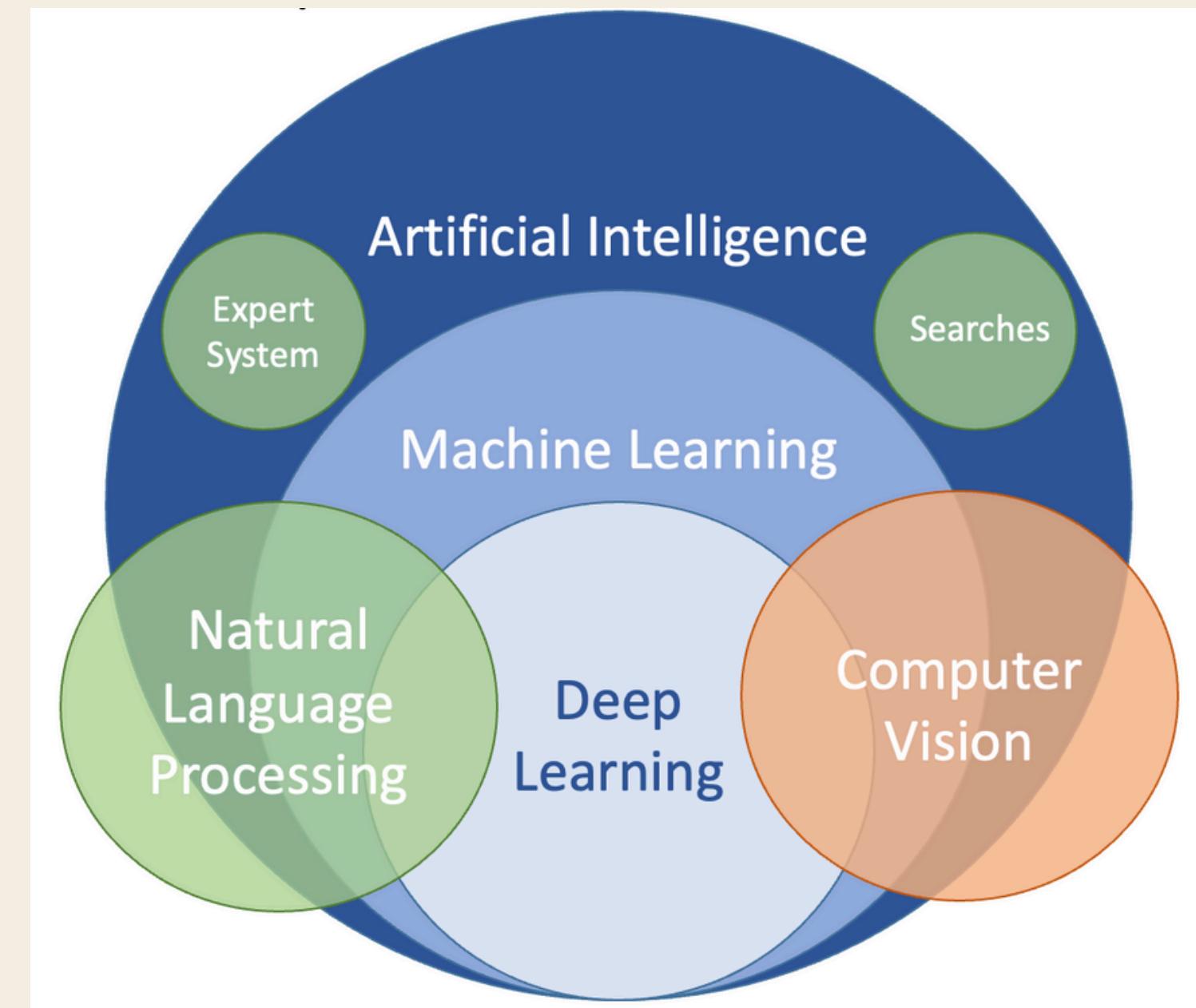
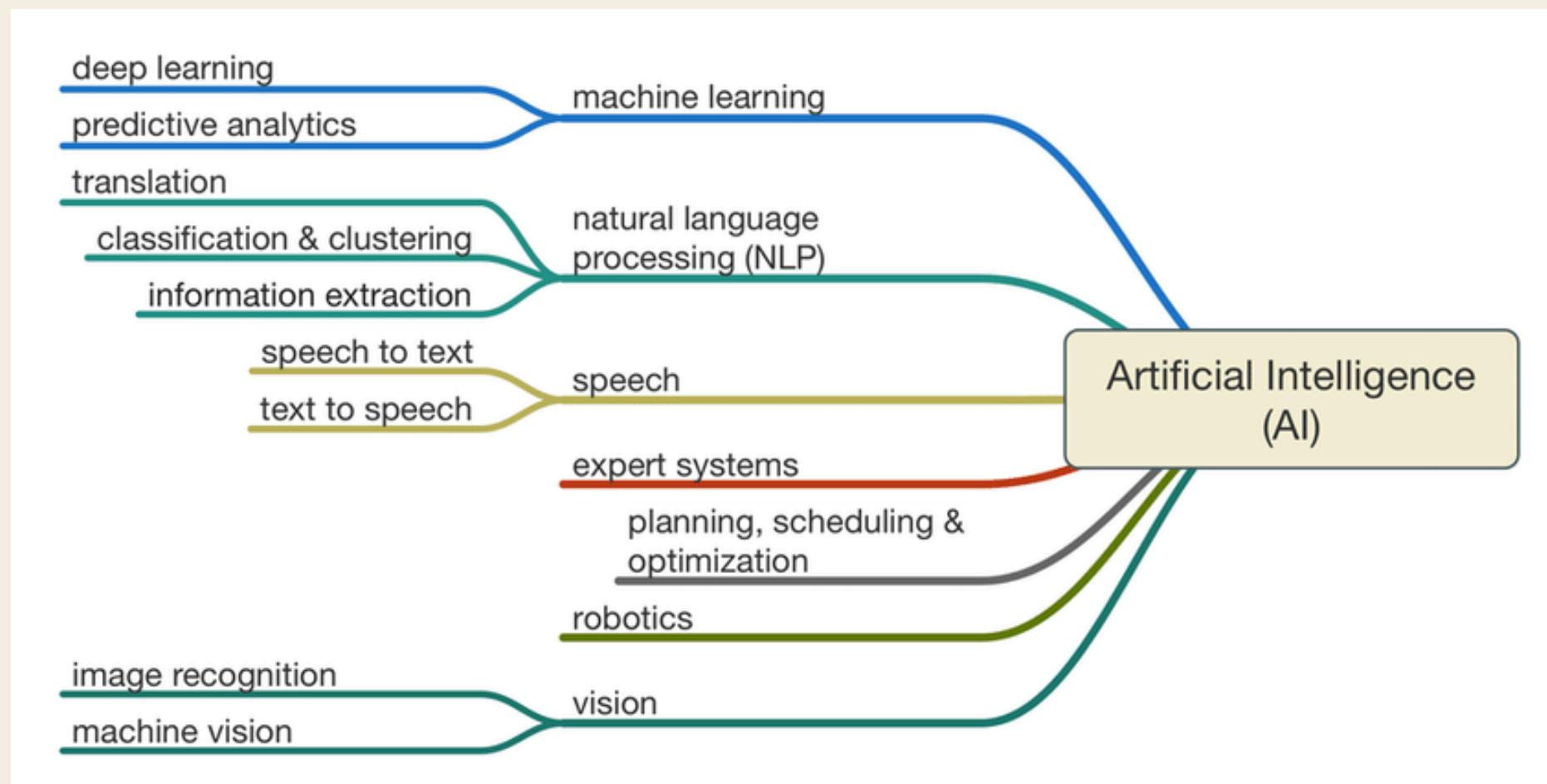
Why AI progress accelerating:

- Exponential growth in computing power
- Explosion of data availability
- Algorithmic advances (deep learning)
- Software + hardware reinforce each other
- AI becoming a general-purpose technology



QUICK CONCEPT RECAP (WEEK 1)

Major branches of AI & how they relate to each other



Q: Where would you classify the running robot in the slide before?

QUICK CONCEPT RECAP (WEEK 2)

Three Levels of Analytics

1. Descriptive Analytics

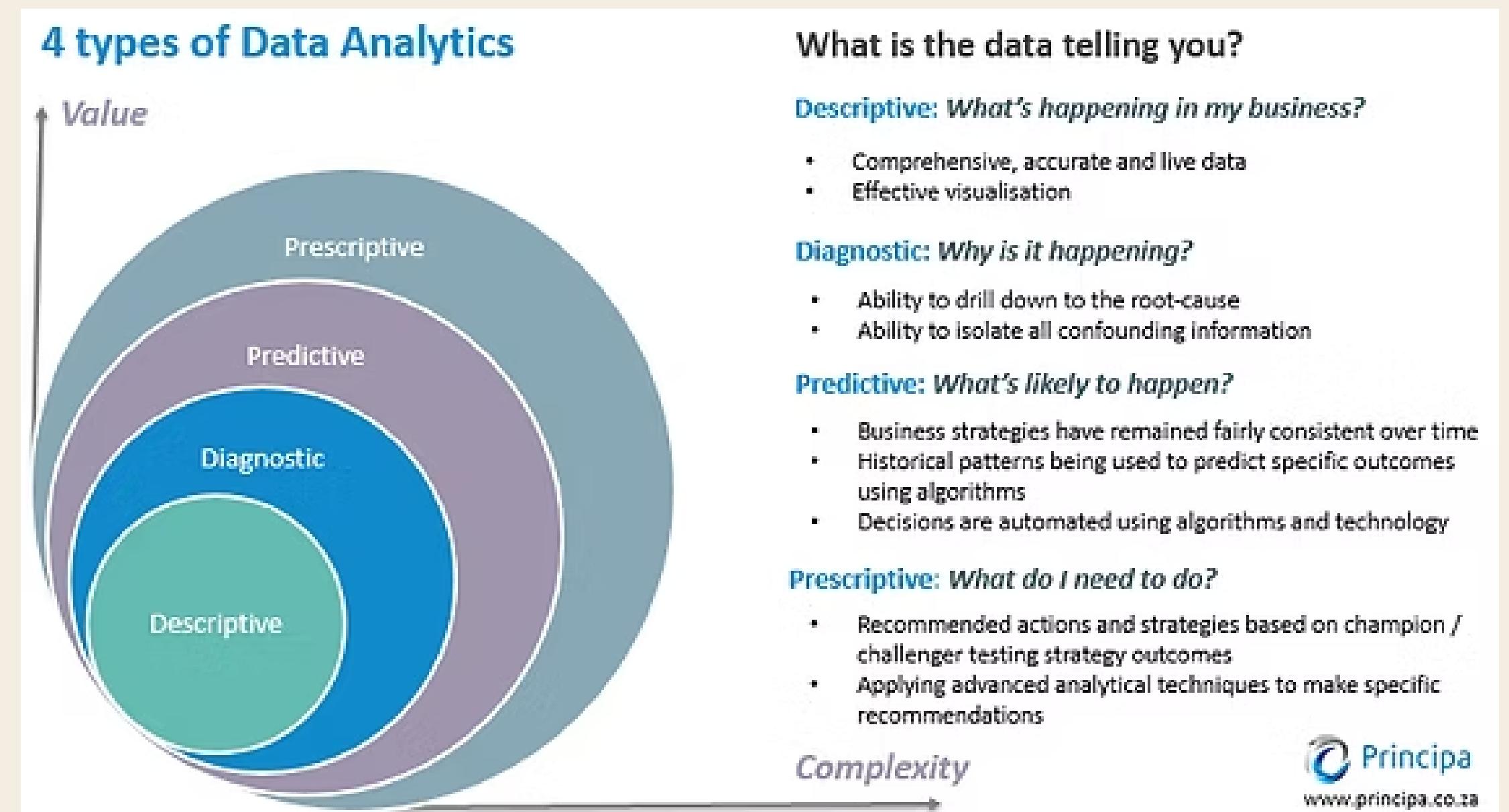
- What happened?
- Clustering, PCA
- Data visualization

2. Predictive Analytics

- What will happen?
- Classification, regression
- Forecasting

3. Prescriptive Analytics

- What should we do?
- Search, planning, optimization
- Decision support



POLLEV QUESTIONS

Join by Web:

PollEv.com/kaironglee

Join by QR:



TUTORIAL QUESTION 1

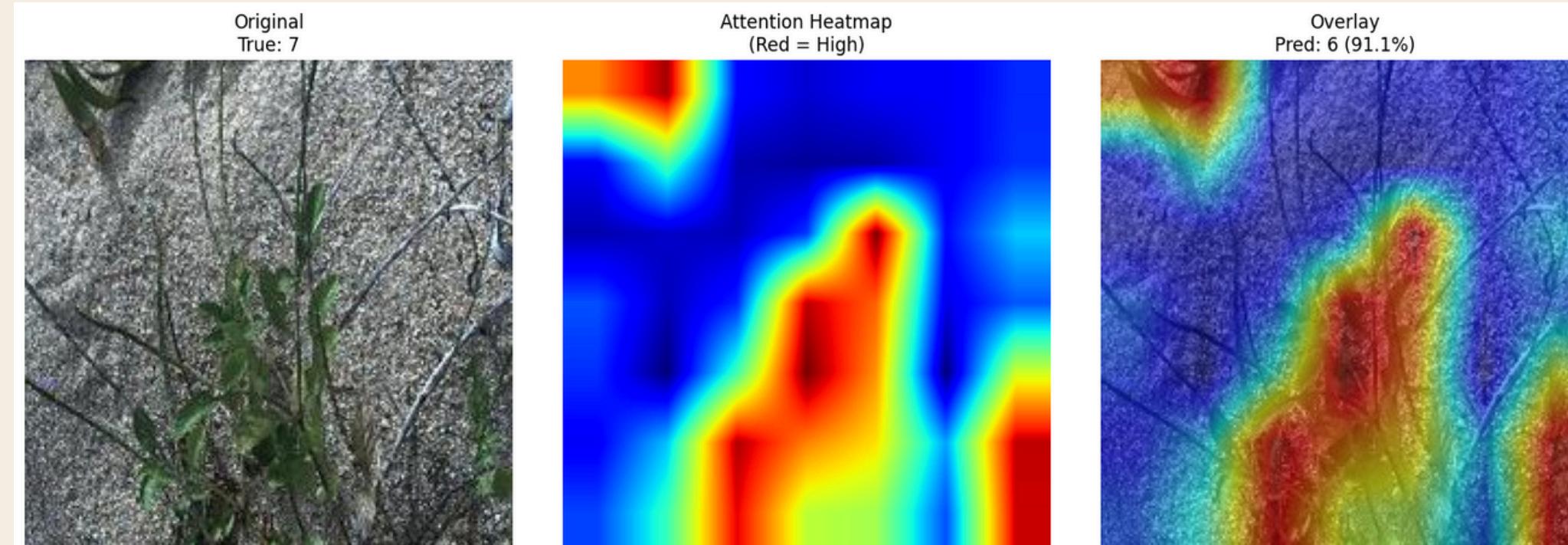
Write one application of AI that fascinates you, and explain why?

Anyone interested to share? :D

TUTORIAL QUESTION 1

Explainable AI (XAI)

- AI nowadays are becoming more and more advanced
- Till not even AI engineers or data scientist who wrote the algorithm can understand and explain how an AI arrives to a certain conclusion → “black box”
- On the top of your head, you could already think of many complications to this issue (eg. bias, AI hallucinations, not being to explain to your non-technical boss what your AI is doing)
- My CS3244 Project: XAI for Weed Image Classification



TUTORIAL QUESTION 2

Write down examples that are not discussed in the lecture videos for the questions below:

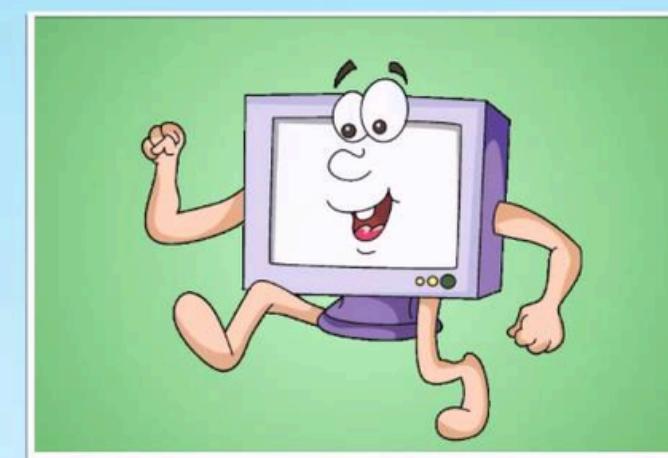
- Write down two tasks that computers are good at and explain why.
- Write down two tasks that computers are not good at and explain why.

Anyone interested to share? :D

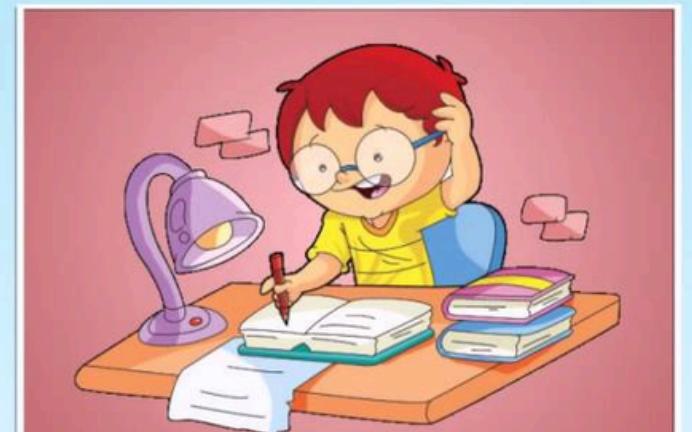
TUTORIAL QUESTION 2

Computers are good at:

- Processing large amounts of data quickly
- Performing repetitive tasks consistently without fatigue
- Parallel processing & multitasking
- Following explicit rules and algorithms
- Precise calculations and mathematical operations



It never gets tired.

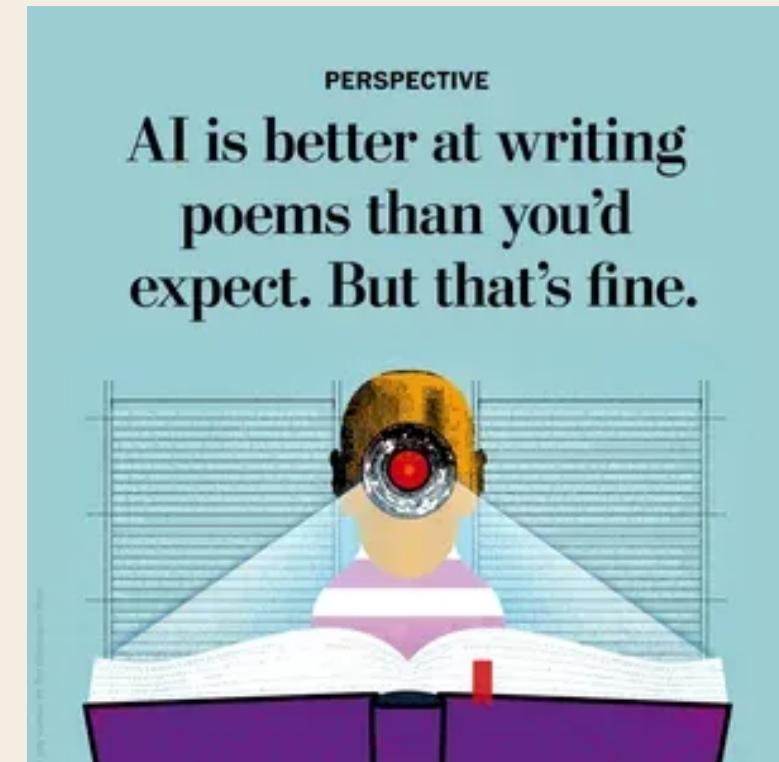
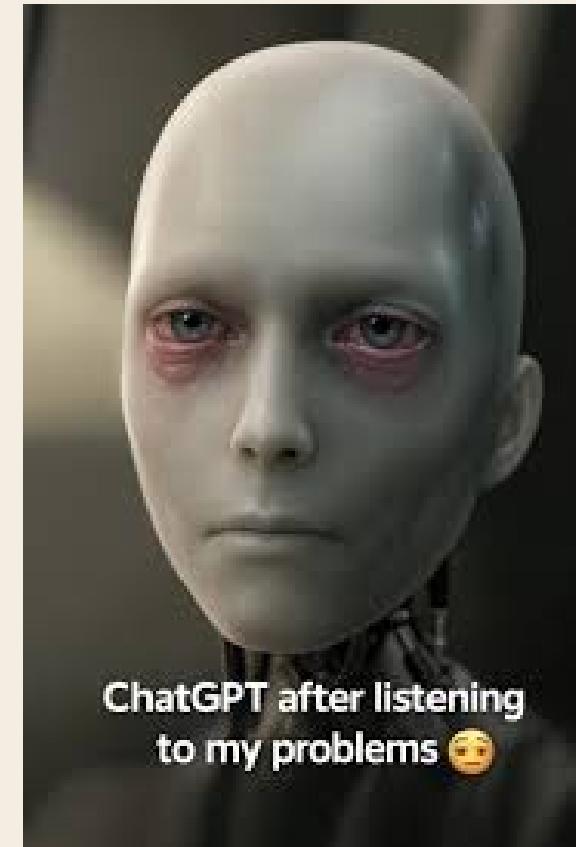


You feel tired after doing some work.

TUTORIAL QUESTION 2

Computers are not so good at:

- 1. Empathy and Emotional Intelligence** (though AI can simulate empathetic behaviour with lots of data, it still lacks the authenticity like humans)
- 2. Adaptive learning and experience** (catastrophic forgetting – AI tends to “forget” old knowledge to adapt to “new” knowledge)
- 3. Creating NEW creative work** (arts, poems etc)



<https://www.washingtonpost.com/books/2023/02/13/ai-in-poetry/>

TUTORIAL QUESTION 3

To what extent are the following computer systems being examples of artificial intelligence:

- a. Decathlon's self-checkout scanners.
- b. Web search engines.
- c. Voice-activated telephone menus.
- d. Spelling and grammar correction features in word processing programs.
- e. Automatic doors in shopping malls.



Anyone interested to share? :D

TUTORIAL QUESTION 3

a. Decathlon's self-checkout scanners

No Intelligence, only sensing & computations → Radio Frequency Identification

b. Web search engines

Selecting relevant text/documents to the query has some AI (in fact, we

have AI Summary Overview today. thanks google!)

c. Voice-activated telephone menus

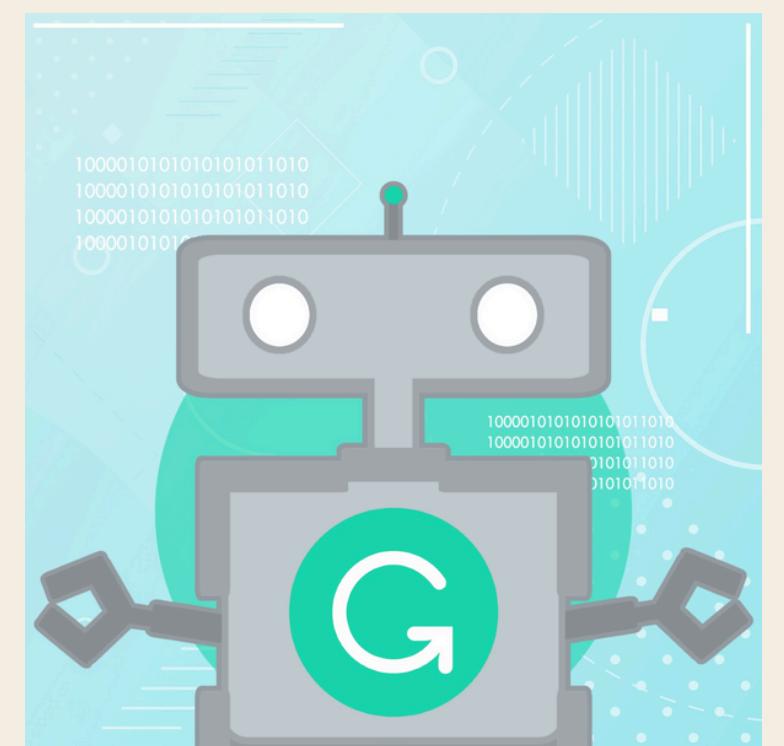
Recognizing voice has some level of intelligence.

d. Spelling and grammar correction features in word processing programs

AI program has to understand the text in order to correct it. So AI in text recognition is used.

e. Automatic doors in shopping malls.

No Intelligence here, only sensing & computations.



TUTORIAL QUESTION 4

Examine the AI literature to discover whether the following tasks can be solved by computers today? If the task can't be solved by computers, try to find out why.

- a. Playing a decent game of table tennis (Ping-Pong).
- b. Driving in the center of Cairo, Egypt.
- c. Driving Autonomous Car in Gardens by the Bay, Singapore.
- d. Buying a week's worth of groceries at the Clementi FairPrice.
- e. Buying a week's worth of groceries on the Internet.
- f. Discovering and proving new mathematical theorems.
- g. Writing an intentionally funny story.
- h. Giving competent legal advice in a specialized area of law.
- i. Translating spoken English into spoken Tamil in real time.
- j. Performing a complex surgical operation.

TUTORIAL QUESTION 4

1. Playing decent table tennis?

- **Yes.** There is an AI powered robot established 8 years ago ([Video](#))



2. AI driving in Cairo, Egypt?

- **No.** Cairo is simply too large, complex and unpredictable for autonomous car

3. Autonomous Driving Car in Gardens by the Bay?

- **Yes.** It is established 6 years ago, running on a 1.5km route ([Video](#))



4. Buying groceries physically?

- **No.** Currently no robot has managed to navigate in crowded area, pick up apples without squeezing and recognize items in various lightnings.

5. Buying groceries virtually?

- **Yes.** Software robots can do such tasks if the website does not change from time-to-time ([Video](#))

TUTORIAL QUESTION 4

6. Discovering and proving new mathematical theorems?

- **Yes.** SNARK is used in NASA Intelligence Systems Project

7. Writing funny story?

- **Yes.** Though funny is subjective.

8. Giving competent legal advice in specialised area of law?

- **Yes,** to some extent. Note hallucination and limitation of training data (not updated)

9. Real-time speech translation?

- **Yes.** Google Translate can do it

10. Performing a complex surgical operation?

- **Yes** (under experts' supervision/help). Robotic skills demonstrated at superhuman levels include drilling holes in bone to insert artificial joints, suturing, and knot-tying.

The image shows a mobile application interface with a light beige background. It features a vertical list of messages between a user and an AI bot. The user's messages are on the left, starting with "Tell me a joke" from a user icon labeled "DC". The AI bot's response is a joke: "Why couldn't the bicycle stand up by itself? Because it was two-tired.", accompanied by a green AI icon. Below this, another user message "Can you tell me a joke?" is shown, followed by the AI's response: "Sure, here's a programming-related joke for you: Why do programmers prefer dark mode? Because light attracts bugs!", also with a green AI icon. At the bottom right of each message row are small icons for thumbs up and thumbs down.

DC Tell me a joke

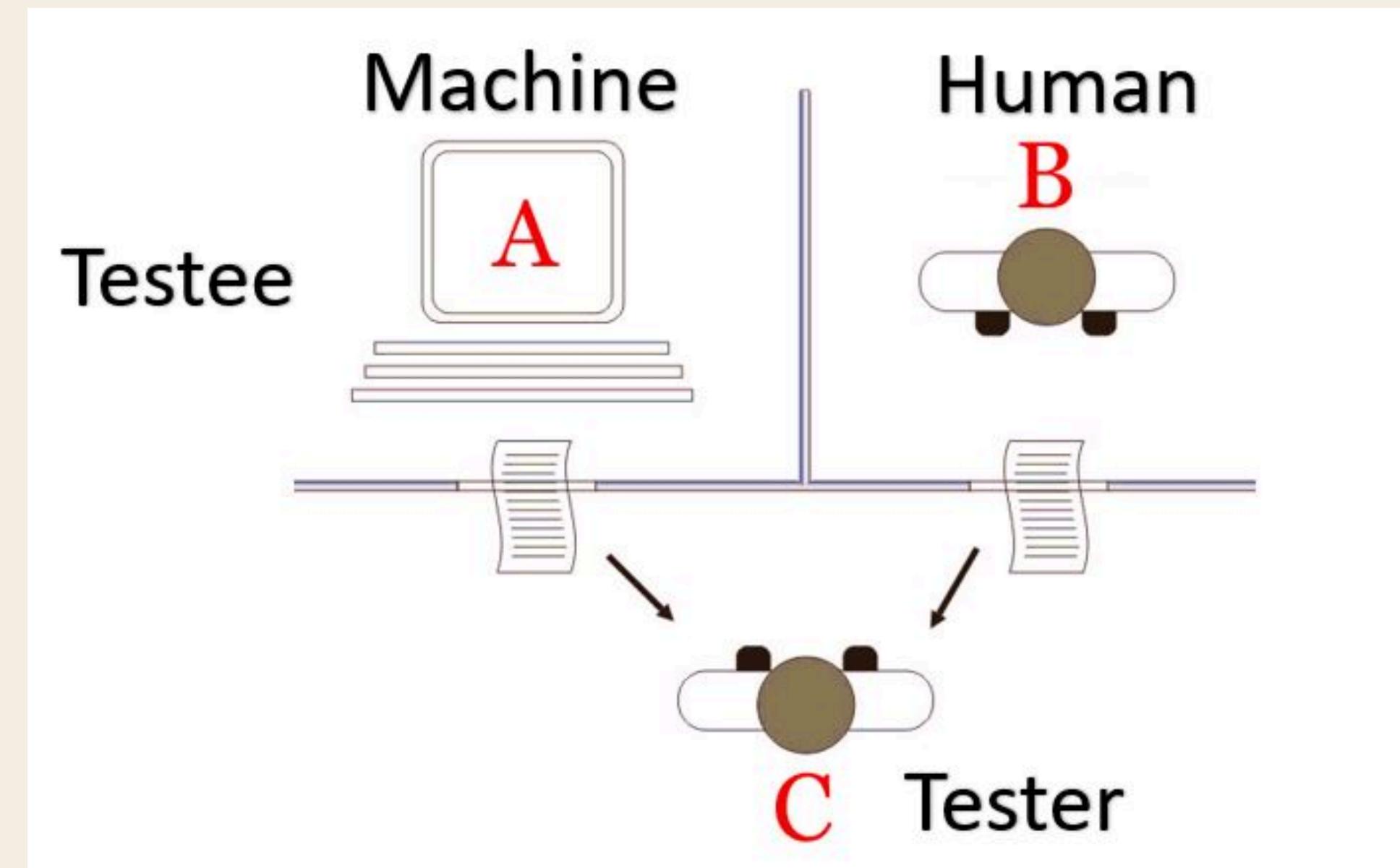
Why couldn't the bicycle stand up by itself?
Because it was two-tired.

MA Can you tell me a joke?

Sure, here's a programming-related joke for you:
Why do programmers prefer dark mode?
Because light attracts bugs!

TUTORIAL QUESTION 5

Find out what is Turing Test. Also explain the strength and weakness of Turing Test.



TUTORIAL QUESTION 5

Find out what is Turing Test. Also explain the strength and weakness of Turing Test.

What is Turing Test?

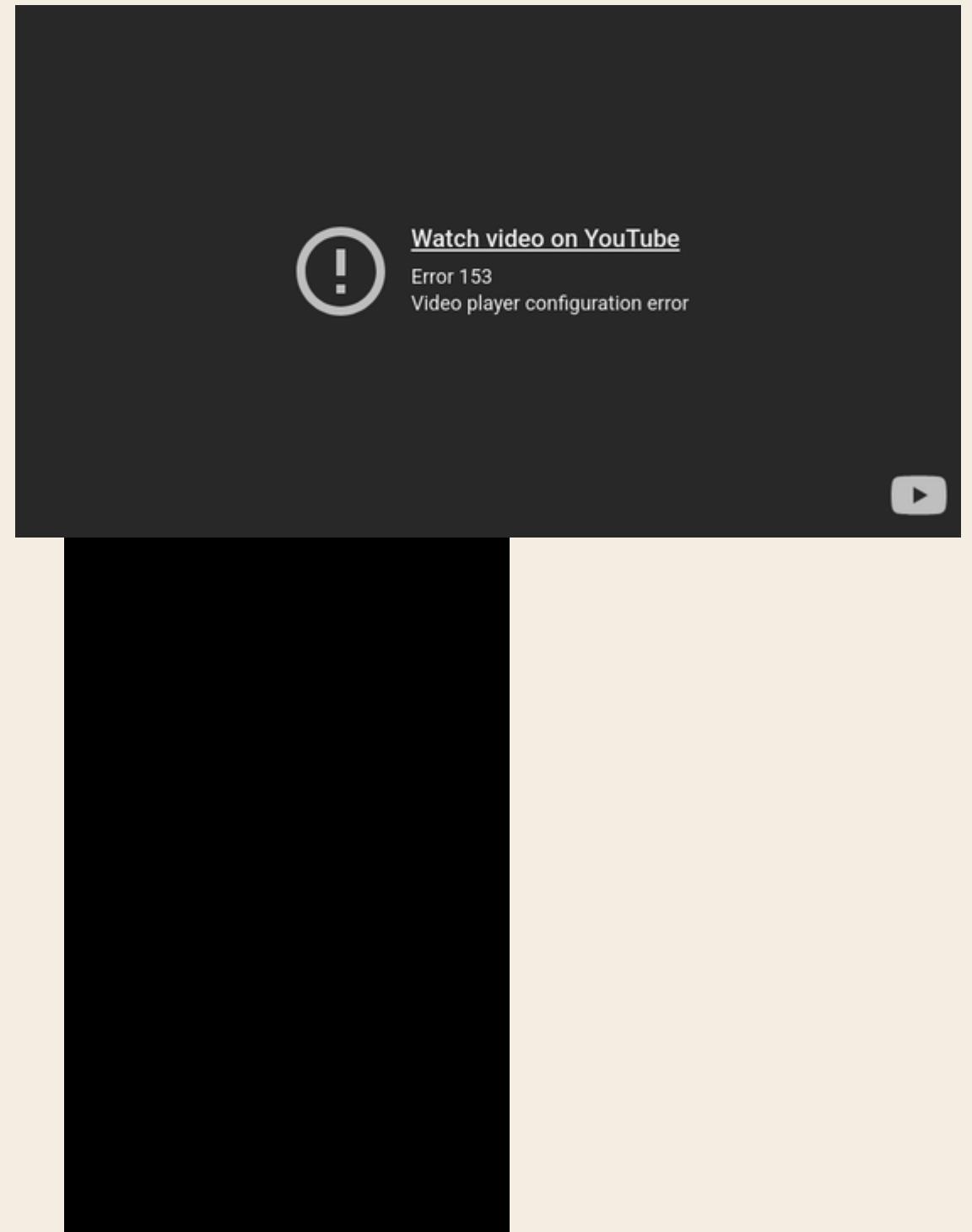
- Assessment to evaluate the machine's ability to intelligent behaviour indistinguishable from humans through written QnA

Strength?

- Measurable and simple (5 minutes conversation)
- Variety of intellectual tasks that we can access on the computer

Weakness?

- Only test if computer behaves like (can imitate) a human being (not that whether a computer behaves intelligently)
- Subjective judgement of the interrogators



TUTORIAL QUESTION 6

Imagine you're using ChatGPT, a language model, to assist you in various tasks. Explain what constitutes a good prompt and a bad prompt when interacting with ChatGPT. Provide 2 examples for each.

With LLMs being so popular these days, prompt engineering is more important than ever. There are many techniques like Few-shot prompting, Chain of thoughts prompting etc.

Fancy names but they're essentially very simple concepts of listing examples and breaking down problems into steps.

(Extra) Read more about [prompt engineering](#).

TUTORIAL QUESTION 6

Good Prompts:

- Clear and specific

🤔: "Tell me about solar energy,"

🤔: "What are the advantages and disadvantages of using solar panels for residential electricity?"

- Structured with Guiding Information

🤔: "Summarize the plot of Shakespeare's 'Hamlet' in three sentences."

Bad Prompts:

- Vague:

🤔: "How does it work?" (What is "it")

- Overly complex / Multi-layered

🤔: "Explain quantum physics, compare it to classical physics, tell me about its history, its applications, and also translate 'hello' into 10 languages."

Bad AI Prompts

Turn person into a cat



Turn subject in photo into a cute tabby cat with brown and black fur in a watercolor style painting, include starry night sky behind subject

Make image space themed



Create hyper-realistic space themed image, person is wearing an astronaut uniform, colorful galaxies and shooting stars in the dark moody sky

A cool colorful painting



A super colorful and bold painting style similar to pop art styles by Andy Warhol with detailed paint brush strokes and geometric shapes in the background of the subject



TUTORIAL QUESTION 6



<https://www.tiktok.com/@gravityassistus/video/7527160814671891742>

Try it at home: Create one good prompt and one bad prompt about asking ur favourite LLM to plan an itenary to the place you want to travel (eg. Japan). Compare the results.

NEXT WEEK

Searches

