Lesson 1: What is AI?

Experience AI

Raspberry Pi Foundation

Starter activity

What is intelligence?

Discuss with the person next to you.

Commonly, people describe intelligence as the ability to learn and **adapt/react to new situations**.

Lesson 1: What is AI?

In this lesson, you will:

- Describe the difference between ‘data-driven’ and ‘rule-based’ approaches to application development
- Name examples of AI applications
- Outline some benefits and issues of using AI applications

Is this piece of paper intelligent?

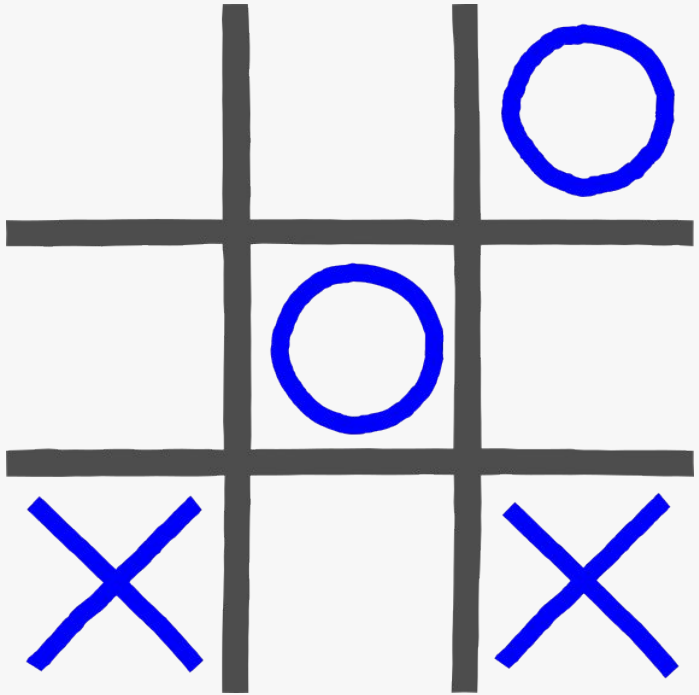
The ‘intelligent’ piece of paper

My intelligent piece of paper has never lost a game of noughts and crosses.

2 volunteers are needed.

1 will play on behalf of the humans.

1 will follow the instructions given by the intelligent piece of paper.



What makes the piece of paper “intelligent”?

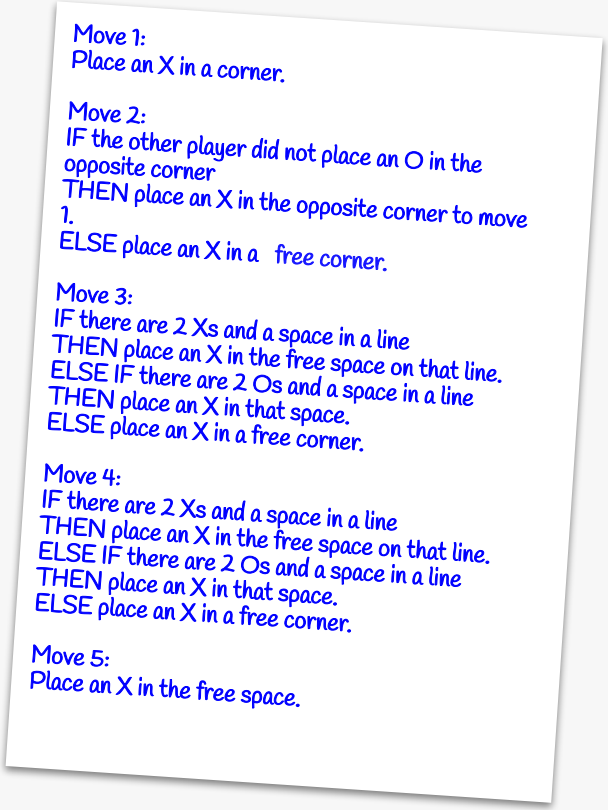
The piece of paper had instructions written on it.

Does that make the piece of paper intelligent?

No.

The piece of paper is not intelligent.

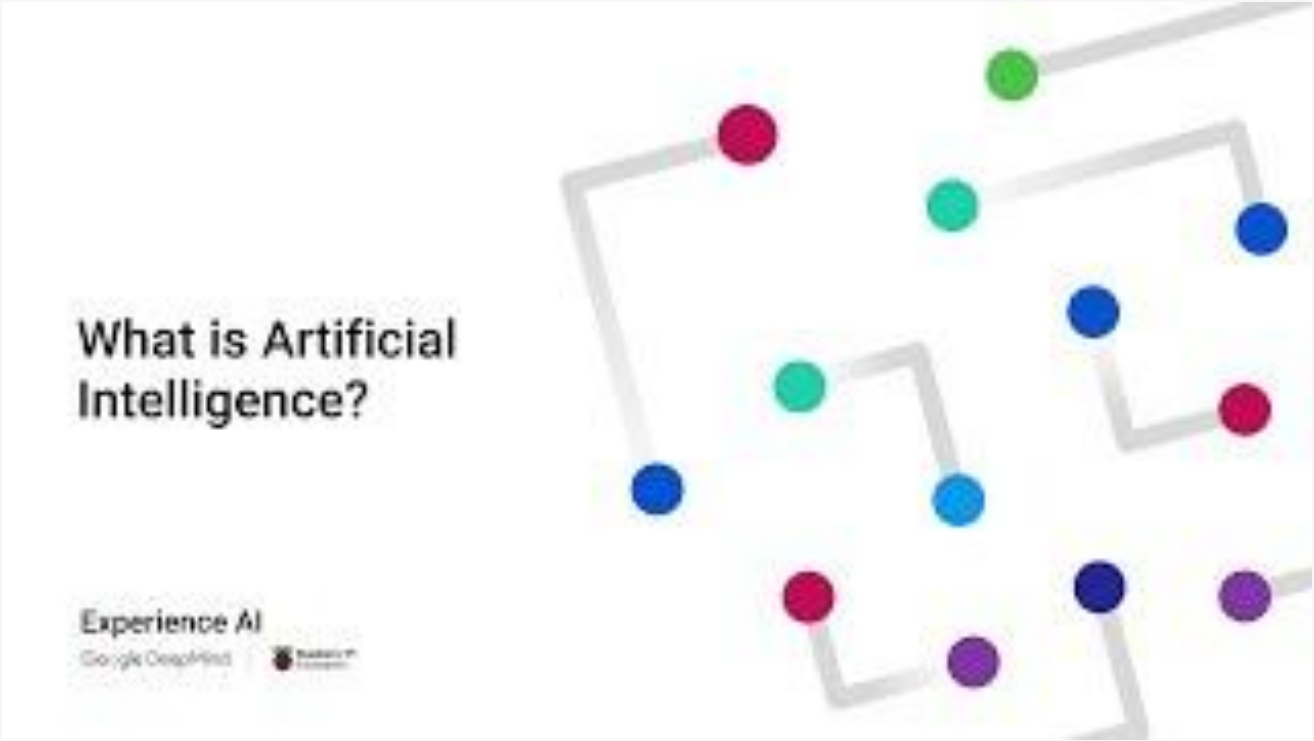
It is a set of IF/THEN **rules** and cannot adapt itself to new situations.



What is artificial intelligence (AI)?

Now you have considered what is meant by **intelligence**:

1. Open your worksheet.
2. Write down what you think is meant by **artificial** intelligence.



Watch the video on YouTube

Using AI to solve problems

Rule-based

Move 1:
Place an X in a corner.

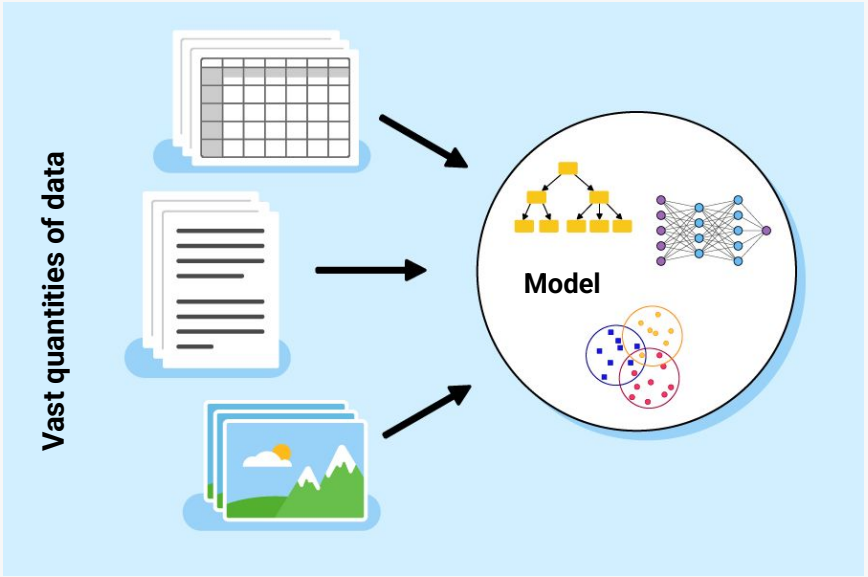
Move 2:
IF the other player did not place an O in the opposite corner
THEN place an X in the opposite corner to move 1.
ELSE place an X in a free corner.

Move 3:
IF there are 2 Xs and a space in a line
THEN place an X in the free space on that line.
ELSE IF there are 2 Os and a space in a line
THEN place an X in that space.
ELSE place an X in a free corner.

Move 4:
IF there are 2 Xs and a space in a line
THEN place an X in the free space on that line.
ELSE IF there are 2 Os and a space in a line
THEN place an X in that space.
ELSE place an X in a free corner.

Move 5:
Place an X in the free space.

Data-driven



What is a model?

A **model** is a representation of a real-world context.

A **data-driven model** is used to solve a problem.

Usually, they rely on a massive number of examples (lots of data), to detect patterns to create the representation.

Example: AI chatbot

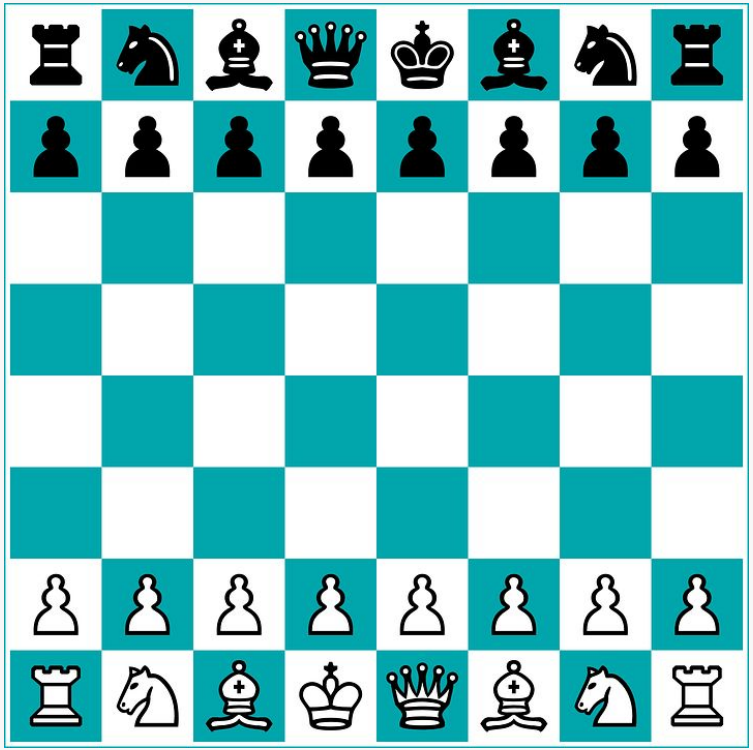
Uses vast amounts of data to create a conversational model.

An application can use this model to hold a conversation.

Creating a model

Chess is a complex two-player strategic board game.

If you wanted to create an AI **model** of how to play a game of chess, what would it need?

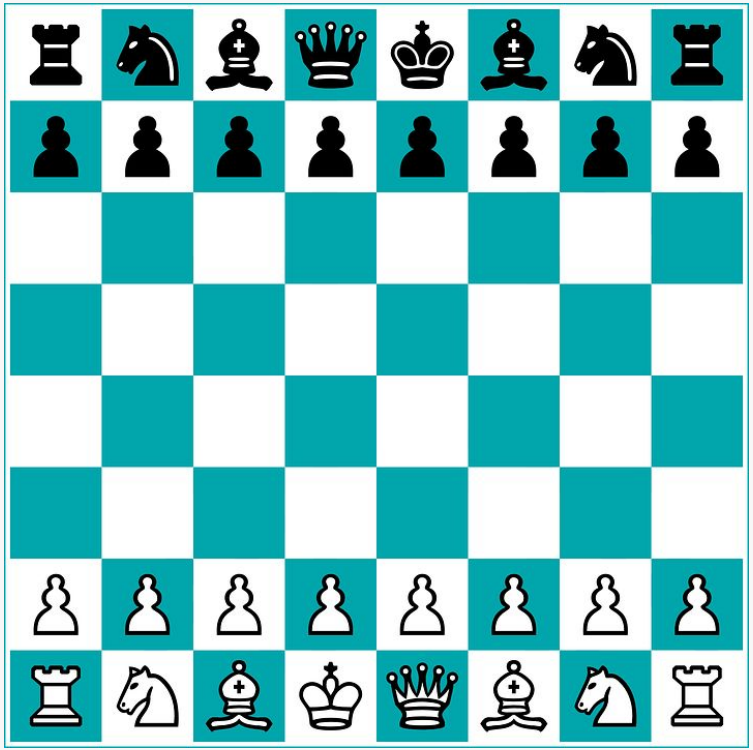


Data

A model of a chess player

What do you want the model to be able to do?

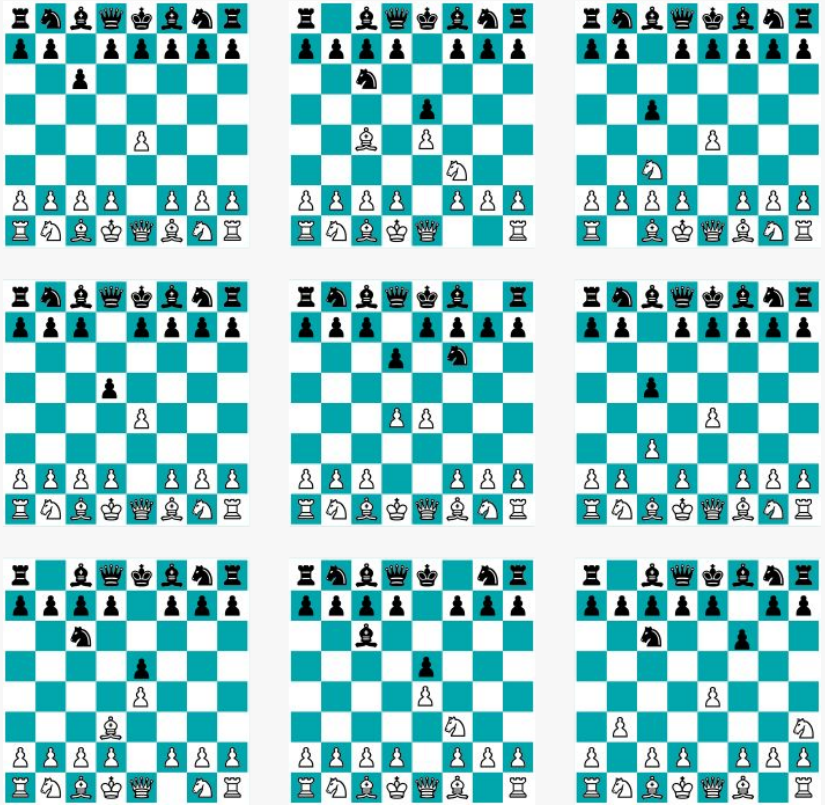
For each turn, choose which piece to play and where to move it to have the highest chance of winning



A model of a chess player

What data would you need to create the model?

- **Where each piece has been placed in previous games**
- **Whether combinations of moves resulted in a win, loss, or draw**



AI and chess

1996 was an important year for AI development, as an AI system called Deep Blue famously beat one of the world's best chess players.

Image source: Encyclopædia Britannica

Why is a data-driven approach beneficial in creating an application to win a game of chess?

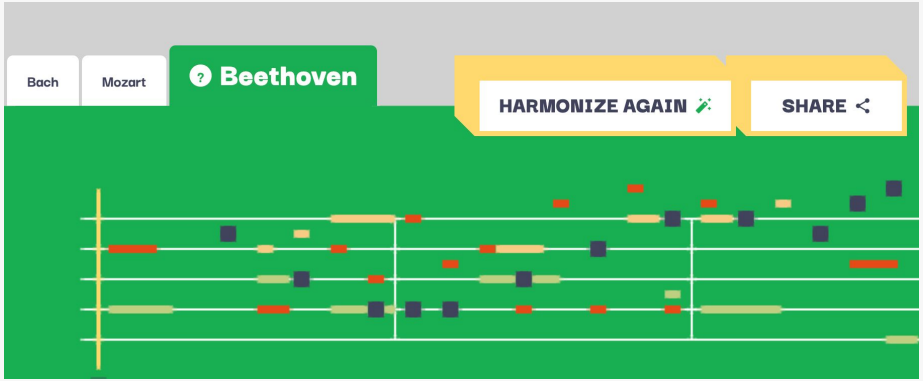
There are more variations of chess games than there are atoms in the observable universe.

Picking the best move would be extremely difficult to achieve with a rule-based system.

AI applications — generative AI

Generative AI applications are built to generate ‘**creative**’ content such as:

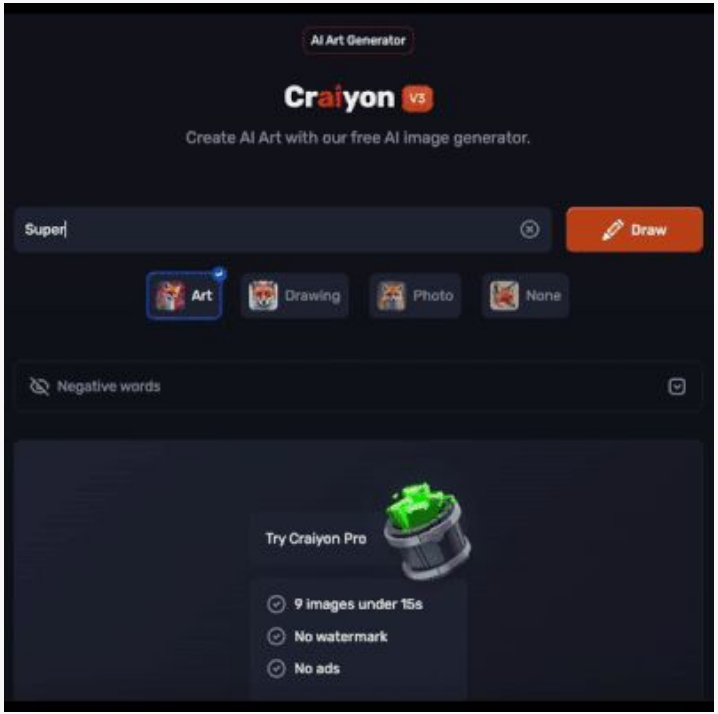
- Sound
- Images
- Text



AI applications generating art

You will use an application to generate artwork based on the criteria you give it.

1. Enter a search term.
2. Select your preferred style
3. Click on **Draw**.



Generating artwork for a film about a superhero who protects a ruined city

AI applications generating art task — 5 minutes

Use the AI application to generate artwork for **either**:

1. A poster for the world climate change conference
2. The wall of a café or restaurant

Things to think about:

Who benefits from using AI to generate art?

- Who owns the art?
- Who made the art? You or the application?

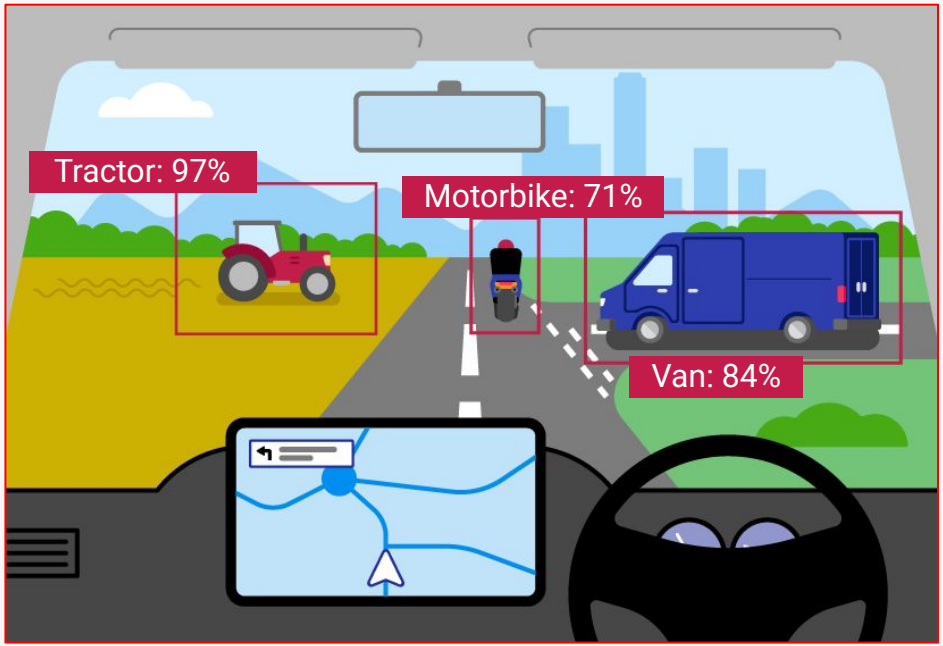
What are the problems with using AI to generate art for you?

AI applications — computer vision

Computer vision is a field of AI that attempts to gain meaningful information from images.

One way it does this is by identifying objects in an image.

Why do you think there are percentages next to each object that has been identified?



Computer vision task — 5 minutes

Use the website linked on your worksheet to choose an image.

It will use AI to **predict** what is in the image.

Study the confidence scores.



Things to think about:

Where can you see this technology being used and who would benefit from it and how?

What might be the problems of being able to automatically identify people and objects in images?

Plenary

AI or not AI?

On the plenary page of your worksheet, look at the example applications.

For each one, decide whether or not you think it uses AI and justify your answer.

Think about whether it is **rule-based** or **data-driven**.

Answers

Spreadsheet that uses formulas to work out the total cost of a holiday

NOT AI

The spreadsheet will work out the total cost of the holiday using rule-based formulas.

Answers

Online streaming service that recommends films based on users' viewing habits

AI

The service will use the viewing habits of the user, compare it to other users, and make a prediction of what the user would like to watch next.

There are too many users of an online streaming service to be able to create rules for each user.

Answers

Customer service chatbot that tries to solve common problems that customers usually have

Could be AI

A chatbot could use IF/THEN rules to respond to **specific** inputs. This would not use AI.

If the chatbot is able to recognise the meaning of any sentence that a customer enters and use a model to produce an appropriate response, this would make it an AI application.

Summary

AI can be used to solve problems.

AI uses **data-driven** models to represent the real world.

Models make predictions.

Plenary

What is artificial intelligence (AI)?

What would you change about **your** first description of AI now you have completed the lesson?

Using the space provided on your worksheet, **update your description** of what is meant by ‘artificial intelligence (AI)’.

Next lesson

In this lesson, you...

Described ‘artificial intelligence’

Looked at AI applications and debated the benefits and drawbacks of their use

Next lesson, you will...

Discuss the role of data in an AI system

Recognise that there are different approaches to solving problems using AI