How are AI systems created?

There are many ways to create AI systems, so there's no one way to explain how all AI systems work. However, there are similar processes and techniques used to create AI systems. Knowing some basics can help us understand what AI is good at, what it might struggle with, and what we need to think about when using it.

Most AI systems built with Machine learning techniques are made by training a model. A **model** is like a set of instructions or a recipe that the computer follows to perform a task:

Think about having a big box of LEGO pieces and wanting to build different things like cars, houses, or animals. Before you can create anything, you need to understand how to use the LEGO pieces properly. A generative AI model works in a similar way. It starts with a lot of information, like words, pictures, or sounds, and learns how to combine these pieces in new and creative ways. The AI is trained by being shown many examples, much like if you were taught how to build various things with LEGO. Over time, the AI improves at recognising patterns and figuring out how to create something new based on what it has learned.

The training process for an AI model is similar to practicing a skill, like drawing. If you wanted to get really good at drawing, you would practice by copying different drawings and learning from your mistakes. The AI does something similar. It tries to create new things based on what it has learned, and when it makes mistakes, it gets feedback and tries again. After a lot of practice, the AI becomes very good at generating new things on its own, just as a person would improve at drawing after lots of practice.

Why is data so important?

Data is really the foundation that makes AI models work. To build a good AI model, we need a lot of data to help the system learn to recognise patterns, make predictions, and get better over time.

This data can come in lots of different forms, like text, images, sounds, and even how people interact with things. It's not just about having a lot of data, though; the data needs to be good quality too. Good quality data should be accurate, complete, relevant, and free from mistakes.

Collecting a large amount of high-quality data can be very challenging, and it is generally not possible to find datasets that are completely free from bias. This is a big problem for people who develop AI models because if the data isn't good, the AI model won't work as well.

What does AI cost?

Creating AI models can be quite expensive and time-consuming, though the cost depends on how big the model is.

Computing Power: Training AI models needs very powerful computers with special parts, like high-performance graphics cards (GPUs) or special processors (TPUs). These computers are expensive to buy and use, especially if you need a lot of them working together.

Large Datasets: To train a model properly, you need a lot of data. Collecting, storing, and processing this data can be costly, especially if you have to buy the data or handle huge amounts of information.

Energy Costs: Running these powerful computers uses a lot of electricity, which increases the cost. The data centres, where these computers are kept, have high energy bills and need to stay cool to avoid overheating.

Training a large AI model can cost millions of pounds in computing time, and it takes many processors and hours to finish.

The human work that goes into AI

Some people might think that building AI systems is just about putting a lot of data into a computer, telling it what to do, and then letting it figure everything out by itself. But that's not true. This idea makes it seem like there's not much human work involved and that we can't control AI systems, which isn't the case.

Humans are actually involved in every step of creating AI:

Creating and Labeling Training Data:

Humans collect, label, and organise the data that the AI model needs to learn from.

Designing and Training the Model:

Engineers and data scientists design the AI model and manage its training, making adjustments as needed.

Testing and Providing Feedback:

Humans test how well the model works and give feedback to make it better.

Deploying the Model:

Developers put the AI model into real-world applications, making sure it works well with other systems.

Monitoring, Maintenance, and User Feedback:

Humans keep an eye on the AI system, maintain it, and use feedback from users to make further improvements.

It's important to remember that creating AI systems involves a lot of human work.

Who is making AI?

Many tech companies are working to develop and improve AI models, and they compete with each other to create the best ones. Each model has its own strengths and weaknesses, and companies try to make their models stand out in this competitive field.

Models are the systems that power AI products, and sometimes they are given the same or similar names - like GPT-4 (the model) and ChatGPT (the product).

Some companies create new AI products for consumers using their own models, or they add new features to existing products with these models. They might also let other companies use their models to create new products. For example, Microsoft's Copilot chat uses OpenAI's GPT model.

Some of the major players

Here are some of the big companies working on AI right now, the models they've created, and some products that use these models.

Google

Google creates AI models like Gemini for language understanding and generating text, and **Inception** for recognising images. These models are used in products like **Google Assistant** and **Google Photos** to make them smarter and more useful.

OpenAI

OpenAI is known for creating models like **GPT** for text (which powers **ChatGPT**), **Codex** for writing code, and **DALL-E** for creating images. They also made **Whisper** for recognising speech.

Microsoft

Microsoft has developed models like **Turing-NLG** for generating text and **Project InnerEye** for analysing medical images. They offer these models through their platform **AzureAI**, which helps others create their own AI tools.

Microsoft also works closely with OpenAI, using their models to add AI features to products like **Copilot**, which uses GPT and DALL-E for text and image creation.

Amazon

Amazon builds AI models for their **Alexa** voice assistant and for understanding text with **Amazon Comprehend**. These models help power products like **Alexa** for voice commands and **Amazon Web Services** for developers.

Meta

Meta (formerly Facebook) has developed models like **RoBERTa** for understanding text and **DeepText** for analysing social media posts. These models improve content moderation and personalised recommendations on platforms like **Facebook** and **Instagram**.

Anthropic

Anthropic is a company focused on making AI safe and aligned with human values. Their main product is **Claude**, a conversational AI assistant designed to be helpful, honest, and safe.

Key points:

- Machine learning models are behind many AI systems and tools. These models are trained on large amounts of data and can improve with feedback.
- Using good, high-quality data to train models is essential to making sure they work well.
- Making AI can be expensive and takes a lot of time because it needs powerful computers and lots of data.
- People are involved at every step to help build, test, and improve AI systems.
- There are a variety of tech companies building AI models and tools, often multiple products are built from the same models.