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Supported by



How does Generative AI work?

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AI Literacy

- AI literacy is a concept and a set of practices that empowers users to make decisions on using AI ethically and effectively.
- AI literacy involves:
 - Recognising what AI is and understanding its capabilities and limitations
 - Critically evaluating AI technologies before, during and after using it
 - Being able to use AI safely, responsibly and effectively.

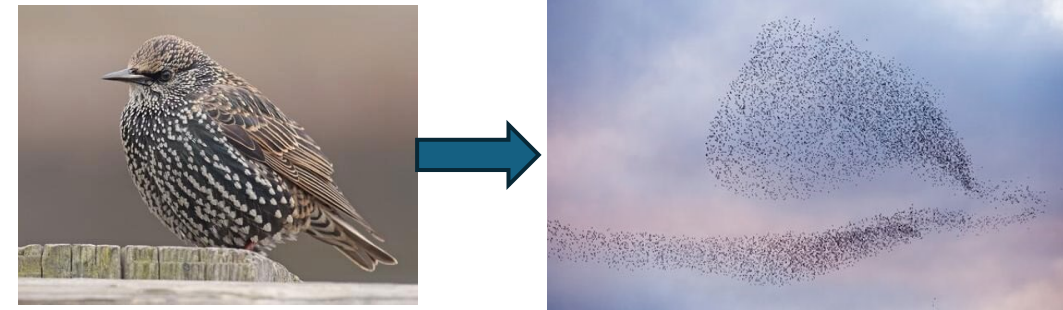
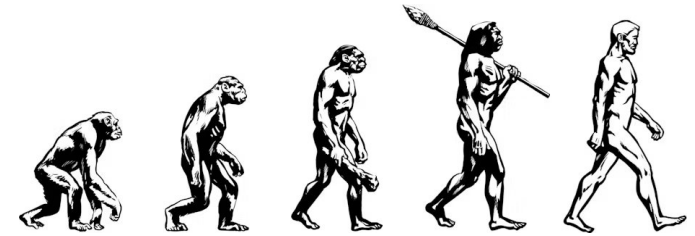
(Ng et al., 2021)

Introduction

- In this presentation, we will cover:
 - What is AI?
 - What is Generative AI?
 - Examples of AI in everyday life and education
- Generative AI is rapidly growing in popularity
 - There is an overwhelming amount of information out there!

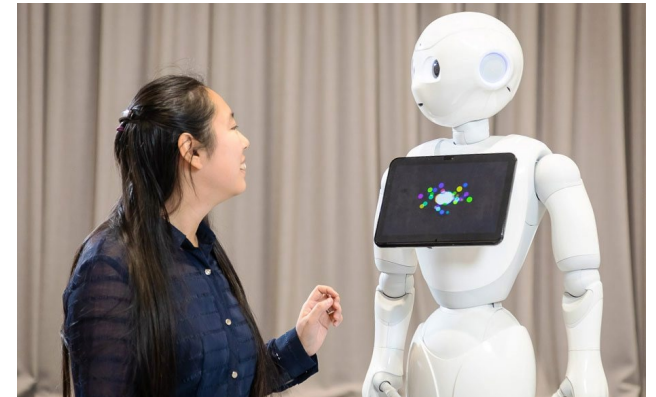
Computational Intelligence

- How do computers solve complex problems?
- We are surrounded by intelligence
 - Evolution – small improvements through adaptation
 - Swarms of birds – simple rules that create complex behaviours
- Computational intelligence is:
 - Taking inspiration from intelligence in nature
 - Using them to search for solutions to problems



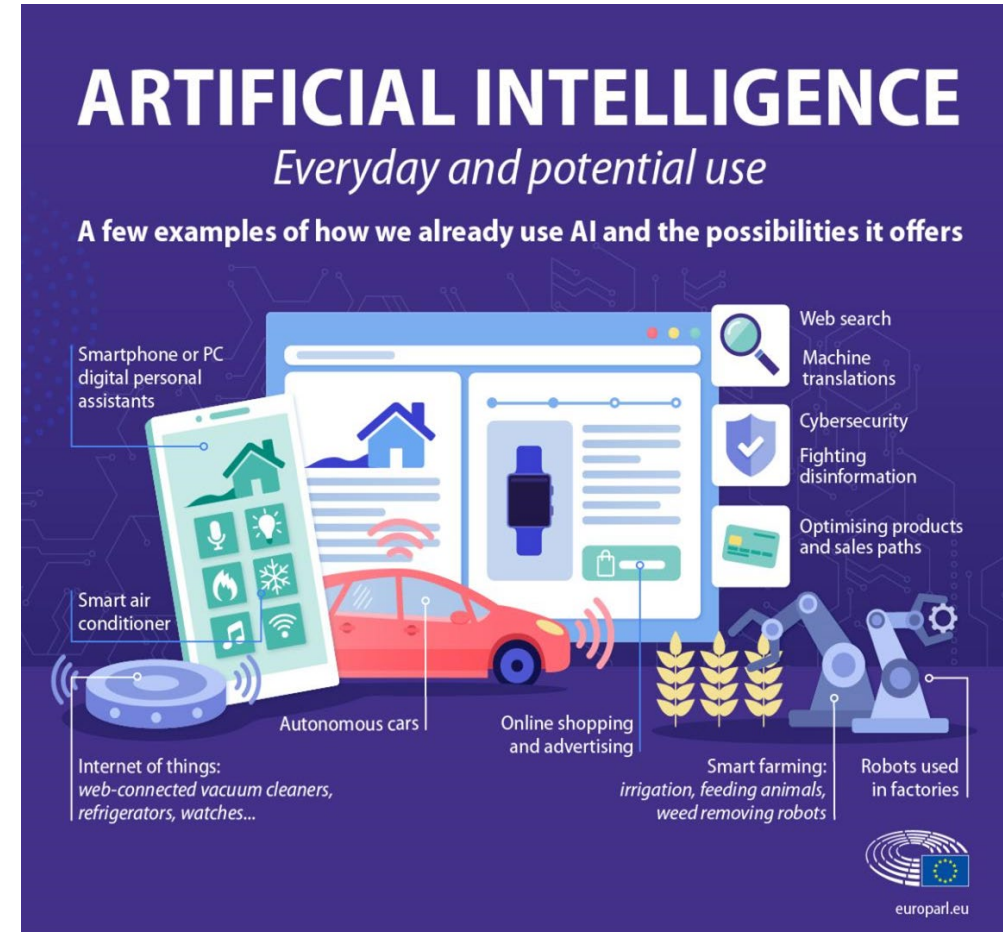
Artificial Intelligence and Generative AI

- AI is a subset of computational intelligence
- Except, we only take inspiration from human intelligence
- For example:
 - How can we teach computers to speak?
 - How can we teach computers to listen?
 - How can we teach computers to help us with tasks?
- Generative Artificial Intelligence is any type of AI that creates media
 - Text, images, videos, sound, etc.



Examples of AI in Everyday Life

- Online shopping and advertising
 - Show people products that are more interesting to them
- Web search
 - Show people results that are more relevant to them
- Personal Assistants
 - Help people with tasks
- Cars
 - Automatically drive to locations
- Farming
 - Automatically water crops when needed, search for weeds



AI in Education examples

- The use of AI in education is growing rapidly
- Machine translation
 - Translating from one language to another
 - Translating text from one level of complexity to another
- Chatbots
 - Provide students with support outside classroom hours
 - <https://www.roboki.vn/>
- Content Creation
 - Assist in creating lessons or study materials
 - <https://www.magicschool.ai/>
- Language learning
 - Personalise language learning for personal educational needs
 - <https://www.duolingo.com/>



In the Media – *Only 1 Week...*



'Don't ask what AI can do for us, ask what it is doing to us': are ChatGPT and co harming human intelligence?

deepfakes 'has into an arms race'

Generative AI
Amazon CEO Urges AI Investment in Annual Shareholder Letter

Apr 16, 2025 | 1 Min Read



Conversational AI Brought to Document Generation
by Scarlett Evans

Apr 18, 2025

Generative AI

Virgin Atlantic Launches AI Apprenticeship to Boost Workforce
by Scarlett Evans

Apr 22, 2025

1 Min Read

'My AI twin may get me more modelling work'

reated
prime picture help you get a job?



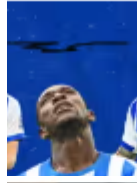
ENTERPRISE
Google introduces AI reasoning con Flash



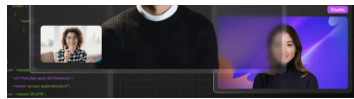
riv
Musk's X
10:02 10 April

Meta may have used books by Gerry Adams to train AI

Northern Ireland



AI spurs 'revolution' for some visually impaired people



AI Avatar Generator Develops Emotionally Aware Avatars
by Scarlett Evans

Apr 21, 2025

1 Min Read

Meta will train AI models using EU user data



Saying 'please' and 'thank you' to ChatGPT costs millions of dollars, CEO says

1 day ago

an investigation into illegal hidden casinos

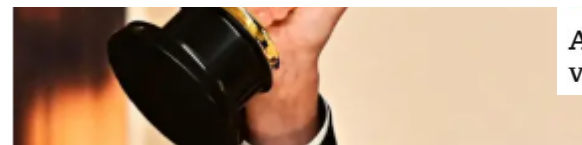


live in the AI Afterlife



ones, with GenAI making them interactive and conversational,...

1 day ago



TahawulTech.com

94% of Dubai govt employees express optimism over impact of generative AI

4 hours ago

MIT Sloan

Generative AI as a new platform for applications development

Generative artificial intelligence is rapidly emerging as a key foundational platform for new

USA Today

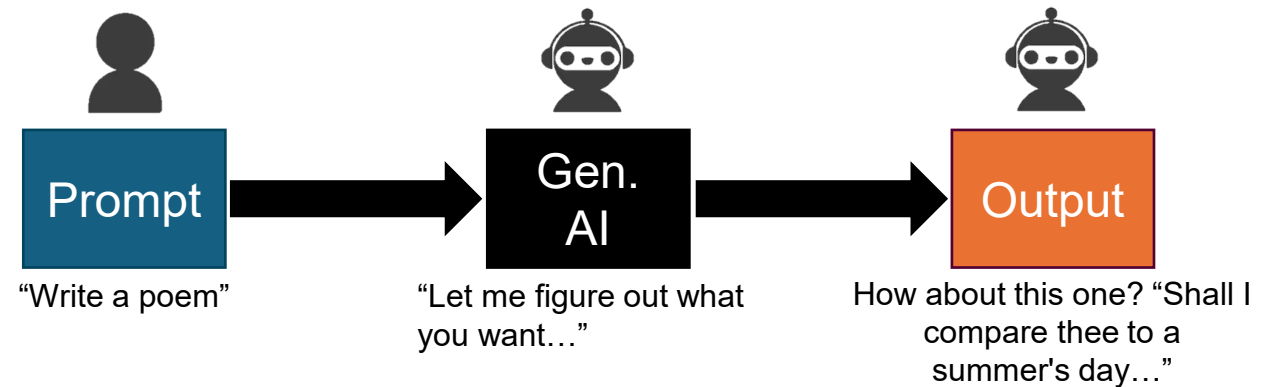
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Information Overload

- Thousands of stories every week – there is too much information!
- Today, we will take a step back and see how these algorithms work

What is Generative AI?

- Generative AI is a type of AI algorithm that can create **media**
 - For example - text, images, videos, music
- Through an Instruction called a “prompt”
- Some types allow us to make changes through conversation
 - Naturally interactive



What is Generative AI?

- The most famous examples at the moment are Conversational Agents
 - ChatGPT, Copilot, Gemini, Claude, etc.
 - AI chatbot that we send text messages to (prompts)
 - It then produces outputs – text, speech, images, videos
 - It is capable of general conversation, as well as following instructions

ChatGPT 4o ▾

🔗 Share

Bạn là một giáo viên Hóa học lớp 10 xuất sắc. Hãy giải thích ngắn gọn bản chất của màu sắc trong pháo hoa.

📖 Bản chất của màu sắc trong pháo hoa là do sự phát sáng của các nguyên tử kim loại khi bị nung nóng.


- Khi pháo hoa cháy, **hiệt độ cao** làm các nguyên tử kim loại bị kích thích, electron chuyển lên mức năng lượng cao hơn.
- Sau đó, electron **quay về mức năng lượng thấp hơn**, phát ra ánh sáng có màu đặc trưng.



What is Generative AI?

- An example

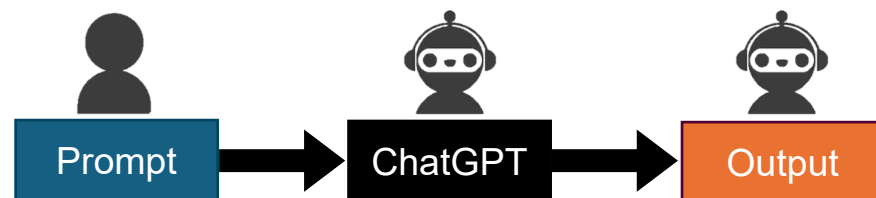
Prompt

 **You**
I need help with some recipe ideas, I just looked in the fridge and I have:

- 4 eggs
- 3 tomatoes
- Pre-made shortcrust pastry
- A bottle of milk
- Peach Iced Tea
- Leftover chicken

AI

Request: recipes
Limitations: ingredients list



Outputs



ChatGPT

With the ingredients you have, here are a few recipe ideas that you can try out:

1. Chicken and Tomato Quiche:



- Use the shortcrust pastry to line a pie dish.
- Beat the eggs and mix them with a little milk, salt, and pepper.
- Dice the leftover chicken and tomatoes, and add them to the egg mixture.
- Pour the mixture into the pastry-lined dish and bake at 375°F (190°C) for about 30-35 minutes until set and golden.

2. Tomato and Chicken Galette:

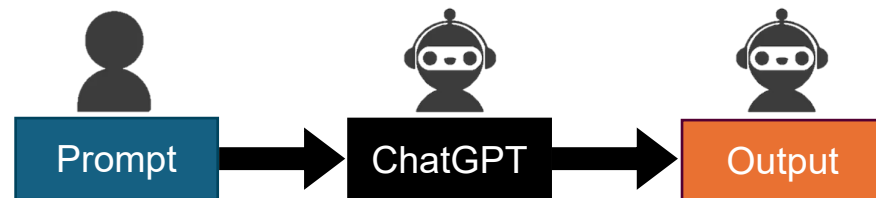
- Roll out the shortcrust pastry into a circle on a baking sheet.
- Mix sliced tomatoes and chunks of leftover chicken with some herbs (like basil or oregano), salt, and pepper.
- Place the mixture in the center of the pastry, leaving a border of about 2 inches.
- Fold the edges of the pastry over the filling, partially covering it.
- Brush the pastry with a beaten egg and bake at 400°F (200°C) until golden, about 25-30 minutes.

What is Generative AI?

- It can also create images

Prompt	<div><div>JO</div><div>You Generate a painting of a jack russell and a border collie running through a field.</div></div>
AI	<div><div> ChatGPT</div><div> Creating image</div></div>

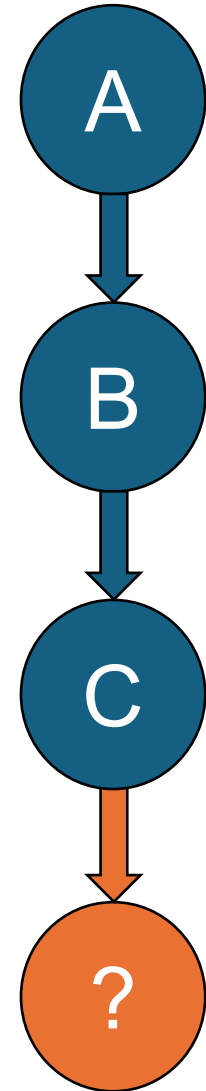
Output



How does it work?

Step 1 - Token Prediction

- “Tokens” are just words in a text
- What word comes next in the sequence?
 - "The quick brown fox jumps over the lazy dog"
- **Input:** "The quick brown fox jumps over the"
 - **Prediction:** "lazy"
- **Input:** "The quick brown fox jumps over the lazy"
 - **Prediction:** "dog"



How does it work?

Step 2 – Instruction Tuning

- All the AI can do at this stage is guess the next word in a sequence... not very useful.
- We then switch the dataset to another
- Dataset 2 contains instruction and response pairs
 - **Instruction:** the request
 - **Response:** fulfilling the request

My instruction

The request

ChatGPT's response

Fulfilling the Request

How does it work?

Step 3 – Reinforcement Learning from Human Feedback

- Now we have a chatbot that can follow instructions
 - But some responses are better than others
 - This part was a major breakthrough!
- The final step involves using human feedback to improve responses
 - The model then aims to increase the number of rewards it earns
- The dog does not know what a hula hoop is, and never will
- Jumping = Treats
- It has an **Artificial Understanding** of the hula hoop
- ChatGPT does not know what intelligent responses are
 - Good responses = rewards
 - It has **Artificial Intelligence**



You're giving feedback on a new version of ChatGPT.
Which response do you prefer? Responses may take a moment to load.

 Response 1


Yes, you *can* use NVIDIA Tesla K80s, but there are important limitations that make them **poor** choices for training modern LLMs:

✅ Pros of the K80:

- Very cheap (~£100–£200 on eBay).
- 24GB total VRAM (12GB per GPU; it's a dual-GPU card).
- Good for small-scale experiments, legacy models, or classical ML.

❌ Major drawbacks:

Limitation	Details
❌ Outdated architecture	Kepler (2014) – very inefficient and slow compared to modern cards.
❌ Low bandwidth	Slower memory (GDDR5), bottlenecks in training/inference.
❌ No Tensor Cores	Lacks modern acceleration for FP16/BF16 used in LLMs.
❌ 12GB per GPU	Not enough for 13B+ models in training. Even inference will struggle.

 Response 2



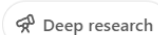
The NVIDIA Tesla K80 is an affordable option for GPU-accelerated computing, but it has significant limitations for modern large language model (LLM) training.

Tesla K80 Overview

- **Release Date:** November 2014
- **Architecture:** Kepler (GK210)
- **GPU Configuration:** Dual GPUs, each with 2,496 CUDA cores
- **Memory:** 24 GB GDDR5 total (12 GB per GPU)
- **Performance:**
 - **Single Precision (FP32):** Up to 8.74 TFLOPS
 - **Double Precision (FP64):** Up to 2.91 TFLOPS

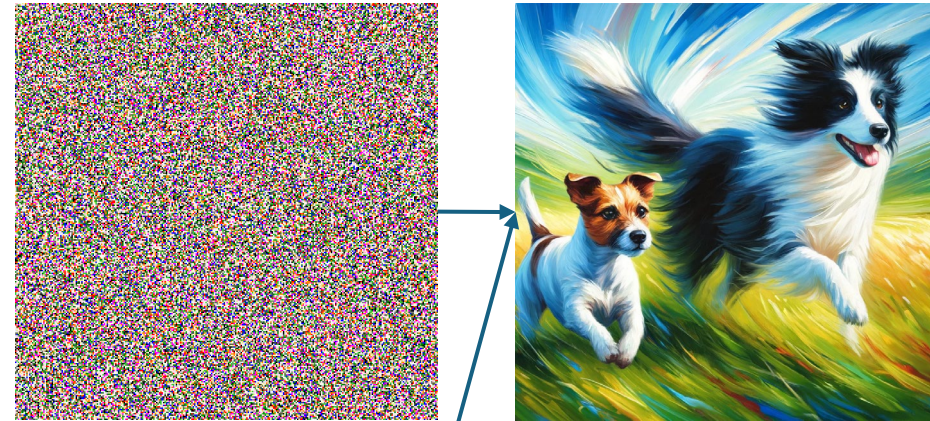
• **Memory Bandwidth:** 480 GB/s total

Ask anything



What about images?

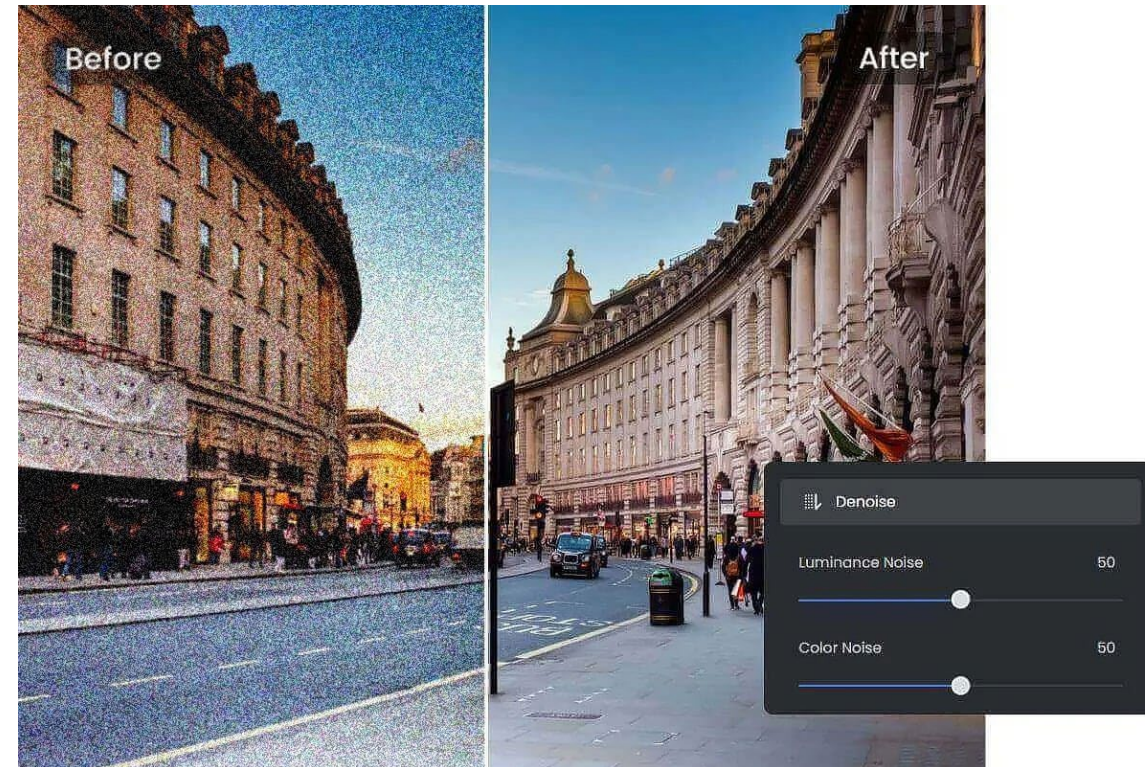
- These models are also capable of generating images
- ChatGPT uses a model called “DALL-E”
- Models like this use an approach called diffusion



“a painting of...”

How does it work?

- Diffusion is a new method of generating images
- Based on noise removal

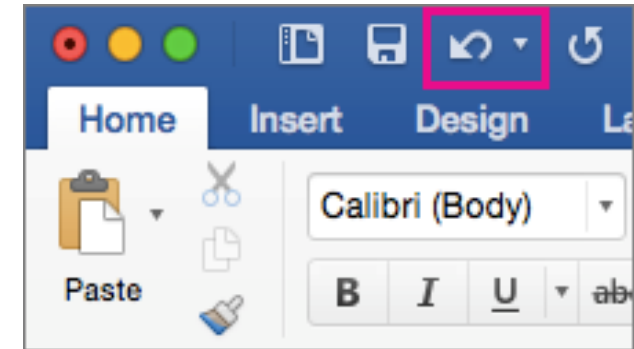
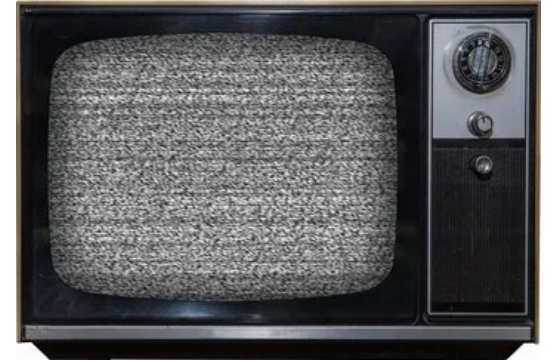


How does it work?

- If we keep adding noise to an image
 - It becomes more random
 - In the end, the image is completely lost

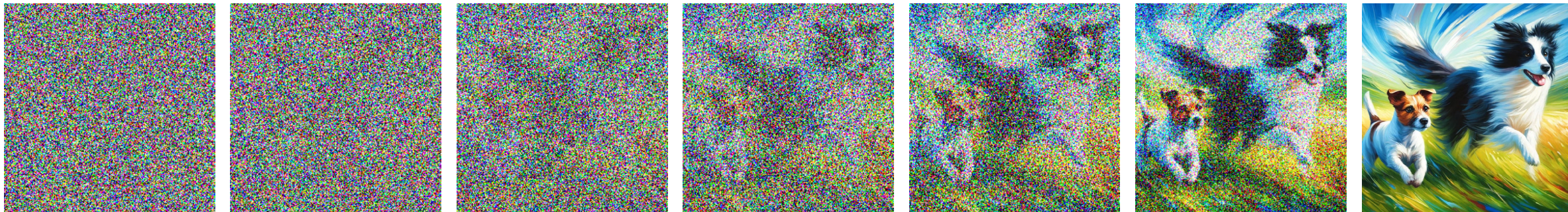


- But, we know the steps that were performed to add the noise
 - So, we can train an AI algorithm to reverse the process
 - Just like pressing “undo”
 - Except we include the text prompt as guidance



How does it work?

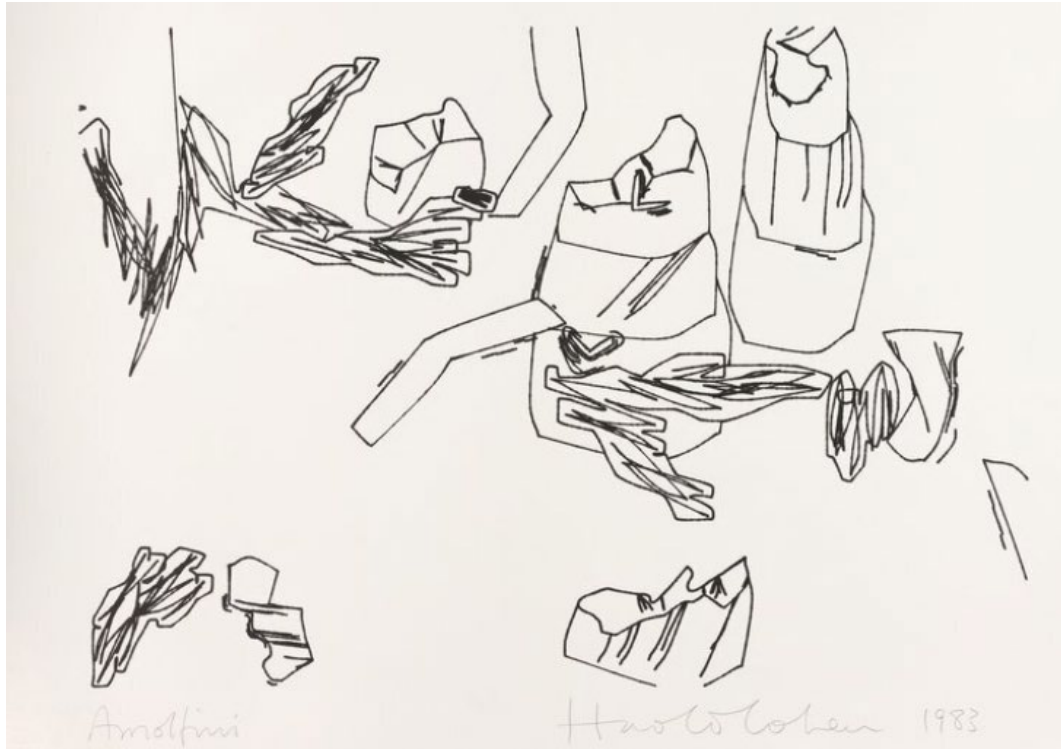
- We train an algorithm to remove the noise
 - We include a prompt to guide the noise removal
 - The algorithm learns to “undo” the noise
 - This **diffuses** the noise – diffusion models
- When the algorithm is trained, we can then give it **real** random noise
- This will generate a new image



Rapid Change

- So, how did we get here?

Rapid Change



Arnolfini Series (Harold Cohen, 1983)

Using computer code to control robots

35 years



Edmond de Belamy (Obvious Trio, 2018)

Sold at a Sotheby's auction for \$432,000
(11,301,120,000 VND)

Rapid Change



4 years



Théâtre D'opéra Spatial (Jason Michael Allen, 2022)

Entered into a digital art competition and won



The New York Times



THE SHIFT

An A.I.-Generated Picture Won an Art Prize. Artists Aren't Happy.

"I won, and I didn't break any rules," the artwork's creator says.

Rapid Change



1 year



Stable Diffusion XL models (2023)

Rapid Change



7 months

Rapid Change



7 months



Video Diffusion Models (2024 onwards)

Let's try it

- Let's use the Random Noise from the start of this presentation
- For our prompt, let's describe a painting of British and Vietnamese collaborators on this project

This oil painting showcases a collaborative moment between four researchers, two from the UK and two from Vietnam, as they explore artificial intelligence education. Set against a backdrop of a chalkboard diagram and intertwined national flags, the researchers are captured in detailed realism, with warm tones and soft blues, focusing on a neural network hologram created above an open laptop.



Let's try it

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Cảm ơn

Thank you