Part 1 Understanding AI: Teacher presentation notes

Slide 1

The following presentation is part of the CSIRO's 'Artificial Intelligence in Action' classroom resource collection. The content has been developed in collaboration with the CSIRO's Data 61 team, who are leading the use and development of Responsible AI within CSIRO.

This presentation is Part 1 of a two-set Responsible Artificial Intelligence (AI) in Action series:

1. Part 1 – Understanding Artificial Intelligence (AI)
2. Part 2 – Responsible Artificial Intelligence (AI).

Part 1 helps introduce and explain AI (artificial Intelligence) to students. It provides definitions and explanations about AI and includes discovery activities and discussion questions.

You can find more information about the collection and use of the presentation in the related Teacher Guide. Available at https://www.csiro.au/en/education/Resource-Library.
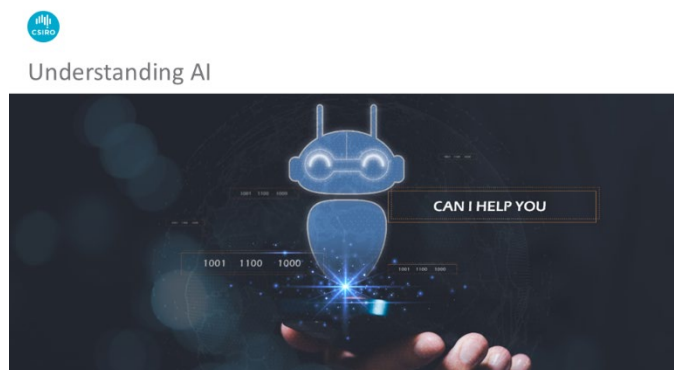
Slide 2

Optional: You may wish to include an acknowledgement of country at the start of your session. The video provided here is a suggestion. Or you may wish to use your school version or make your own. For more information check out <u>Reconciliation Australia</u>.

Video link - https://vimeo.com/417035853

Slide 3

Understanding AI

Section information

This section has two information slides, followed by a Question Time activity. You may choose to change the order of the Question Time slides with the information slides to explore prior understanding. Questions can be found on slides 7 – 11.
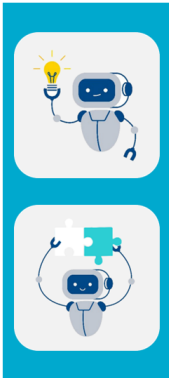
Slide presenter notes

You have probably heard of words like Artificial Intelligence and Machine Learning before. These types of technology has been around since the 1950s. But back then, computers weren't as powerful as the ones we use today. Unlike older technology, today's computers and programmes can follow much more complicated instructions, and their memory is so great that they can store vast amounts of data.

Slide 4

What is AI?

- AI stands for Artificial Intelligence

- Think of AI as a group of programs that have been 'trained' to do something that humans can do. These programs have the ability to work together in a system.

- AI systems are designed to solve problems, with each program contributing a specific task.

AI stands for Artificial Intelligence. It is a term becoming more and more common when we talk about computer programs and how they work. But what is AI?
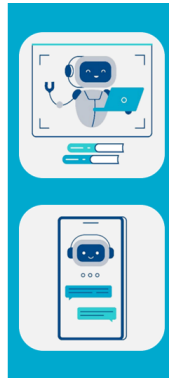
AI is a group of programs that work together to solve a problem that is typically solved by a person. Each program in an AI system contributes something; one program may collect data, another may look for patterns, another will follow a set of rules when analysing the data like '1+1 always equals 2', or another will make the AI to speak to you.

Slide 5

Each AI system works a little differently, but one thing they have in common is that they work off massive amounts of data. The more data and training an AI program receives, the better it can solve a problem.

But AI cannot think as freely as a human. AI solves problems by following a set of instructions that are given to it. It follows logic and relationships between facts. For example, an AI system understands that human language follows speech patterns. It knows that in English, you put the describing word before the object and not after, because that is a grammar rule. For example, the 'red car' and not the 'car red'.

AI cannot use human skills like imagination, awareness, emotions or values.

Slide 6 - 11

Group Activity

This section provides a set of discussion questions. Select from the question options to lead a general class discussion or hold a mini debate. You may choose to add your own question options. The provided questions are listed below.

Open Questions:

1. Are human skills like imagination and emotions important to decision-making?

2. Are there problem-solving situations where logic and relationships between facts are the only things that matter?

3. AI can create art does this count as imagination? Why? Why not?

Closed Questions:

1. What are two things AI systems need to work?

2. When did AI become a widely available tool?

Slide 12

How does AI work?

Section information

This section has three information slides and a short video created by CSIRO.

The video explains how AI collects and uses information, and how the power of AI lies in the instructions and information it receives.

Slide presenter notes

AI works by building upon more and more data. Think of services like Uber Eats; every time someone orders food from the Uber Eats app, the AI makes a note of what was ordered, then slowly starts guessing what foods to recommend that person at different times of the day.

AI doesn't just use your data; it collects data from everyone who uses it. If thousands or even hundreds of thousands of people are using an AI system, over time it will collect a lot of data and get a lot of training, making it better and better at what it does.

But no matter how smart an AI system seems to be, it still needs to be taught. AI cannot do anything without first receiving large amounts of data and then instructions with what to do with that data.

In the early stages, AI is checked often to make sure it is giving the right answers. This can be done by people or even other program. Once the makers of the AI are confident it is doing what they want it to do, it will be released into the world.

A very important thing to remember: **AI is only as good as the instructions and information it is given**.

If you teach an AI program by giving it a whole bunch of pictures of apples but tell the AI they are oranges, the AI will think that any image of an apple is actually an orange.

Another issue can be bias in the data. An example of this would be if AI makers created a food app, but the creators don't like desserts. They may not include many desserts in their app but forget that others feel differently. Developers need to be very careful of their own bias and select their training data carefully to ensure the AI output is accurate.

Let's explore different ways in which AI can receive information and instructions.

Definitions

Bias – means liking or disliking something. It's usually personal and sometimes there is a good reason for it, but not always. For example, people have a favourite colour or food that they like. They also have certain foods they don't like.

Unconscious Bias – is the same thing as a bias but without realising it. It can cause us to unconsciously think certain things or act in certain ways. For example, picking a tv show with a colourful 'cover image' image because you unconsciously think that all colourful cover images represent comedic tv shows.

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When developers are training an AI system, they can choose different strategies to help the AI system learn.

One option is to give the AI system the data and tell the system what the data means. This is called **supervised learning;** the AI system is being given specific information, including categories and types.
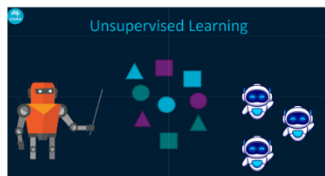
Bias could impact the AI system during this process if the developers or training program include 'wrong' information. For example, if the input data tells the AI that this is a picture of a cat, when it is actually a picture of a dog.

Slide 14

Another option developers can use is to give the AI system large amounts of data and ask the system to find its own patterns through 'learning'. This is called **unsupervised learning** as the AI system needs to make decisions on its own.

Again, it is important to check for bias in the system. This can be down by reviewing what the system has discovered and confirming whether it has made the right decision.

Bias could impact this type of AI system if the developers teach it 'wrong' or biased information during the checking processes.
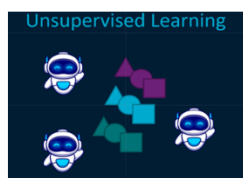
For example, the teaching instructions say that shapes with 3 corners are triangles and that all purple objects are also triangles. What might the learn with these instructions? What if the system is told that no shapes should be aqua blue, because the developer doesn't like that colour?

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An important aspect of unsupervised learning systems is that they may be able to identify trends and patterns that people have not noticed.

This can be particularly important when an AI system receives large amounts of data.
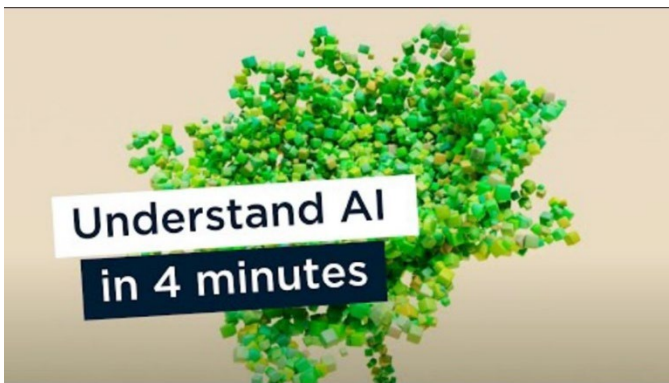
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The power of AI lies in the 'data' or information that it holds. This can be information it gathers or information it is taught.

Remember that **AI is only as good as the instructions and information it is given**.

Let's watch a video to learn more about how AI collects and uses information.

Slide 17

Video content information

AI EXPLAINED: It's maths, not magic (a simple guide)Artificial Intelligence (AI) is all around us. But how does it actually work?

In this short video the CSIRO team help shed light on the science behind the AI-driven apps and programs we use every day.Share the video with students to help broaden their understanding of how AI works in today's world. You can watch the video as a class group or share the link with students to watch individually.

This content was proudly supported by Google Australia's Digital Future Initiative.

The video has been embedded in the presentation. You can find the video on YouTube via the following link: https://www.youtube.com/watch?v=5mHxO2JpCR0

Slide 18

When we say AI, people often think of 'science fiction' examples like Jarvis from Iron Man or C3PO from Star Wars. These examples are possible forms of future generation complex AI systems that can think independently in the same way a human mind does.

The AI that we use in our lives is not like this. In fact, many researchers believe we only have a 50% chance of creating this type of AI by 2099, while others do not think it is possible at all.

Let's explore the ways we can classify or group AI systems.

Slide 19

Section information

This section includes two information slides and a classroom activity. The section focuses on how we classify or group different types of AI systems.

Slide presenter notes

Did you know that we have been using different kinds of AI for decades? The AI systems that we use can be classified from Narrow to Generative AI. These classifications help to explain the complexity of the instructions an AI can receive and act on.

The simplest forms of AI are called Narrow AI. This type of AI is really good at doing one or two things. These systems are designed to recognise patterns in data and make predictions .

At the other end is Generative AI; a kind of artificial intelligence that can create something new in response to a person's prompts and inputs. This could be writing, art, videos, code for a program, music etc. The more data this type of AI is given, the more complex its responses can be. The ability of these systems are based on the quality of the data they have been trained on.

Class question (connects with discussion on next slide)

1. Can you think of examples of narrow or generative AI that you use?

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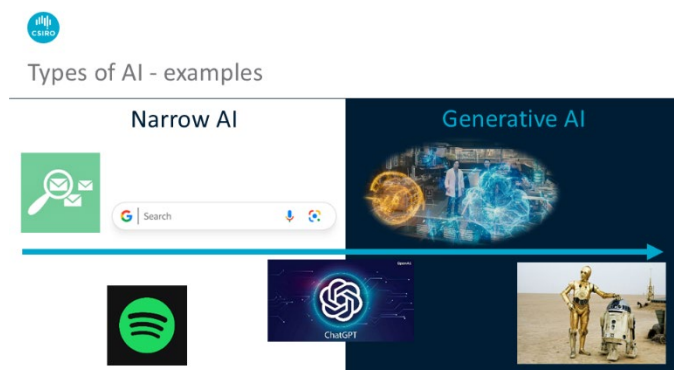
Presenter note - *consider the examples students presented and link them with the information on the slide.

Things like SPAM filters on your email, spell check and NPC (non-player character) characters that you can interact with in games are examples of simple or narrow AI.

Take a SPAM filter as an example. It will decide what SPAM is based on what you, other users and its programmers have taught it. It will look for certain types of email addresses and the wording in email titles to make its decision, but it doesn't understand what it is looking at and can still make mistakes. Everyone has probably had an email from someone they know end up in their Junk folder by mistake.

ChatGPT is an example of Generative AI, because it is creating something new, in response to prompts and inputs from a person. It is designed to write like a human; it does this through complicated algorithms telling it what to do and lots and lots of data.

But can we call it original if the responses are a rearrangement of information that was already given to the machine? Is it really thinking for itself like the science fiction characters Jarvis or C3PO appear to do?

Discussion question options:

2. What makes something original?

3. How do you feel about AI systems that create music, art, or videos?

4. What do you think about science fiction AI systems like Jarvis?

5. How do you feel about narrow and generative AI?

6. What is the difference between Narrow and Generative AI?

7. What are some examples of Narrow and Generative AI?

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AI is now so common that we often use it or are impacted by it without even realising. For example:

- The news stories we see online and via social media,

- the foods and products that are recommended to us in ads,

- the way we navigate around our cities,

- the health information provided to us by our watches,

- the searches we do online to find out information, and

- the software that recommends songs and movies.

All these examples rely on different types of AI. Being aware of AI is important if we are to be critical users of this technology.

Group activity

Split students into pairs or small groups. Have students write examples of AI on Post-It notes (5-10 minutes). Explain that the class will come back together and share their findings through a group discussion.

Key questions

As required, use the questions below to facilitate conversation and brainstorming.

1. What apps do you/friends/family use?

2. Do you have any devices that recommend you things you might like?

3. Do you use programs that answer questions for you?

4. What about in the car?

5. How do you get your groceries?

6. Do you ever make changes to the videos or photos you take?

7. How do you find new music?

8. What about at school? Do you use programs that are personalised to you? Is your teacher using AI?

9. What happens to SPAM emails and text messages?

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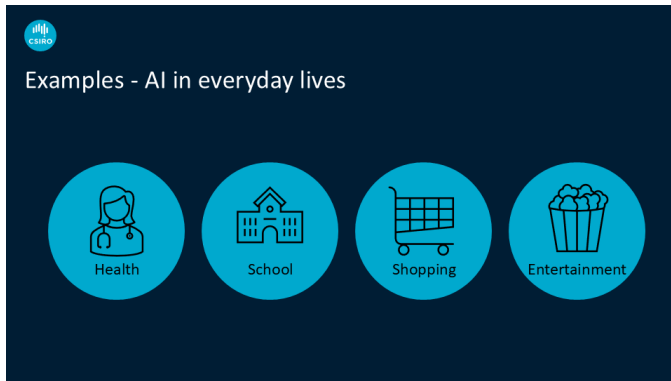
Share student responses.

Summary activity

Have student's group their answers into the categories shown on the slide. You can add more categories if students have different suggestions, or if new categories are becoming clear from student responses. (5-10 minutes).

Key questions:

As required, adapt the supplied key questions to facilitate a summary discussion.

1. Why do companies make these kinds of AI? What if the program is free?

2. What information do you give these programs?

3. What are the positives of these kinds of AI?

4. Are there any negatives?

Slide 23
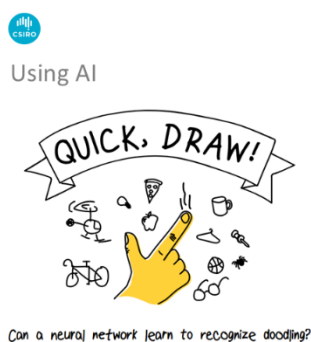
Time to try an AI system.

Google Quick Draw is an example of supervised learning. It works using a labelled data set created by developers. As the popularity of the game grows, the amount of data it has to use continues to grow, making the program faster and more accurate.

Slide 24

Google Quick Draw

Presenter information: https://quickdraw.withgoogle.com/

Group activity

Allocate a set amount of time for students to try out Google Quick Draw.

You can use the main classroom screen and have students come up to take turns. Or, you could allow students to use individual devices and try the program for a set amount of time. (5 mins)

The program will allocate items for students to draw at random. You could ask them to keep track of what they have drawn to help with the summary discussion.

Summary information

The AI system that supports Quick Draw is not looking at the actual picture you are creating. Rather, it is looking at the order in which you created your image, the shapes you included and the direction of your strokes. The AI system has also been predominately trained on images that are drawn from a sideways perspective.

Now you understand the way the AI works, do you think there are ways you could challenge the programming?

What if you draw your response from a birds-eye view? Or, what if you create your image in an unusual order? How might the system respond? Ask them to give it a try.

Other possible discussion questions are listed below:

- Is this an example of supervised or unsupervised learning?

- Why do you think Google created this program?

- Could there be bias in the way Quick Draw guesses your drawing?

- What happens to the doodles once we are done?

- What could google use the data we give it for?

Slide 25

Understanding AI – summing up

Ask the class to share a key learning they have discovered.

Ask the students for any final thoughts or discoveries.

Explain that in a follow up session, the class will be exploring the responsible use of artificial intelligence.