Longitude Explorer Prize

Artificial Intelligence Glossary

Artificial Intelligence is the ability for a computer or machine to learn. General AI mimics certain types of human intelligence, such as learning, problem solving, seeing and understanding images etc. There are two types of AI, and it is important to understand which type of AI we use in the world today:

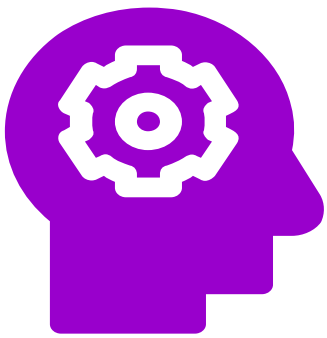
Artificial Narrow Intelligence ANI (Narrow AI) - exists today: this is the type of AI that we use in the world today. It is designed for a specific purpose, for example an AI designed to understand a person when they speak will not be able to analyse medical data, or understand images. Current AI systems lack flexibility and creativity, which are two very human characteristics.

Artificial General Intelligence AGI (General AI) - does not exist today: this type of AI does not exist yet, and experts think that there is a 50% chance that by 2099 we will have developed AGI. AGI would be able to do anything a human can, for example, writing stories, telling jokes, inventing things, etc.

Algorithm A set of step-by-step instructions used by computers to solve problems or complete tasks. Although we normally use algorithms when we talk about computers, algorithms are everywhere. Food recipes are algorithms, solving a long division problem is an algorithm. There are books of algorithms to solve a Rubik's cube.

You can turn almost any series of logical steps into an algorithm. For example making a cup of tea:

1. Go to kitchen
2. Find a mug
3. Get a tea bag and place in mug
4. Get the kettle and fill with water
5. Put the kettle on and boil the water
6. When water is boiled, pour the water in the mug
7. Add milk
8. Take out tea bag



Programs usually contain many different algorithms.

Artificial Neural Network (Neural Network) These are algorithms designed to learn and have been inspired by the structure of the human brain. An artificial neural network is made up of many interconnected algorithms . These networks are mostly used for deep learning (see definition).

Analysis (Data Analysis) This is the process of finding out what data means. If we calculate the average height of all the 12 year olds in the UK we are analysing data (height and age) and coming up with a useful piece of information (the average height).

B

Bias - watch this video
Simply put bias is preferring one thing or group of things, over another thing or group of things, which leads to unfair treatment and favouritism. Bias can affect the data we collect and use when developing or designing systems or programs. It can be introduced through measurement and analysis.

C

Chatbot - this is a tool used to allow humans to have a "conversation" with a machine, it can either be powered by AI or by a set of rules (traditional programs). These are made for many reasons, including gaming, customer service, etc.

Cloud Computing - The "cloud" in cloud computing is a metaphor for internet based. Examples include webmail services like gmail, and social media platforms like facebook and is a way of accessing a lot of information through an internet connection, rather than needing to store and process things locally

Computer Vision - this is AI concerned with developing ways for computers to "see" and classify images, including photographs and videos. The purpose of computer vision is to extract useful information from videos or images, e.g. how many cats walk down a street on a particular day. Computer vision uses machine learning.

D

Data - these are facts and figures that can be used in calculations, reasoning or planning, examples include images, measurements from sensors, text, sound or video recordings etc.

Dataset - this is a collection of data selected for a specific reason.

Deep Learning - this is a type of Machine Learning, which uses many layers of neural networks (see definition). The neural networks are usually trained with millions to billions of real world data.

H

Hardware - The physical parts of a computer for processing a problem. Examples are monitors, keyboards, computer data storage, graphic card etc.

I

Image recognition - see computer vision.

M

Machine Learning - see this video (https://www.youtube.com/watch?v=f_uwKZIAeM0)
Usually programmers create a set of instructions and rules (a programme), which is how a computer "knows" what to do, e.g. if you type in "hello" then the computer responds with "hey!".

Machine Learning is a different type of programming. The programmer will provide very many examples of data (e.g. lots of examples of how people respond to the word hello). The computer, using a set of algorithms, will try out different programs to find one that matches the example data the most. This process is called training.

In this way the computer is "learning" how to accomplish a task (e.g. how to respond when they receive the input "hello").

Machine vision - see computer vision

Metric - this is a number that you care about, either because you want to measure it or monitor and understand how it changes under different circumstances.

N

Natural Language Processing (NLP) - this is a type of machine learning that is focused on understanding human language. Almost every device that can be voice operated uses NLP, e.g. gaming consoles, smart phones etc.

Neural Networks: See artificial neural networks

P

Program (Computer Program) - a set of instructions or rules that perform a specific task when run or executed by a computer. This is different from an algorithm as algorithms are designed to solve a problem rather than just performing a task.

Programming Language - these are the codes used to write a program. Computers do not understand human language, so we have to use programming languages to create instructions that computers can understand. There are different types of programming languages.g. Python, visual basic, C# etc. They can work together, for example AI coding is often done in python, but many libraries and tools referenced in python are built in C++

R

Robot - a robot is a machine that can do things in the physical world with little to no help from humans.

Robotics - a field of computer science and engineering that deals with designing and building robots.

S

Software - these are all the programmes and operating systems, constructed out of code, used by a computer.

T

Training - the process of analysing data to provide a prediction from an AI model. You split datasets in half and train with one half, then test with the other to see how well your model performs.

Turing Test - this is a test to see if a computer can trick a person into believing it is a person, so far no system has passed the test.

V

Virtual Assistant is an AI made to help people in many different ways, usually with tasks that can be done online, such as ordering food from a restaurant, creating a reminders, sending messages and much more. Examples include Alexa, Siri, Google Home etc.