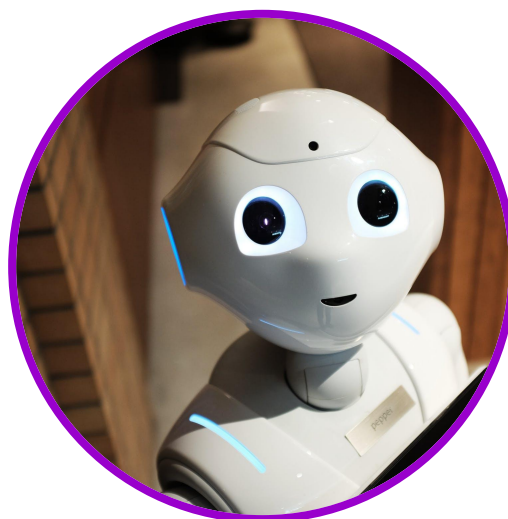# Artificial Intelligence Factsheet

What is Artificial Intelligence (AI)?

AI is the ability for a computer or machine to learn. 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:

Narrow AI or Artificial Narrow Intelligence (ANI)

This type of AI is already used in the world today. It is designed for a specific purpose, for example an ANI 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.

General AI or Artificial General Intelligence (AGI)

This type of AI does does not exist today. 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.

The kinds of tech that we would classify as AI:
- Technology that can **learn** from the huge amounts of data we have in the world today.
- Technology that can **see & interpret images** in a similar way to us.
- Technology that can **understand & respond to human language** (natural language).

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Take a look at the table below to see how good AI is at the different types of human intelligence:

We talk about AI mimicking human intelligence - what do we mean by intelligence? Can AI mimic all of our intelligence?

Intelligence is the ability to learn or understand or deal with new or trying situations*. As humans we use different types of intelligence in our daily lives.

Intelligence type	Can AI today do it?	AI capabilities	Type of AI
Logical reasoning: *This includes things like math, calculations, understanding patterns, logic games etc.*	Yes - very good	AI is very good at mimicking this type of intelligence, and doing things like analysing data. When an AI beat a human at a game like chess, or is able to detect tumors in x-rays more accurately than humans, this is the type of "intelligence" it is simulating.	Narrow AI
Visual and spatial: *Seeing and understanding images, videos, and the physical world around us.*	Yes - good	AI is getting better at understanding images and the real world. But in many cases, humans and other animals are still much better. All robots that move around, and self-driving cars or drones need to understand the world around them using data from cameras and other sensors	Narrow AI

* definition from the miriam-webster dictionary

Intelligence type	Can AI today do it?	AI capabilities	Type of AI
Body & movement *Both seeing and understanding movement in humans, animals, and other physical things.* *Also moving around e.g. robots or self driving cars.*	Yes - sort of	AI is still only kind of good at this. The way AI learns is through observing something happening thousands of times, if a human sees something happen once it can learn based on that one occasion. Currently AI cannot. Robots can perform simple tasks faster than humans, e.g sorting objects in a factory assembly line. But independent robot movement (e.g. a robot walking through a forest) is still less advanced.	Narrow AI
Creative *Creativity is all about designing or imagining something new and unique, it's also about expressing yourself.*	No - not at all	Narrow AI tech is being used to help creatives e.g. writing lyrics or content for articles but it is not at the level of human creativity.	General AI

Intelligence type	Can AI today do it?	AI capabilities	Type of AI
Social *This includes things like being able to understand how other people are feeling, and understanding cultural behaviours (e.g. how to wish someone a happy birthday)*	Growing field	AI that can recognise human emotions is a growing field. This is where machines are able to analyse data to, say recognise emotion in voices or facial expressions. However this is not at the levels of human ability.	General AI
Self awareness *What are your likes and interests as an individual person?* *What are your goals? What kind of music do you like?*	No - not at all	Computers (including AI), have no likes or dislikes. Artificial Intelligence is based on a series of algorithms. It has no understanding of what it is doing or why it is doing it.	General AI
Human Language *Understanding what people say or write, and communicating in a way people will understand.*	Yes - sort of	AI can now understand commands, questions, and even hold simple conversations with people. But AI is still not good at understanding sarcasm, irony, and humour.	Narrow AI

Adapted from https://www.dummies.com/software/other-software/ai-dummies-cheat-sheet/

A basic introduction to how AI works

There are the 3 key stages to **train** an AI machine:

| 1. Dataset | > | 2. Learning Algorithm | > | 3. Prediction |

1. Data

What is a data? Data is what we call different types of information that is recorded. These are facts and figures that can be used in calculations, reasoning or planning, examples include images, measurements, text, sound or video recordings etc.

A dataset is a collection of data selected for a specific reason.

2. Learning Algorithm

Artificial Intelligence is made up of algorithms. An algorithm is a set of step-by-step instructions used by computers to solve problems or complete tasks.

The basic structure of an algorithm:

Inputs → Steps to change input → Outputs

Example adding a contact to your phone:
Input:
Contacts name
Phone number
   Steps:
   Open address book app
   Fill out name
   Add phone number
   Save
      Output:
      A new contact

Examples:

| Netflix suggestions | Email Spam |

Datasets

| Your past viewing history (clicking, watching, finishing a film or show | Past emails you and other people have labeled spam (also can use NLP to determine whether the text used is similar to spam) |

Prediction

| Suggestions for you - Predicting what movie or show you will click on | If email is spam or not |

3. Prediction

The output of an algorithm that has been trained and then applied to a new dataset.

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Machine Learning

The most common type of AI used today is Machine Learning.

Traditional programming: Usually programmers create a set of instructions and rules (a programme), which is how a computer "knows" what to do. For example, if you type in "hello" then the computer responds with "hey!".

Machine learning: This a different type of programming. The programmer will use many examples of data (e.g. millions 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**. The data used in this process is called **training data**. In this way the computer is "learning" how to accomplish a task (e.g. how to respond when they receive the input "hello").

Artificial Intelligence is an invisible, but increasingly, part of our daily lives, suggesting what we should read, or answering our customer-service queries.

Some common uses of AI today:
- suggest the music you might want to listen to (Spotify)
- suggest movies you might want to watch (Netflix, Amazon)
- spot attempts at bank fraud and cybercrime
- help doctors read X-rays and other medical images
- identify inappropriate content online or in emails: email spam & filter;
- respond to emails 'google: 'smart reply'
- respond to customer service requests

- help teachers and examiners recognise plagiarism through analysis of student's written work
- recognize faces and suggests friends to tag in social media (Facebook)
- personalize your news feed so you're seeing posts that interest you (Facebook)
- personalize emojis (Instagram)
- apply facial filters; animated effects & digital masks (Snapchat)
- automatically identify objects in images (Pinterest)
- organize and coordinate business/personal calendars
- read video feeds from drones.

And many more....

Useful videos

Video	Duration
What is AI?	1.57 mins
What is Machine Learning?	2.19 mins
Bias - an example of bias in AI	4.59 mins

Other Resources

Material	Format
An Ethics of Artificial Intelligence Curriculum for Middle School Students - MIT Media Lab	Document
Introduction to Algorithmic Bias	Presentation
Teachable Machine - Google Experiments	Web platform