Introduction to AI

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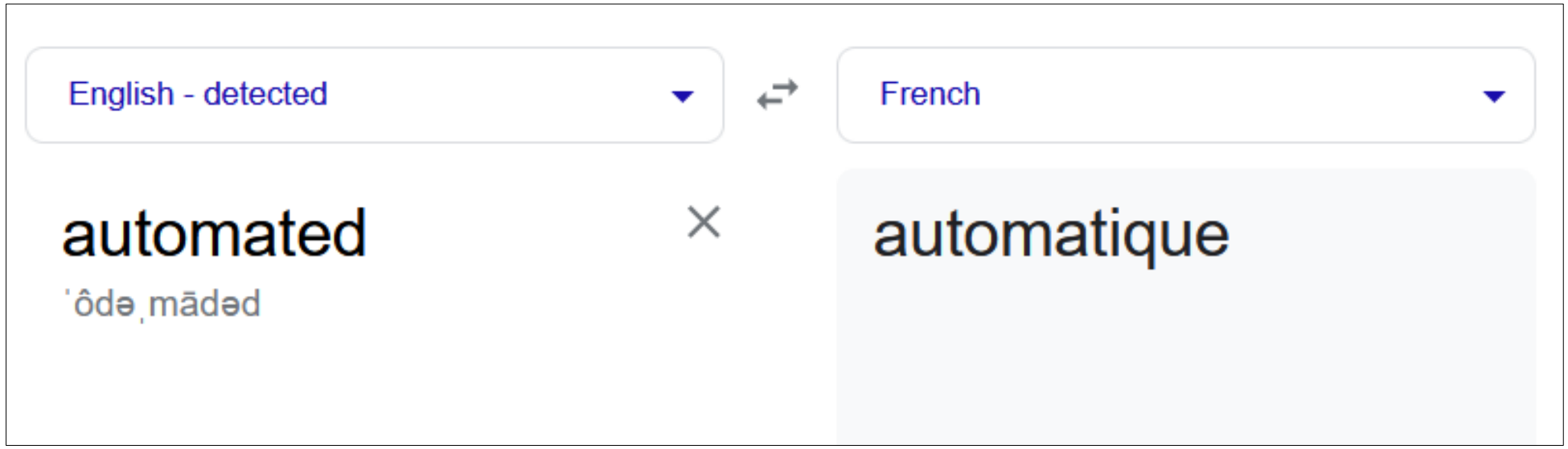
Applications of AI

- Descriptive – what happened
- Diagnostic – why it happened
- Predictive – what will happen
- Prescriptive – what should happen
- Generative – make it happen
- Deontic – the right thing to happen

All applications
https://ethics.mooc.ca/all_applications.htm

Automated Translation



https://support.google.com/chrome/answer/173424?hl=en&co=GENIE.Platform%3DDesktop

https://support.mozilla.org/en-US/kb/how-add-translate-feature-firefox

https://www.adobe.com/acrobat/hub/translate-a-pdf.html

https://www.deepl.com/translator

Face Recognition

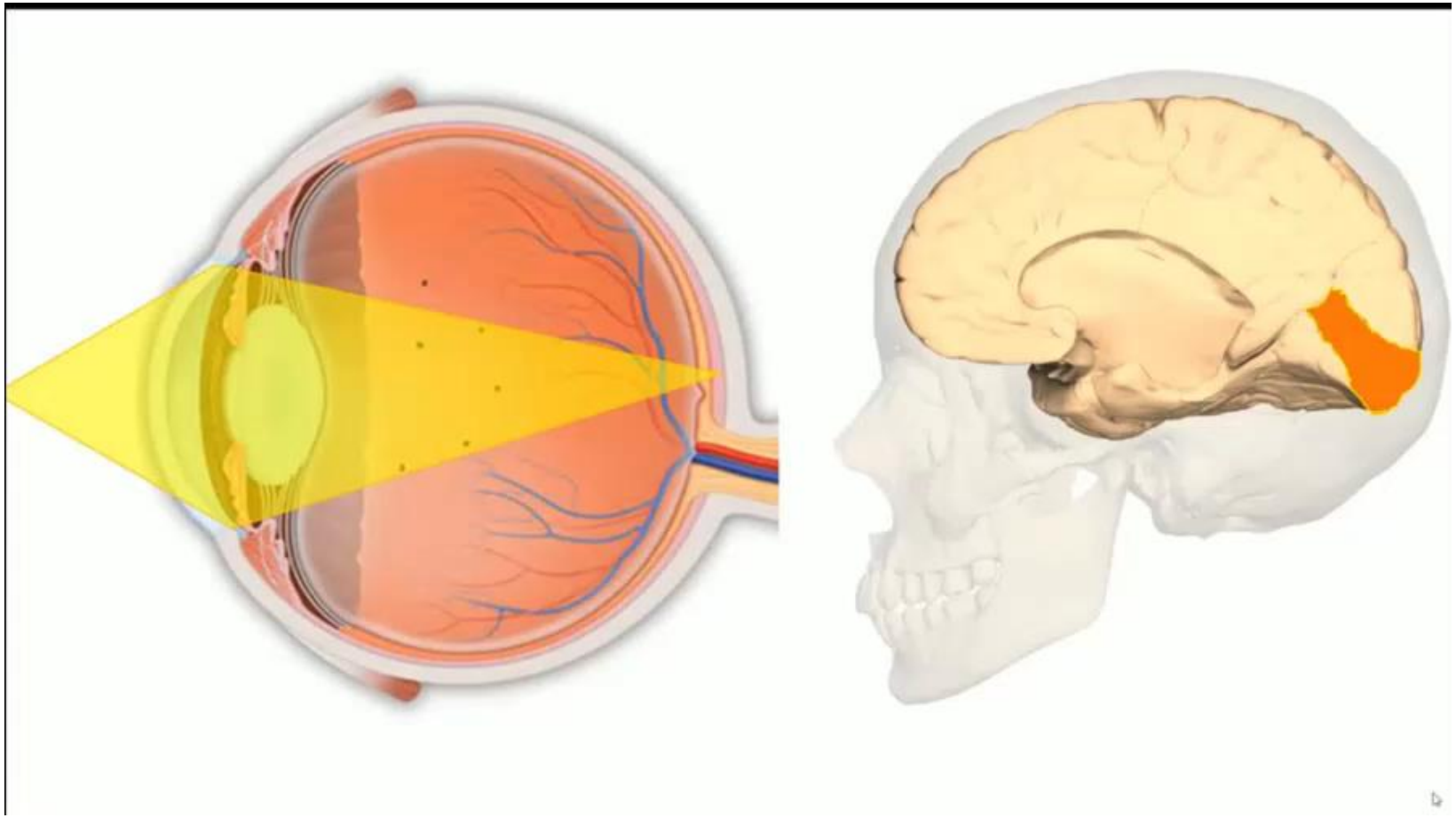
Example: your phone or computer signs you in by face recognition or thumbprint scan

https://www.contec.com/support/blog/2023/230215_ai/

Character Recognition

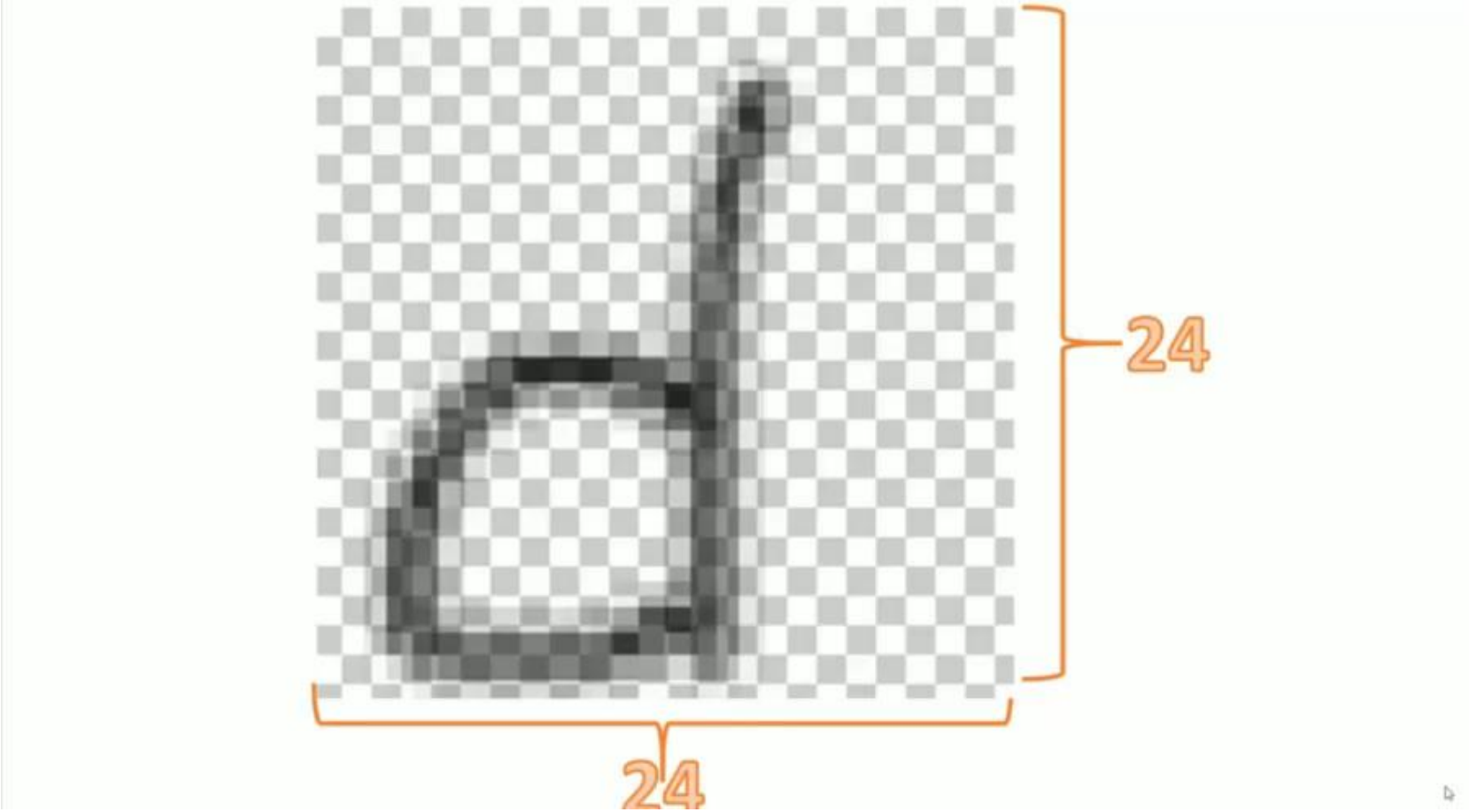
https://www.shutterstock.com/video/clip-1083335428-animation-convolutional-neural-network-teaching-computer-recognize

Layers of Neurons



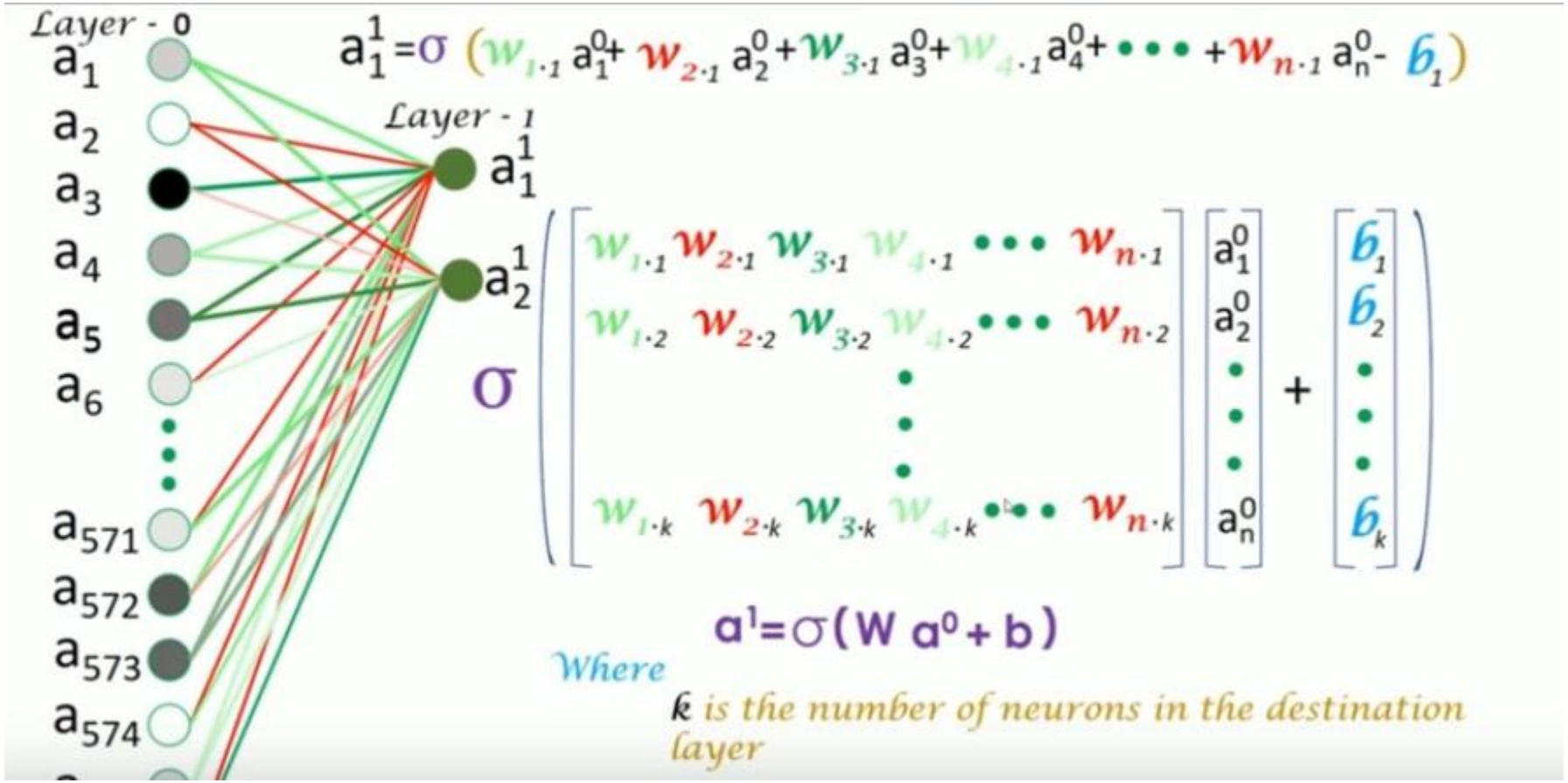
https://www.youtube.com/watch?v=C6JdeZEkNHs

Activation of Neurons



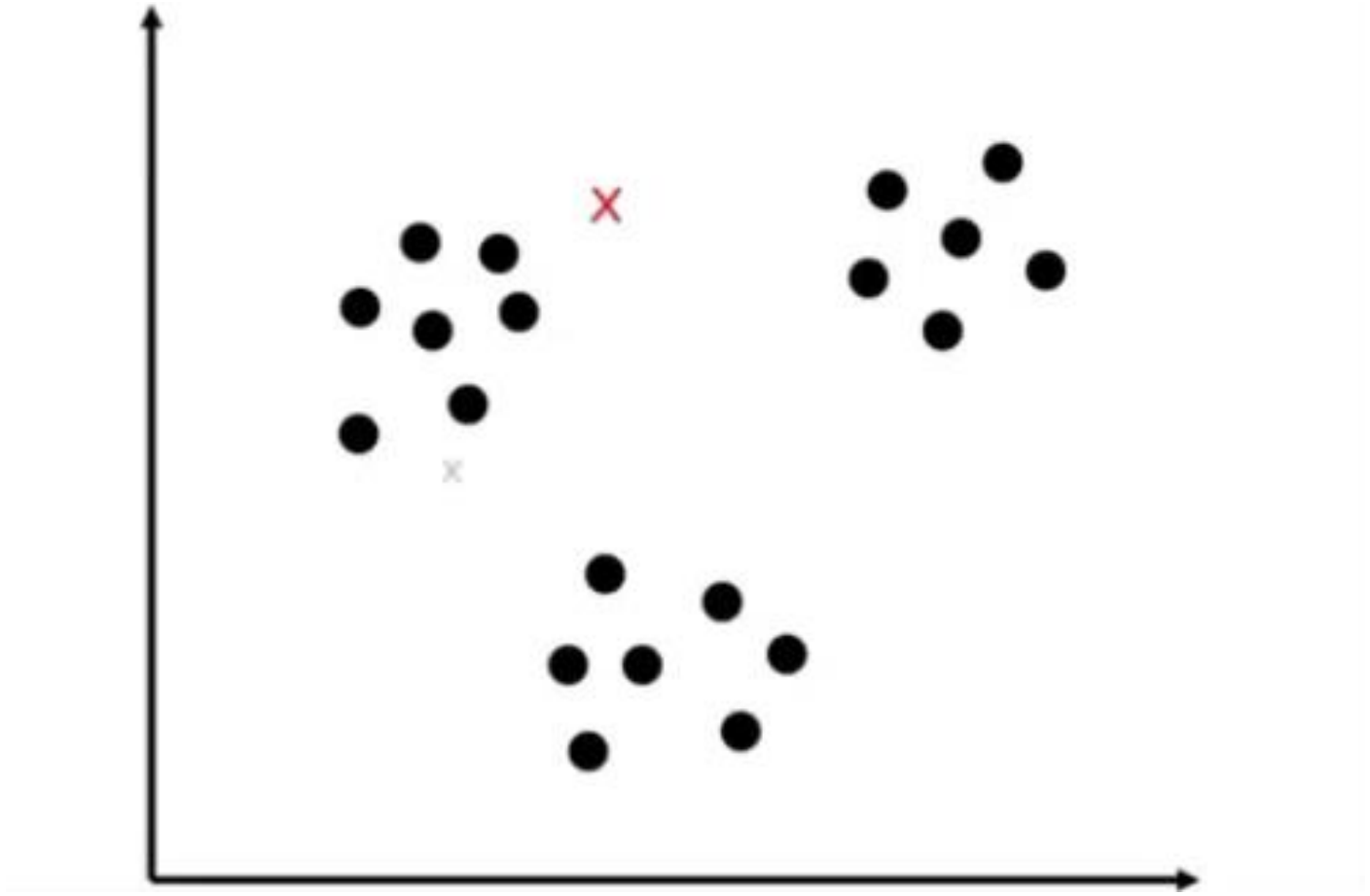
https://www.youtube.com/watch?v=C6JdeZEkNHs

Raw Numbers



https://www.youtube.com/watch?v=C6JdeZEkNHs

K-Means Clusters



https://www.youtube.com/watch?v=qX-rm_Ike30

The Projection Game

What word comes next?

The Projection Game

What word comes next?

Bacon and _____

The Projection Game

What word comes next?

Bacon and _*eggs*_

Wayne _____

The Projection Game

What word comes next?

Bacon and _*eggs*_

Wayne _*Gretzky*_

American _____

The Projection Game

What word comes next?

Bacon and _*eggs*_

Wayne _*Gretzky*_

American _*Idol*_

Justin _____

The Projection Game

What word comes next?

Bacon and _*eggs*_

Wayne _*Gretzky*_

American _*Idol*_

Justin _*Trudeau*_

Tried and _____

The Projection Game

What word comes next?

Bacon and _*eggs*_

Wayne _*Gretzky*_

American _*Idol*_

Justin _*Trudeau*_

Tried and _*true*_

Predicting the Next Word

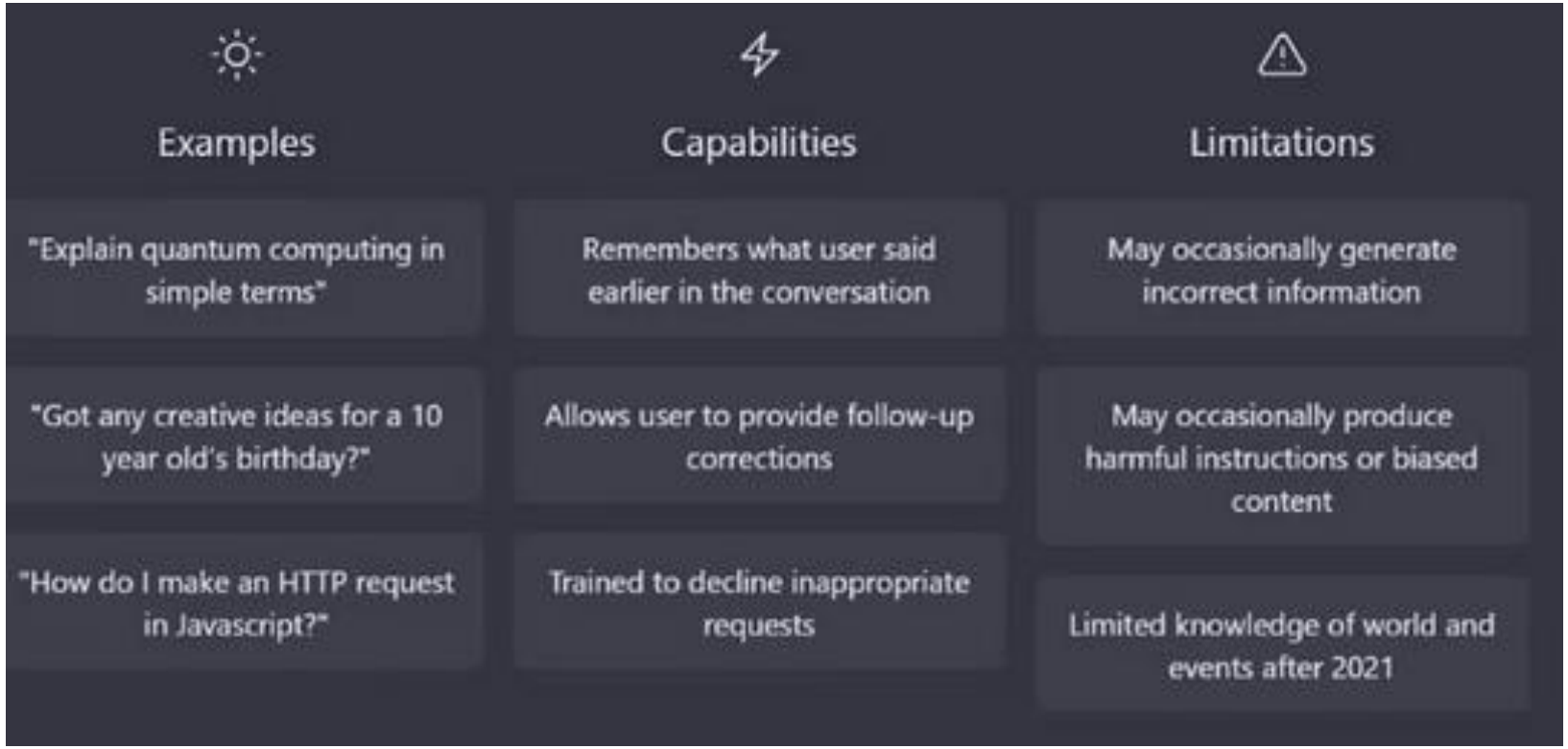
https://www.youtube.com/watch?v=hgpIOduCED0

Scaling to ChatGPT

https://www.youtube.com/watch?v=hgpIOduCED0

ChatGPT

https://chat.openai.com/



https://www.domusweb.it/en/news/2023/01/17/what-is-chatgpt-and-why-its-so-relevant.html

ChatGPT Prompts

Some good advice:

- talk to it as if it were a person
- set the stage and provide context
- have the AI assume an identity or profession
- iterate with multiple attempts
- keep it on track
- specify output format
- explicit constraints on responses

https://www.downes.ca/cgi-bin/page.cgi?post=75667

Creating Images

https://deepai.org/machine-learning-model/text2img

AI and Accuracy

How accurate is AI?

It depends on what you're doing.

- If it's just a creative act (like removing speckles from photos) it's fine
- For many recognition tasks, it performs very well
- If the output needs to be factually correct, it's not reliable
- If it is asked to manage or direct, it's untrustworthy

The real questions are:

- How do you evaluate AI for accuracy
- How do you correct AIU and make it more accurate?

AI ‘Hallucinations’

AI can be creative and *will* make things up

- It’s not relying on a fact-based database
- If explicitly asked for something, it will make a ‘best effort’
  - This includes making fake references
  - Also, assertions of fact that are untrue

https://teche.mq.edu.au/2023/02/why-does-chatgpt-generate-fake-references/

https://blogs.library.duke.edu/blog/2023/03/09/chatgpt-and-fake-citations/

AI Ethics

- Building ethical AI

  https://www.pewresearch.org/internet/2021/06/16/experts-doubt-ethical-ai-design-will-be-broadly-adopted-as-the-norm-within-the-next-decade/

- Ethical AI use

  https://www.canada.ca/en/government/system/digital-government/digital-government-innovations/responsible-use-ai.html

Guiding Principles for Teachers and Educators

- **Protect student privacy**: Teachers need to understand how this data is collected, stored and used to ensure that student privacy is protected.
- **Ensure Fairness**: Teachers need to ensure that these systems are fair and do not discriminate against certain groups of students.
- **Foster digital citizenship**: Teach students about the ethical considerations of AI, including bias and privacy concerns.

https://ced.ncsu.edu/news/2023/02/27/3-things-k-12-educators-should-know-about-the-ethics-and-use-of-ai-in-education/
https://teaching.cornell.edu/generative-artificial-intelligence/ethical-ai-teaching-and-learning

Guiding Principles for Government

To ensure the effective and ethical use of AI the government will:

1. **understand and measure** the impact of using AI by developing and sharing tools and approaches
2. **be transparent** about how and when we are using AI, starting with a clear user need and public benefit
3. **provide meaningful explanations** about AI decision making, while also offering opportunities to review results and challenge these decisions
4. **be as open as we can** by sharing source code, training data, and other relevant information, all while protecting personal information, system integration, and national security and defence
5. **provide sufficient training** so that government employees developing and using AI solutions have the responsible design, function, and implementation skills needed to make AI-based public services better

https://www.canada.ca/en/government/system/digital-government/digital-government-innovations/responsible-use-ai.html#toc1