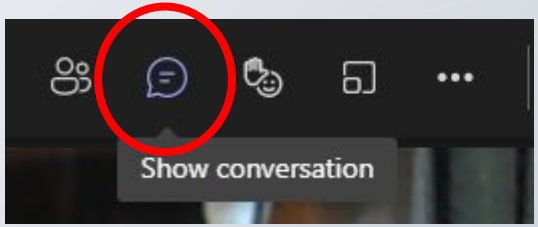
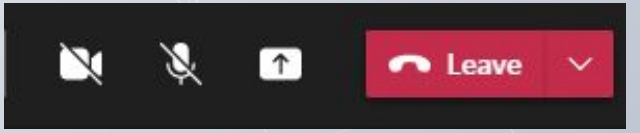
While we wait to get started ...

Open the chat



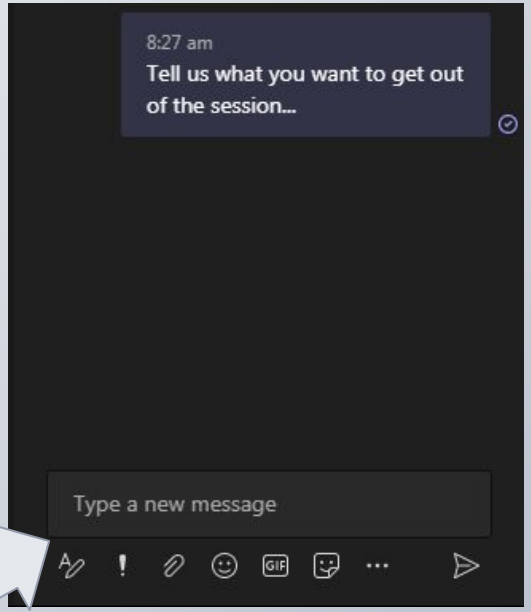


Your mic is on mute
... and camera disbaled

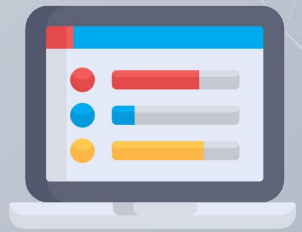
Tell us what you want to get out of the session.

NOTE:
your name will appear with your comment.

The chat won't be part of the recorded version.



Take our poll ... you will find it in the chat...



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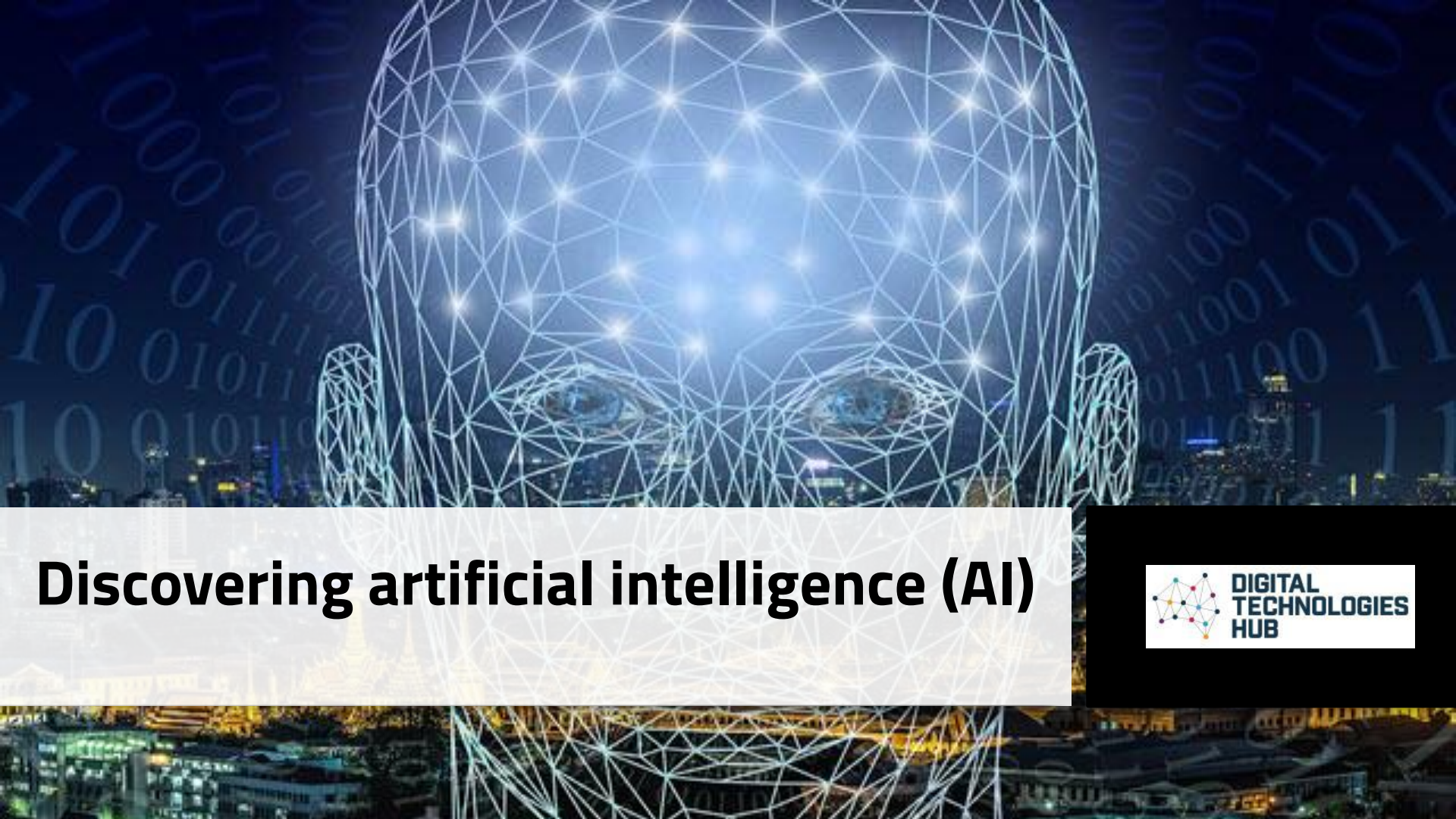

Discovering artificial intelligence (AI)

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Acknowledgement of Country

ESA acknowledges the Eastern Kulin Nation, Traditional Custodians of the land on which our head office stands, and pays our respects to Elders past and present.

We recognise the Traditional Custodians of Country across Australia and their continuing connection and contribution to lands, waters, communities and learning

By the end of this session...

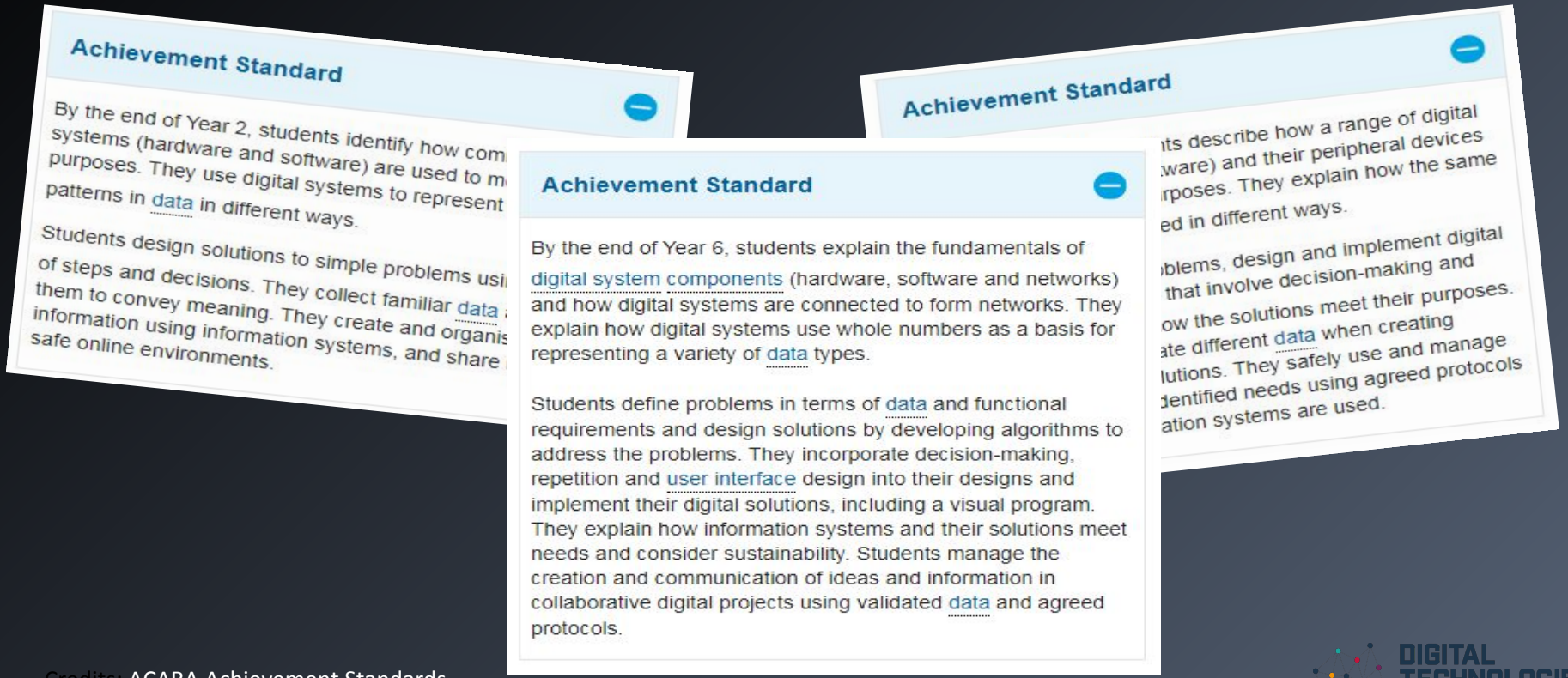
You should be able to:

Build on your understanding of what AI is, and what an AI can do.

Use AI as a context for learning.

Develop some assessment strategies and approaches that you can apply to the AI-related learning tasks.

Achievement standards: starting point



Credits: ACARA Achievement Standards

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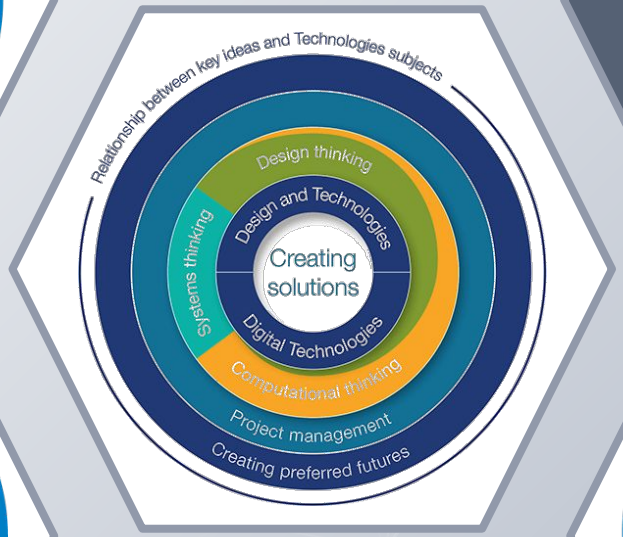
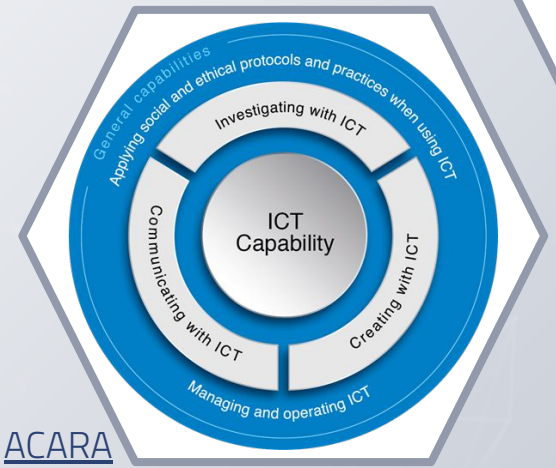
AI topics

Australian CURRICULUM





Source: ACARA

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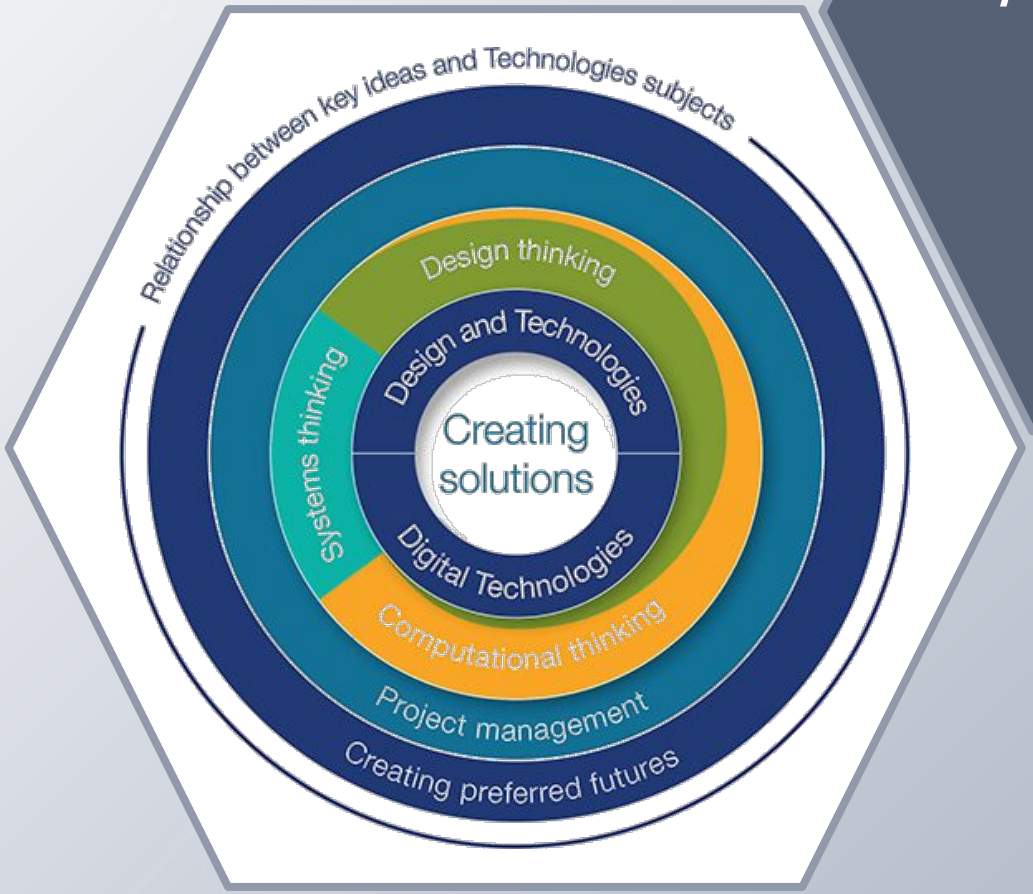
AI topics



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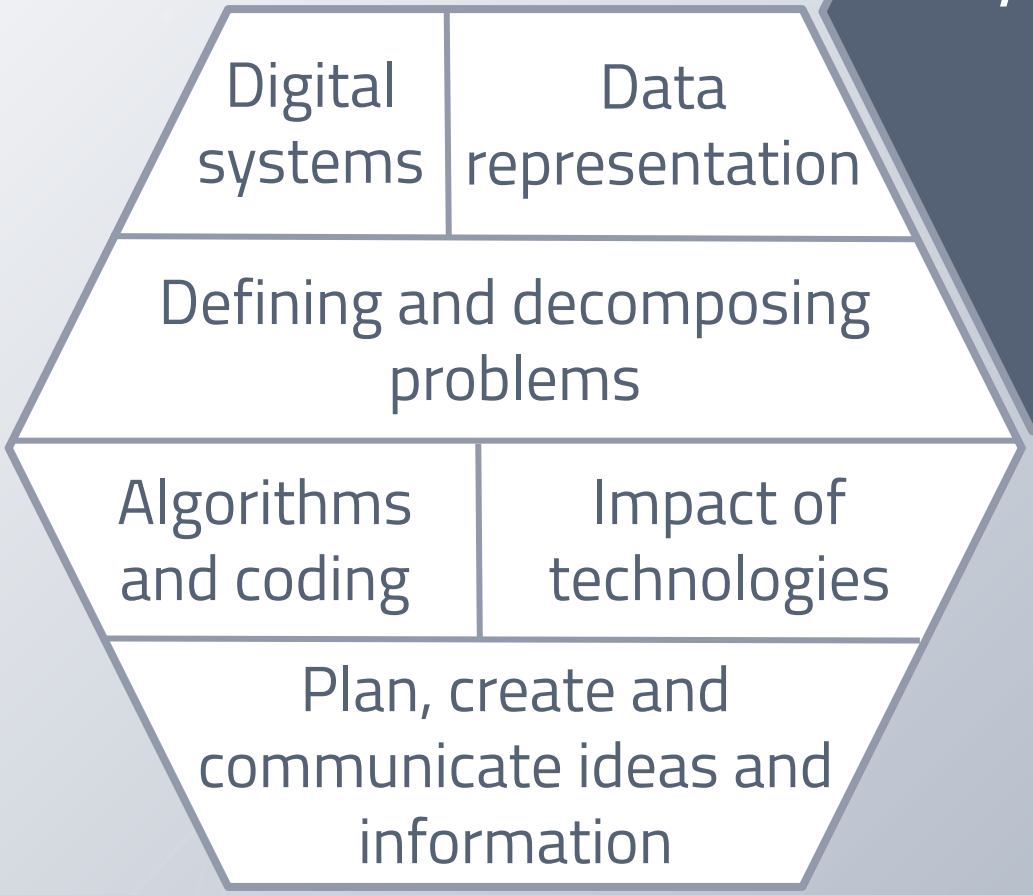
AI topics



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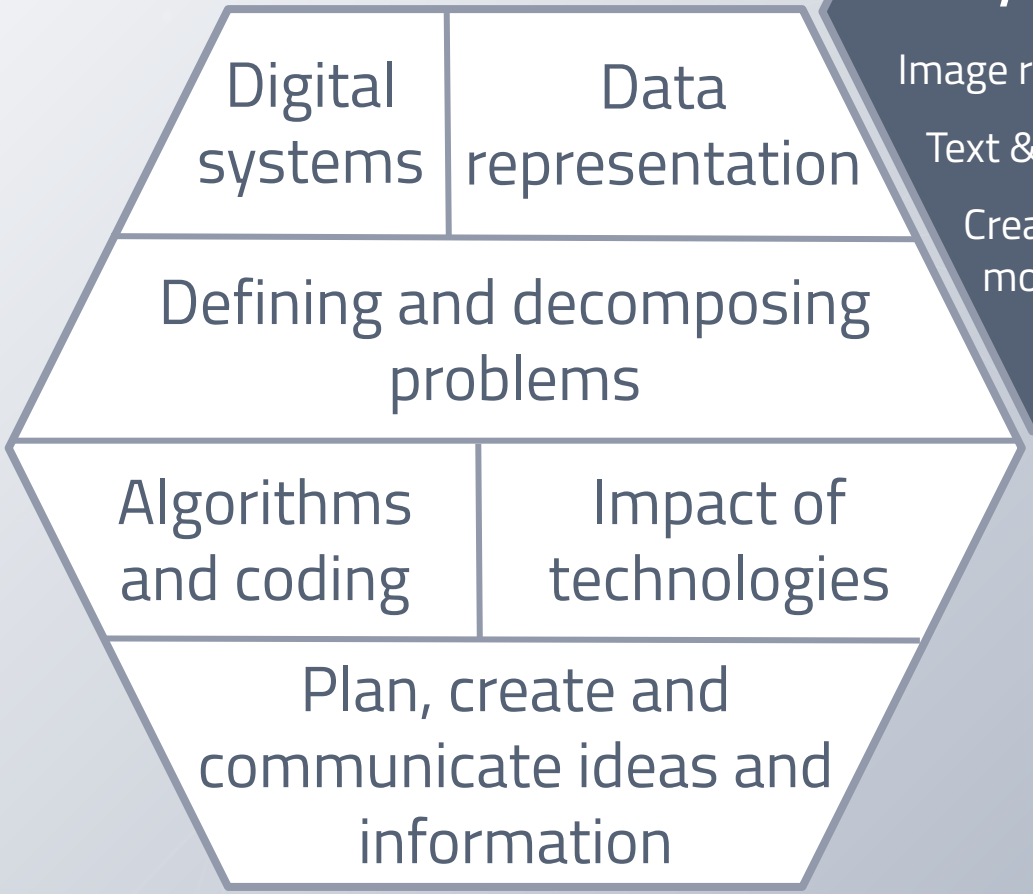


AI topics

Image recognition

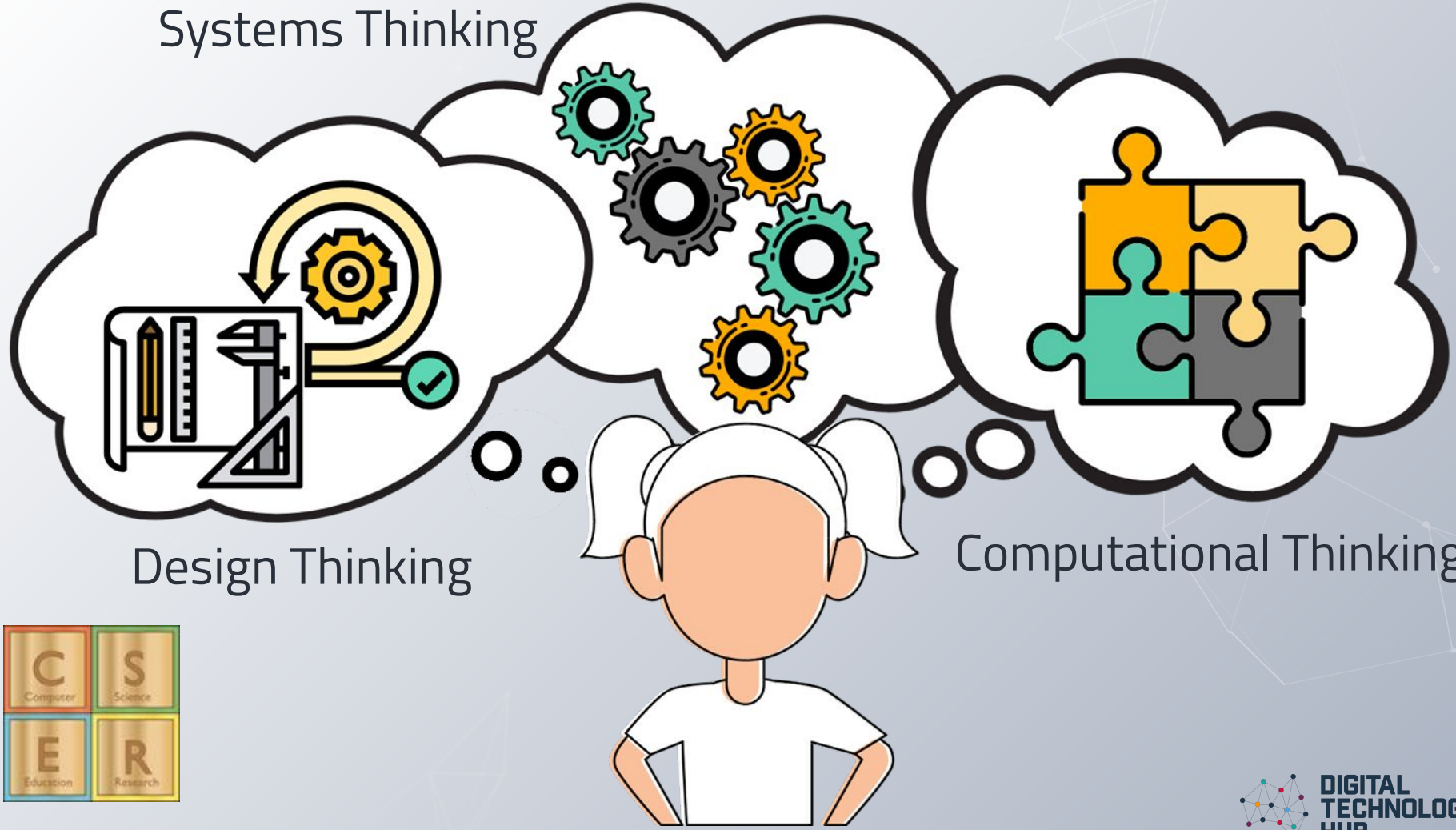
Text & speech recognition

Creating & using AI models (machine learning)

Bias and ethical issues

DIGITAL TECHNOLOGIES HUB

Systems Thinking



Design Thinking

Computational Thinking

C Computer S Science E Education R Research

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What is **Artificial Intelligence?**

and what is it *not*?

The creation of machines to mimic human capabilities.

Teaching a machine to “see” (recognise objects in an image).

Teaching a machine to “read” and “listen” (interpret and analyse text and sounds).

... solve problems autonomously without explicit guidance from a human being.

Used an AI... today, this week, this month?

Used a virtual assistant?

Had spam blocked from your email?

Used predicted text while sending an SMS?

Had a YouTube clip recommended by the system?

Had search terms suggested in a Google search?

Translated a language by speaking into an app?

Chatted online to a chatbot for product information?

Used thumbprint or iris scan to unlock your smartphone?

Had your photo tagged on a social media site?

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You are stopped in the school yard ...

A parent asks why are you teaching about AI?

Shouldn't you just focus on Literacy and Numeracy?

What would you say?

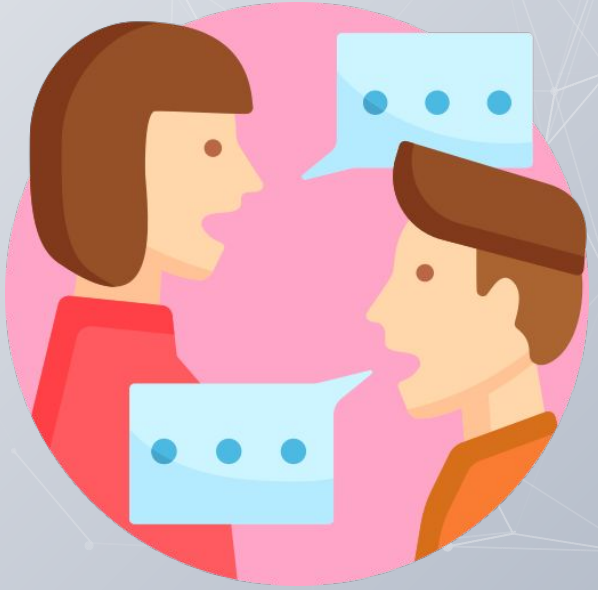

Image source: Flaticon

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A love story

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AI relies on data

AI relies on data

- Sound
- Images
- Text
- Sensory data

How AI is a part of our daily lives

RESOURCE: AI cards (PDF)

LESSON: Recognising AI (years 5-8)

EXPLAINER VIDEO: AI in our everyday life

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See, move & sense

Computer Vision

Listen, read & respond

Natural Language Processing (NPL)

Think & recommend

Clustering information

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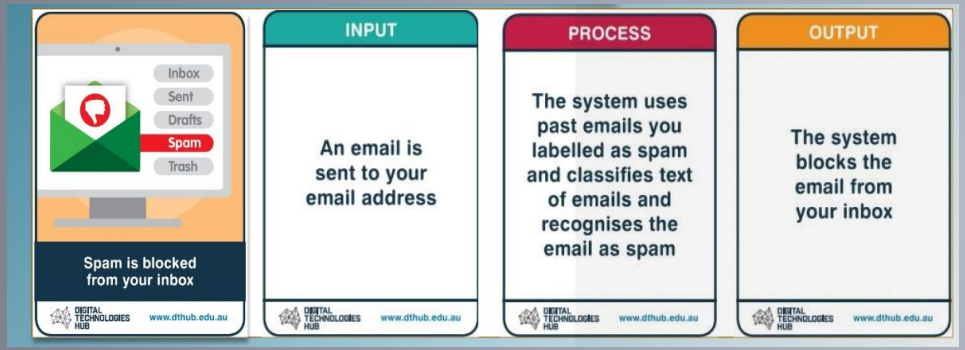
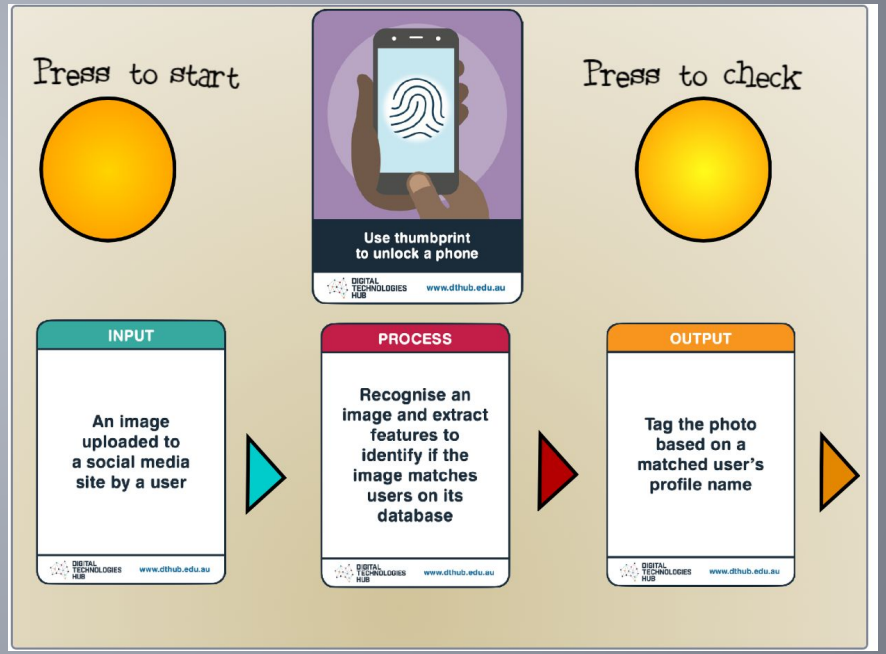
Systems thinking





Use the input-process-output cards or play the Scratch game

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Frayer diagram

NSW DET Digital Learning Selector

Definition
[insert info here]

Facts/Characteristics
[insert info here]

Artificial Intelligence (AI)

Examples
[insert info here]

Non-examples
[insert info here]

Image recognition

The ability of machines to recognise objects in images or videos (part of **computer vision**).

Examples include unlocking your phone, face tagging on social media photos and vision used by self-driving cars.

Google

Cloud Vision

Car	91%
Car	82%
Truck	78%
Traffic light	73%

Image: M. Richards

I see, I think, I wonder

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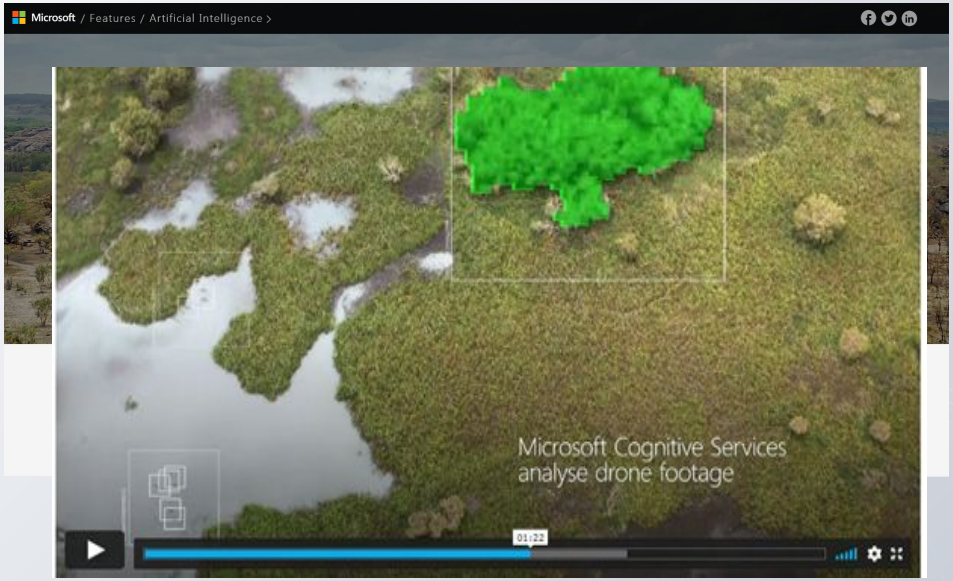
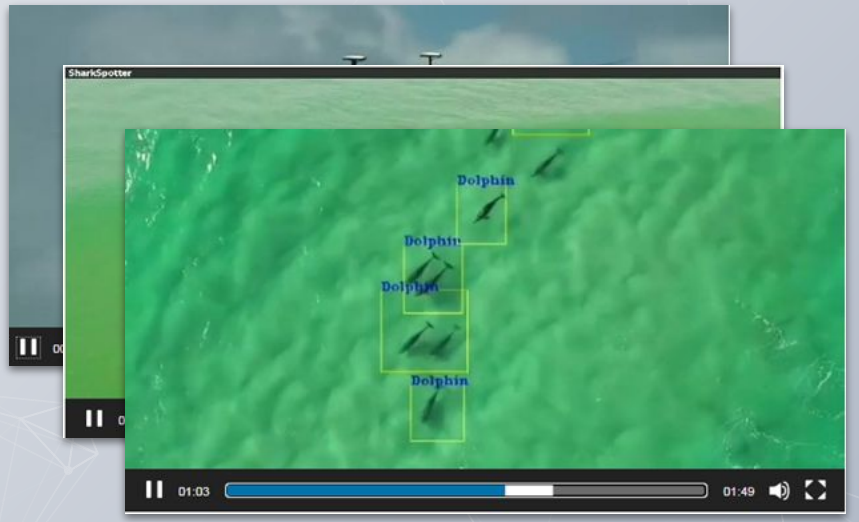
Image recognition in action





Weed spotting Kakadu National Park

Shark spotting drone

Images: CSIRO/Microsoft

Images: Channel 9 News

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Image recognition: Feature extraction

A shark and a dolphin…
What features help us to tell them apart?

Test it using an AI AutoDraw

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Image recognition

Now try drawing a shark or a dolphin in **Autodraw**.

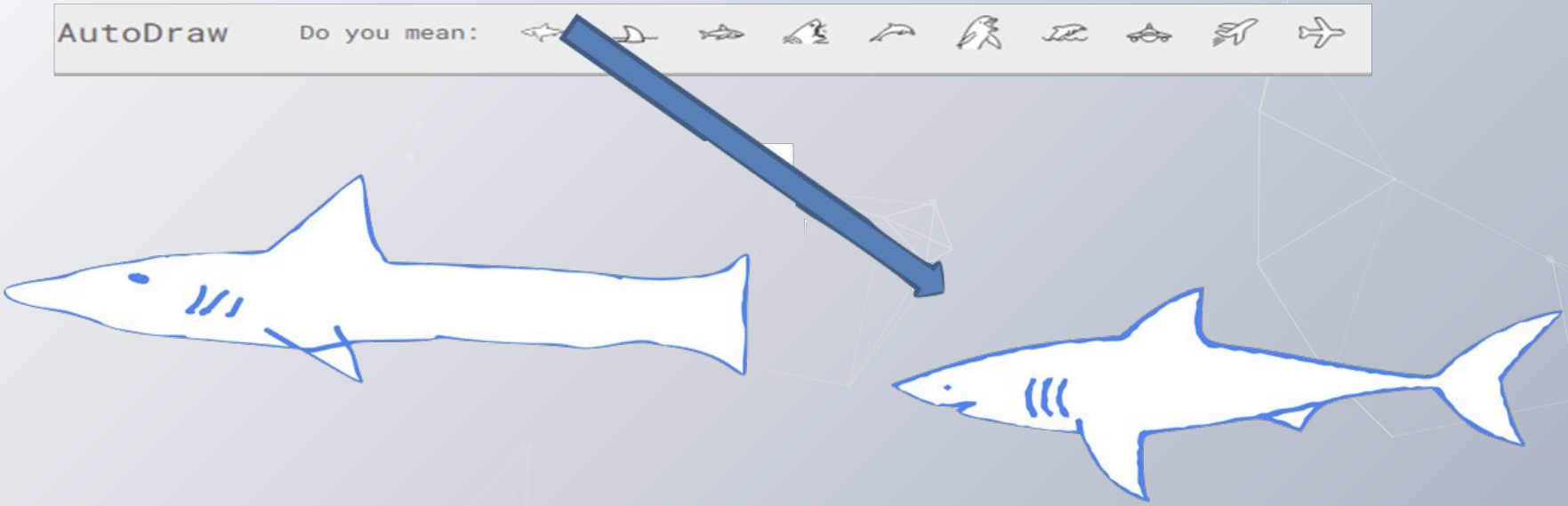

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Image recognition: feature extraction

Shark	**Dolphin**
Pointed nose	**Rounded nose**
Eyes on side of its head	Eyes on side of its head
Long thin body	Long thin **curved** body
Jaws with triangular teeth	**Mouth looks like its smiling**
Gills behind its head	**Blowhole on its head**
Triangular top fin	**Curved** top fin
Two side fins	Two side fins
V shaped tail fin	**Flat curved** tail fin

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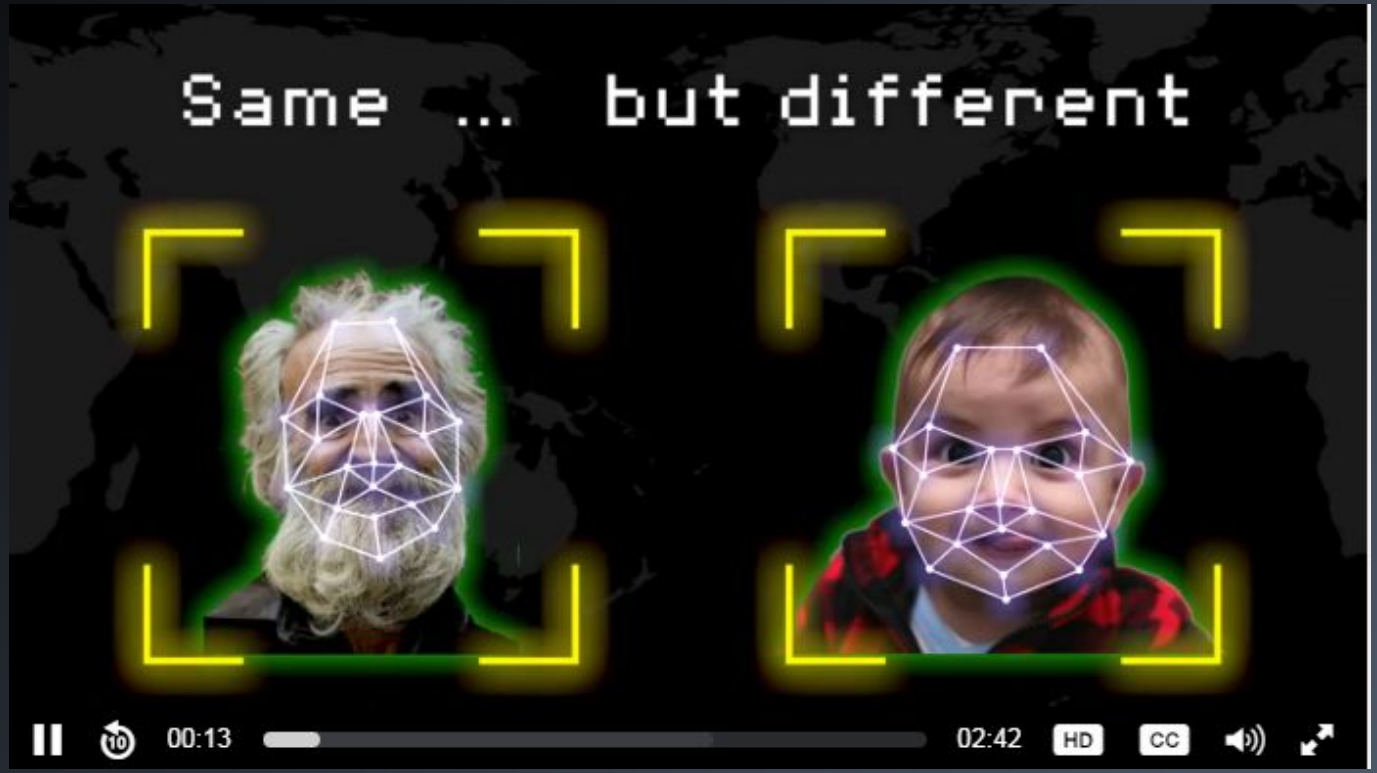
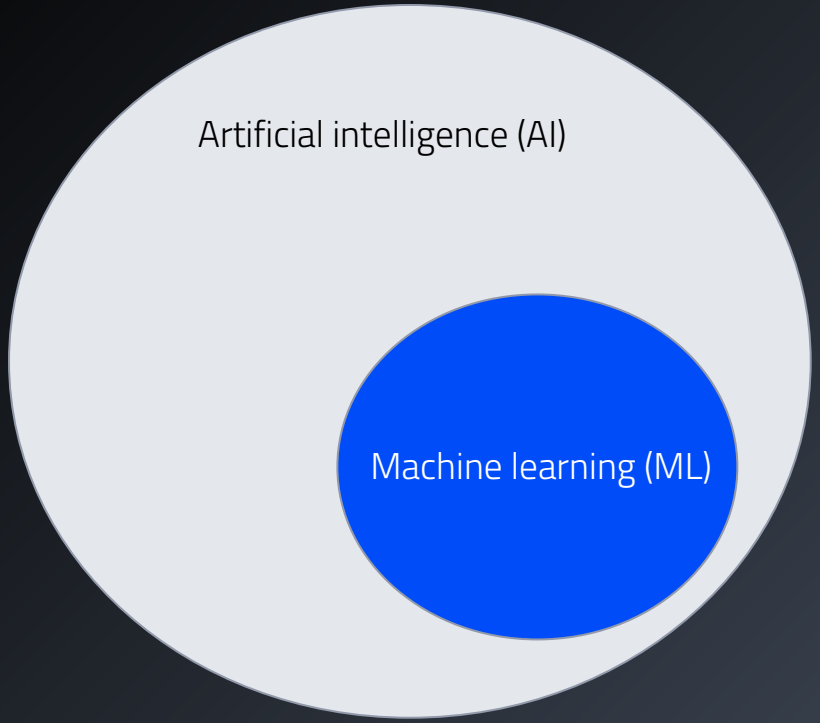
How machine learning makes this possible...



Artificial Intelligence Explainers: Video 1: Introduction to AI & machine learning

AI and machine learning

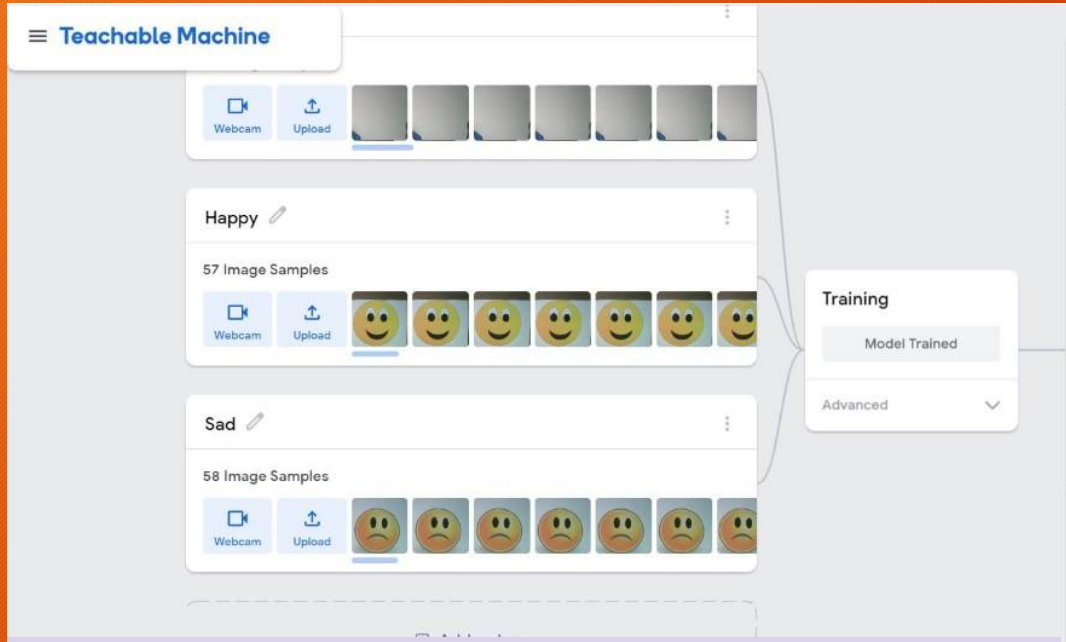


AI enables machines to mimic human behaviors.

ML is teaching machines to identify patterns by providing data, allowing the machines to learn from that data to generate new predictions.

What is an AI model?

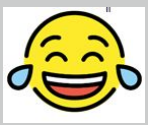
Creating an AI model



Use this pre-made model to test the AI to see how well it recognises a happy or sad emoji. (You will need a device with a webcam).

DT Hub Lesson plan Can an AI guess your emotion?

Creating an AI model

Label	Train: Image 1	Train: Image 2	Train Image 3	Train Image 4	Train Image 5
Happy					
Sad					
Angry					

Bias
This sample provides a more diverse range of training images.

Give the AI a star rating; for example:

- Correct not much of the time
- Correct some of the time
- Correct most of the time.

Image credits Emily Jäger

AI Tool: Teachable Machine

Applying social and ethical protocols and practices

Privacy

Avoid students photographing their own face in their AI model.

Check ‘Terms of use’ of AI tools

Recognise intellectual property
Use of images:

- source free libraries
- credit images

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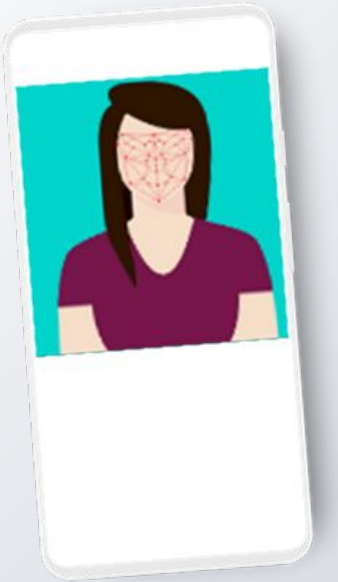
Ethical issues

A situation where there are competing alternatives and the right thing to do is not obvious or clear.

Sometimes terms such as good, bad, wrong, better or worse are used to consider the effect of particular actions on our lives, society, nature and the environment.

Ethical dilemmas



Use an ethical dilemma to develop ethical understandings

1. Explore an ethical issue and interactions
2. Select and justify an ethical position
3. Reflect on and interrogate core ethical issues

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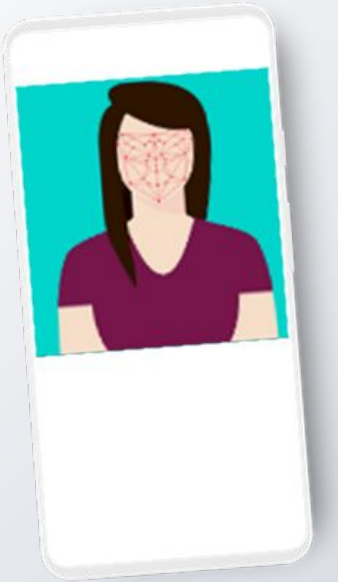
Scenarios: drawing on ethical understanding



A company is behind schedule and over budget in building an AI application.

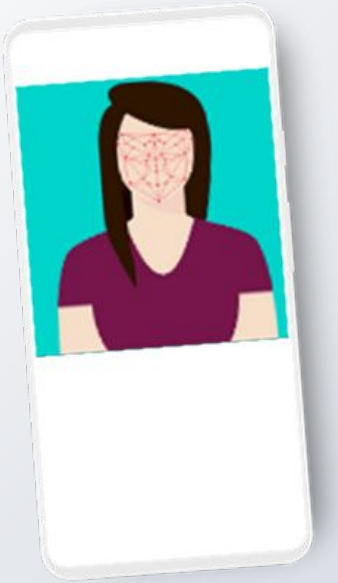
The AI uses face recognition to unlock a smartphone.

Through testing, the company found that the AI worked with **most** people's faces.

LESSON: AI Quiz (Years 5-6

DIGITAL TECHNOLOGIES HUB

Scenarios: drawing on ethical understanding



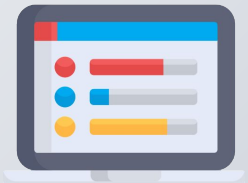
Should the company...

A: Sell the phone using this AI to make money and fix the AI in the next version of the phone. Don't mention any issues.

B: Take longer and spend more time and money to retrain the AI so it works for all people.

C: Sell the phone using this AI but also include a warning alerting customers that face scan may not work for everyone.

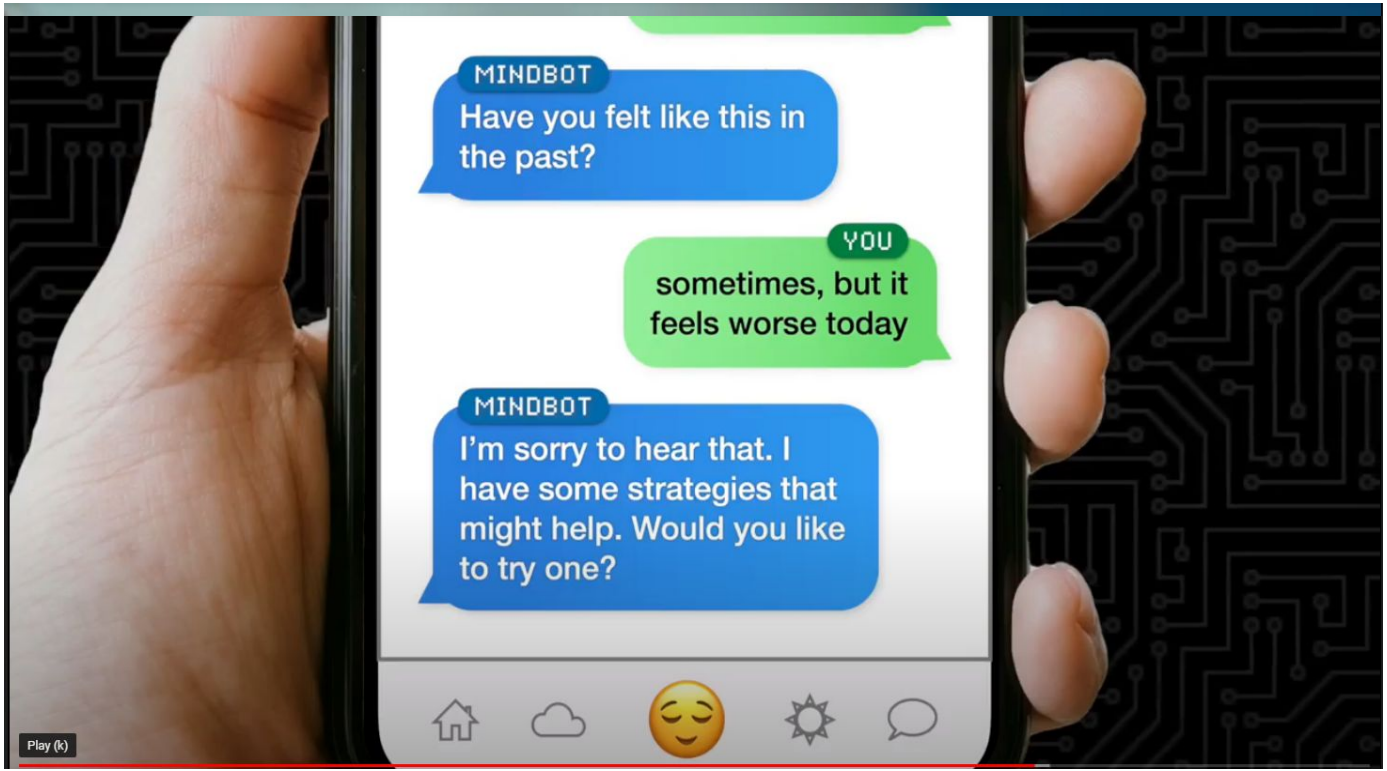
D: Fix the AI and sell the phone at a higher price to still make a profit.



LESSON: AI Quiz (Years 5-6)

Exploring ethical issues

Ethical considerations: Flowchart A



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A chance to ask questions ...

Use the chat...

How can you incorporate these teaching ideas?

How would your students handle the tasks?

What would you need to consider?

Speech recognition

Natural Language Processing (NLP) is the ability of machines to interpret and analyse forms of human communication, such as text and speech.

Contexts for exploring speech recognition

Chatbots

- Customer service

Virtual assistants for:

- Home automation
- Language translation
- Independent living for people with disabilities

Artificial Intelligence Explainers: Video 2: AI in our everyday life

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Programming a virtual assistant

Let's apply Computational Thinking:

Decomposition

- What is interacting?
- What needs to happen first, next, etc.

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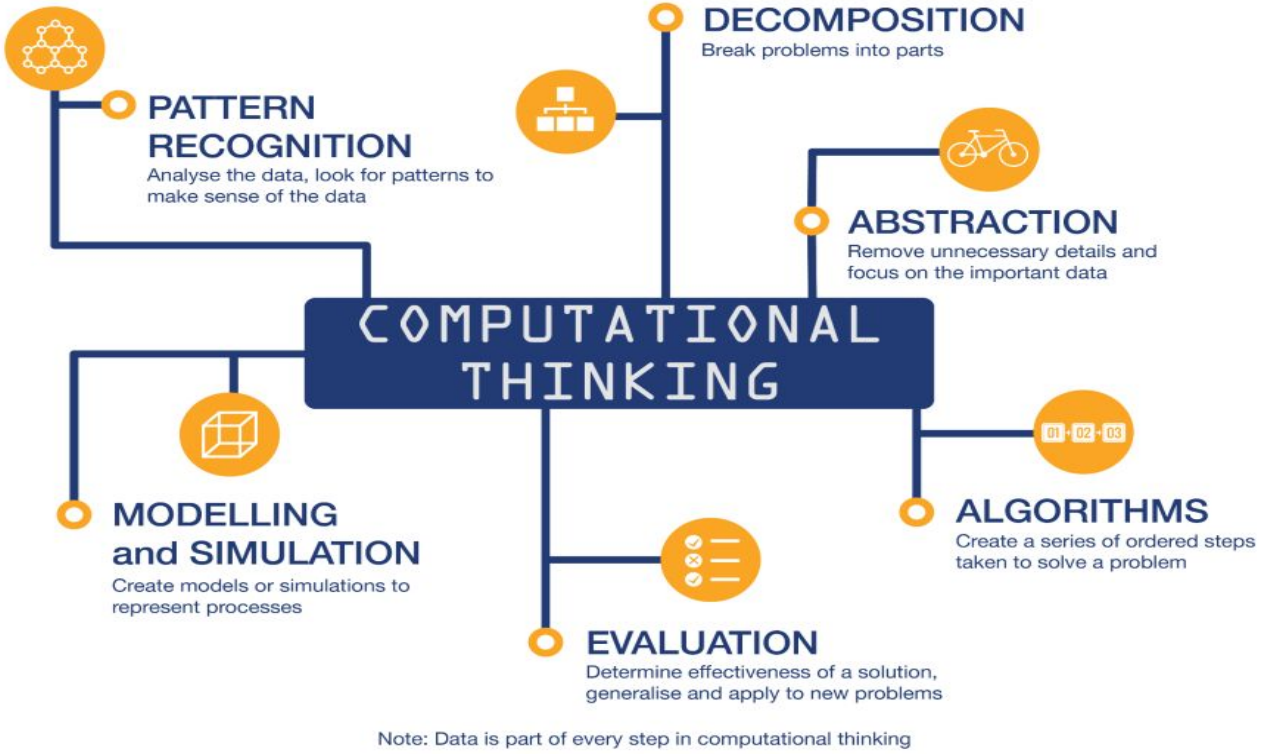


Note: Data is part of every step in computational thinking

acara AUSTRALIAN CURRICULUM, ASSESSMENT AND REPORTING AUTHORITY

Australian CURRICULUM

Algorithm: order steps

A. The correct appliance receives the message

B. The virtual assistant recognises your speech (and says it)

C. The virtual assistant asks for a command

D. The appliance follows the instruction until a new message

E. You speak a command (user input)

F. The appliance follows the message (on/off) and animates

G. The virtual assistant sends a message to an appliance

Which step comes first?

A. The correct appliance receives the message

B. The virtual assistant recognises your speech (and says it)

C. The virtual assistant asks for a command

D. The appliance follows the instruction until a new message

E. You speak a command (user input)

F. The appliance follows the message (on/off) and animates

G. The virtual assistant sends a message to an appliance

C. The virtual assistant asks for a command

E. You speak a command (user input)

B. The virtual assistant recognises your speech (and says it)

G. The virtual assistant sends a message to an appliance

A. The correct appliance receives the message

F. The appliance follows the message (on/off) and animates

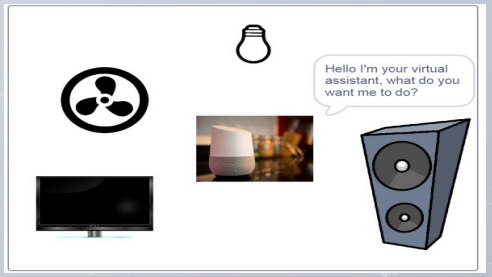
D. The appliance follows the instruction until a new message

Algorithm: Missing step

Start

1. The virtual assistant asks for a command
2. You speak a command (user input)
3. The virtual assistant recognises your speech (command)
4.
5. The correct appliance receives the message
6. The appliance follows the command (on/off) and animates
7. The appliance follows the instruction until a new message

End

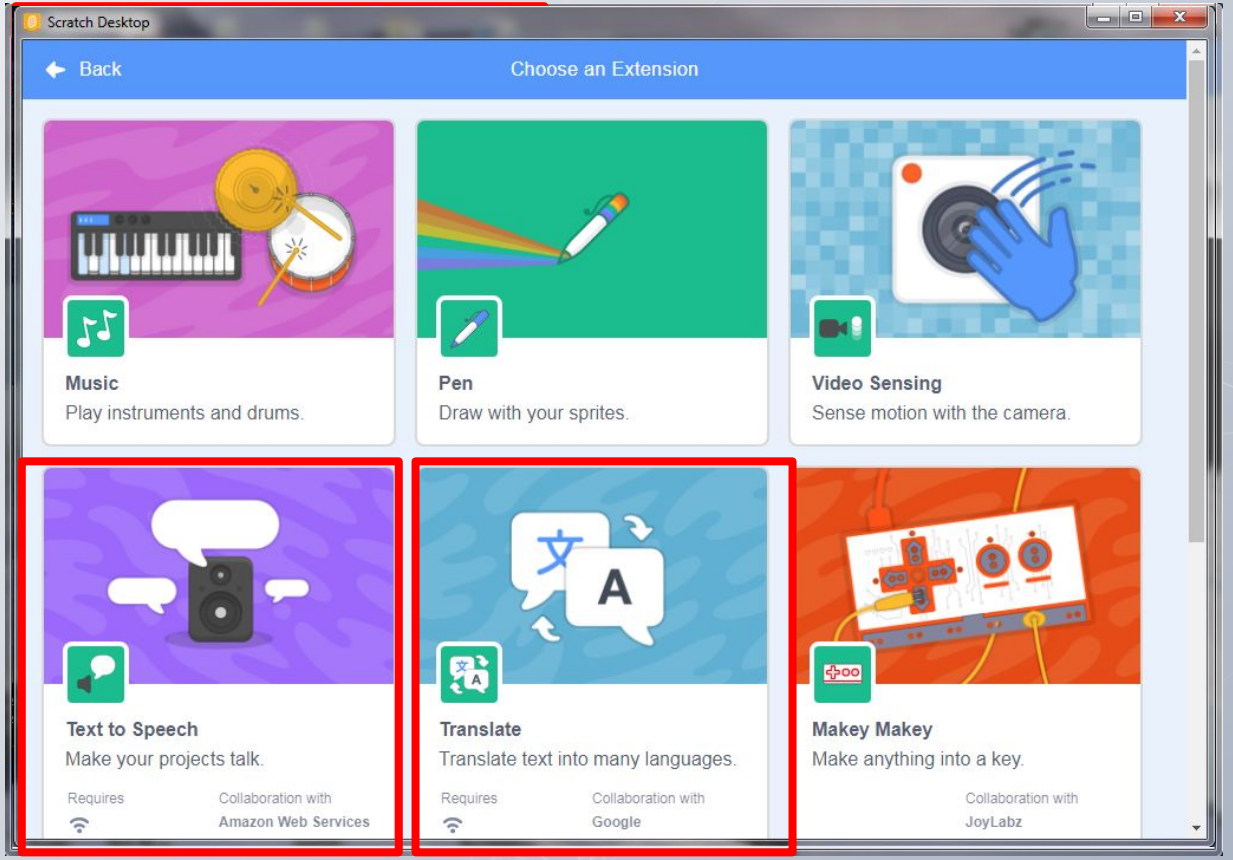


Text to speech recognition & Translation

This version of Scratch has additional blocks that enable

- Text to speech
- Translation

[Scratch 3.0]



Speech to Text blocks and Translate blocks accessed in the additional blocks available in Scratch 3.0

Systems thinking

Artificial Intelligence Explainers:

Video 3: AI Systems

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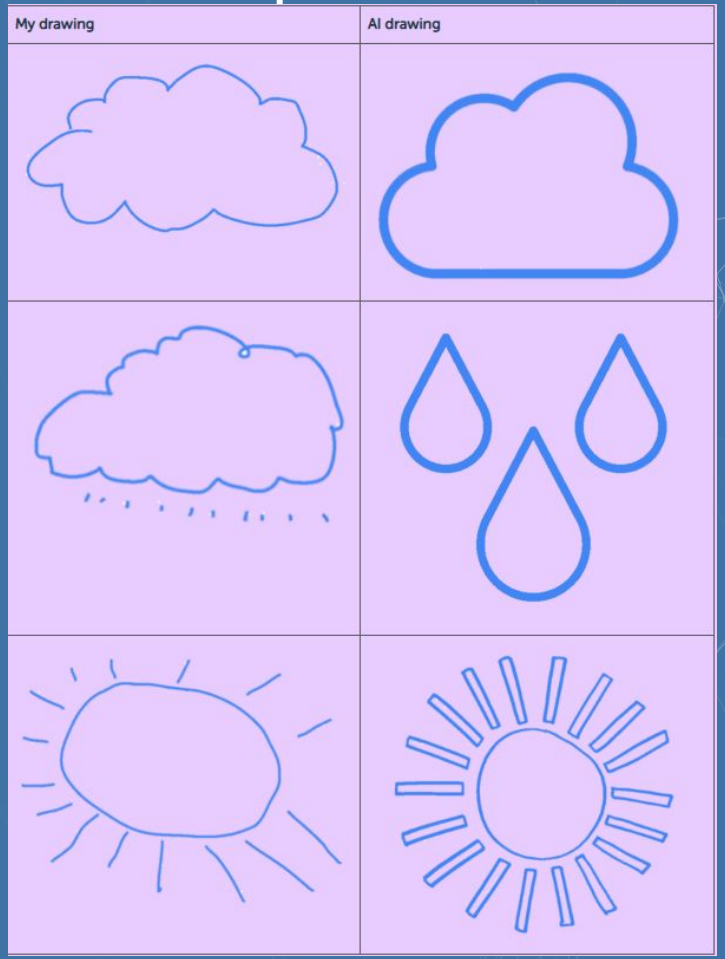
Assessment

Artificial Intelligence is a rich field for assessment opportunities.

Here are a few examples in the core concept areas of data, algorithms and implementation

Data representation (F-2)



They use digital systems to represent simple patterns in data in different ways.

Draws symbols to represent weather

Compares to AI drawing

Describes main features of their representation.

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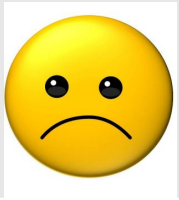
Data representation (F-2)

Label	Train	Did it work?
Happy		
Sad		
Angry		

They use digital systems to represent simple patterns in data in different ways.

Chooses images to train the AI.

Labels the images.

Uses an image to represent yes or no.

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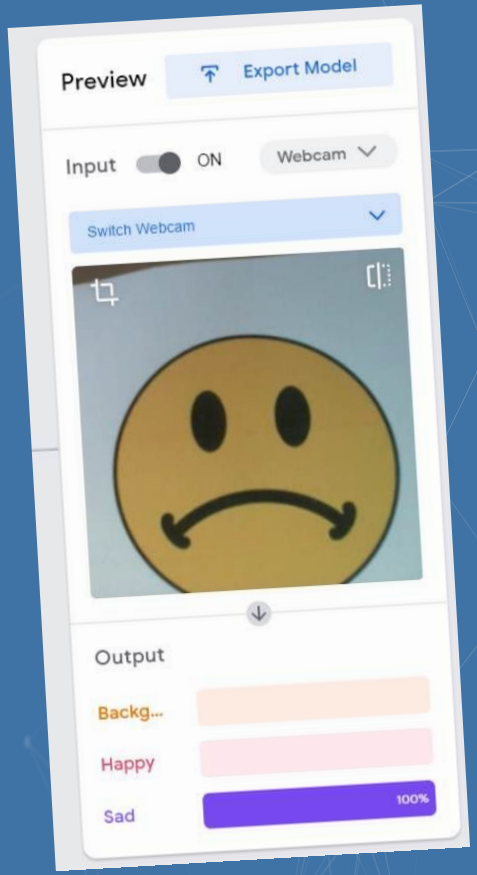
Algorithms (F-2)



Students design solutions to simple problems using a sequence of steps and decisions.

Demonstrates how the model works.

Describes the steps to create the model.

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Data representation (Yr. 3-4)

The student explains how the same data sets can be represented in different ways.

Label	Train: Image 1	Train: Image 2	Train Image 3	Train Image 4	Train Image 5
Happy					
Sad					

Give the AI a star rating; for example:

- Correct not much of the time
- Correct some of the time
- Correct most of the time.

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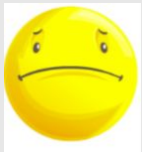
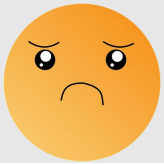
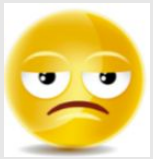
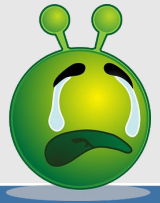
Data representation (Yr. 3-4)

The student explains how the same data sets can be represented in different ways.

Label	Train: Image 1	Train: Image 2	Train Image 3	Train Image 4	Train Image 5	Rating
Happy						
Sad						

Selects a range of images to represent emotion.

Explains reason for selecting images.

Uses star rating and images.

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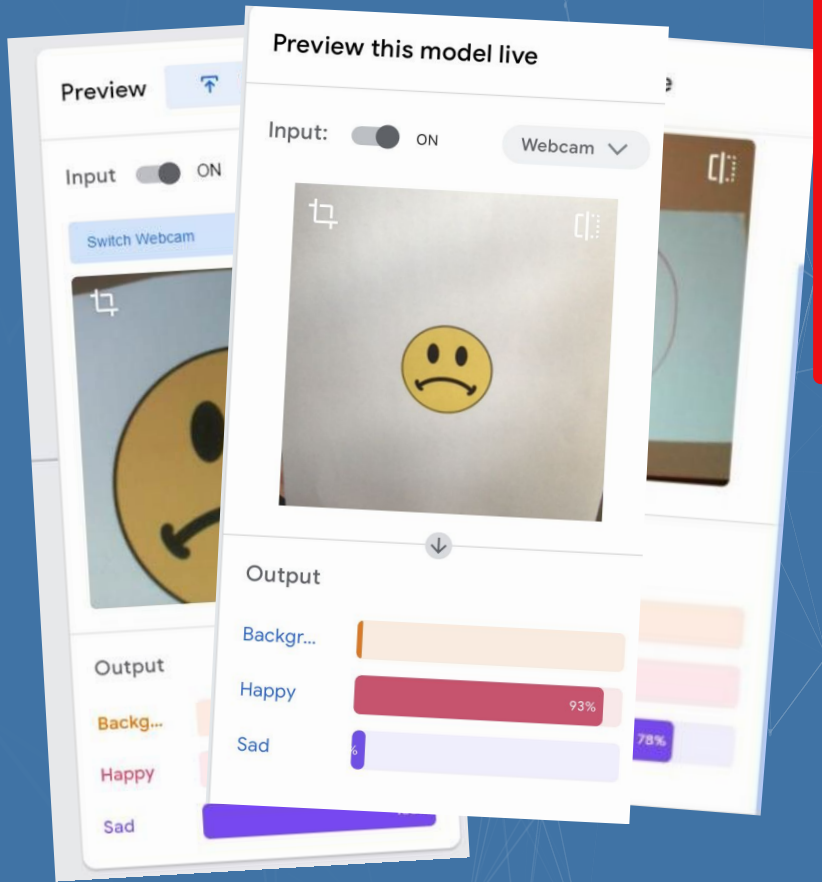
Information systems (Yr 3-4)



The student explains how the solutions meet their purposes and collects and manipulates different data when creating information and digital solutions

Demonstrates how the model works.

Explains why the model works well or where it doesn't gives reasons.

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Student project (Yrs 5-6)

Programming a virtual assistant

The student can define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems.

The student can incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions including a visual program.

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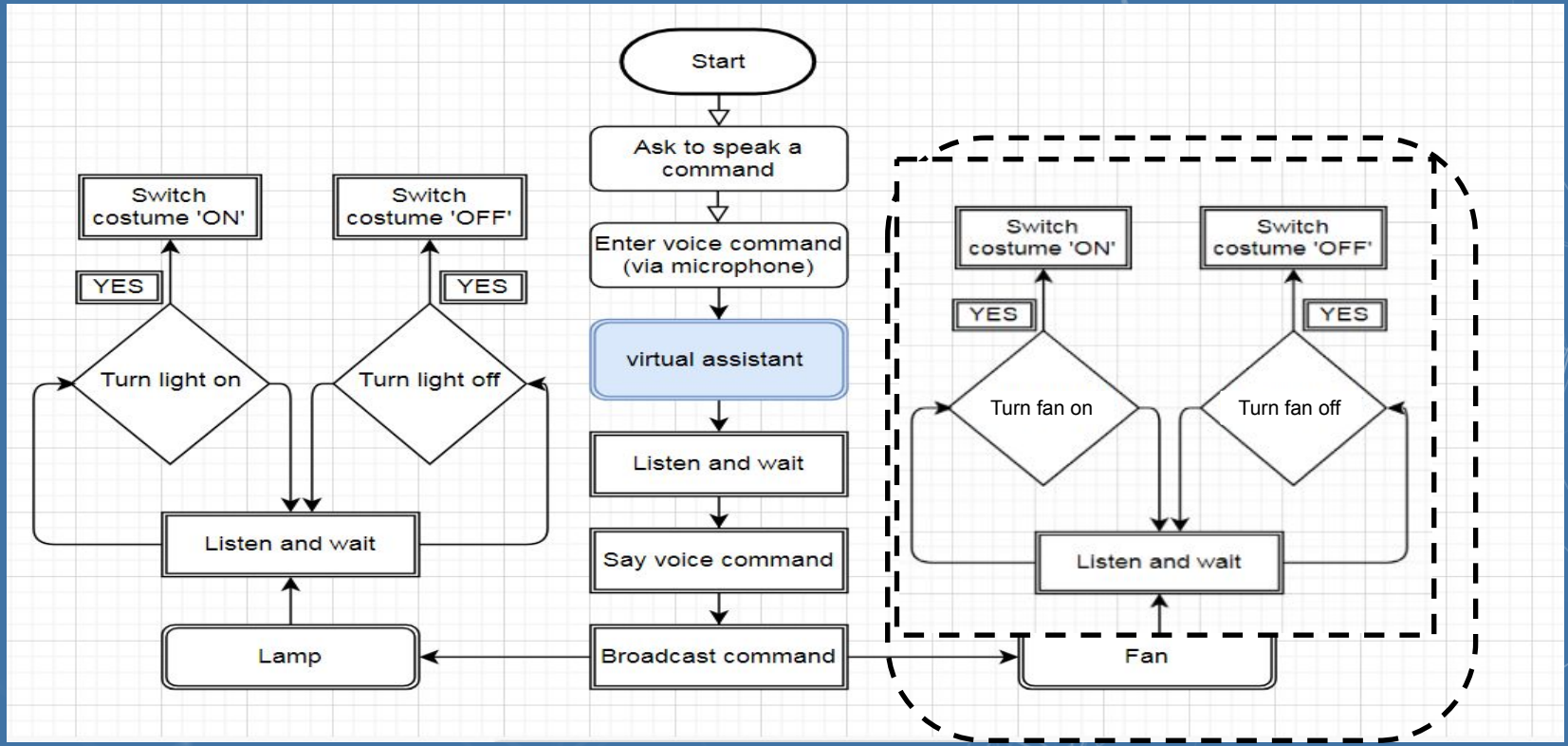
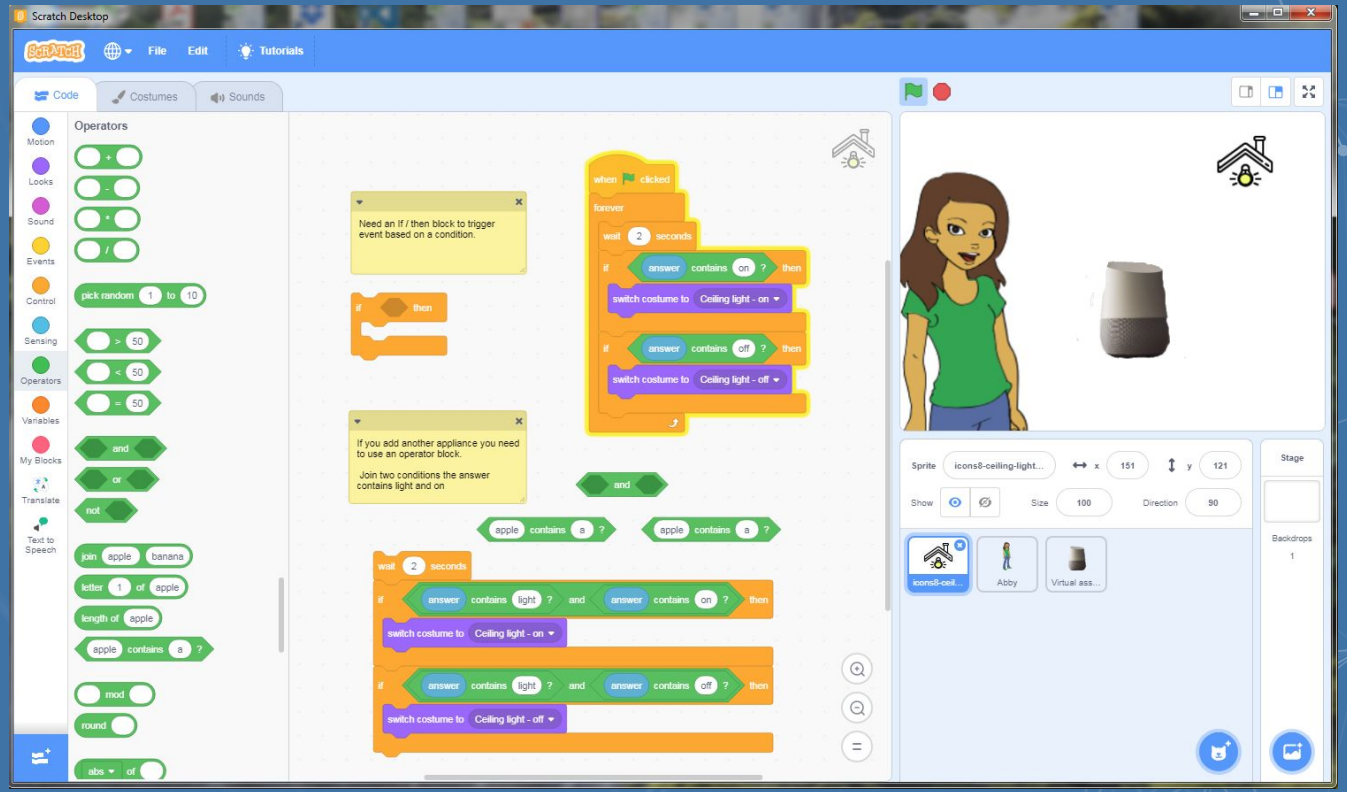
An algorithm represented as a flowchart



Turning the algorithm into a program



Use think aloud (student interview)

Explains how their program works

Includes input (speech), if/then block (branching) and loop (repetition)

Algorithms and implementation: Self reflection

Supported I need help from someone to do this	Acquired I to do this myself	Mastered I can do this easily and quickly
		

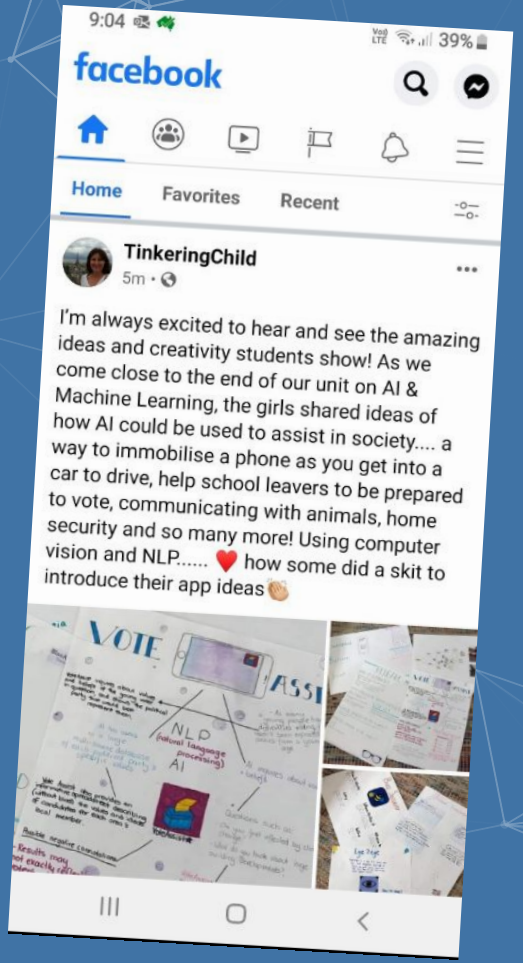
Designing and algorithm	My self reflection
Written steps	
As a flow chart	

I can include in my programming...	My self reflection
an input	
a decision	
a loop	

Student project (Yrs 5-6)

Coming up with their own AI app idea

Our team is...	
We're creating an AI model that...	(the target user)
to help people to...	(the problem/challenge)
by providing them with...	(the possible solution)



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Ethical understanding

To what extent did the student:

- identify and describe an ethical issue
- weigh up multiple perspectives to make informed decisions
- respond to a problem fairly, justly and responsibly?

Who is responsible?

A: The owner of the car, even though they are the passenger.

B: The car manufacturer who built the AI.

C: The parent crossing the road illegally, causing the accident.

D: The cyclist, who should have avoided the car.

The issue here is that an AI caused harm and it is difficult to see who is responsible. We chose C. You can't blame the driver as they were not in control. The AI had no choice to swerve and hit the cyclist. I feel sorry for the cyclist. Before AI cars are on the road we need to work out these issues. Marco and Anna 5B

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Artificial Intelligence lesson plans

Humans display natural intelligence in contrast to machines that demonstrate artificial intelligence (AI).

AI has various definitions however for our purposes we are using the definition 'any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals' [1]. Read more...

The following lesson ideas cover a range of specialisations and subsets as indicated by the colour coding. Click on the coloured squares to learn more about each definition.

Machine learning | Supervised learning | Natural language processing | Computer vision | Classification | Clustering

Lesson plans

Artificial Intelligence

Access DT Hub AI lesson plans

A chance to ask questions …

Use the chat…

How can you incorporate these teaching ideas?

What do you feel more confident about?

What do you still need to know?

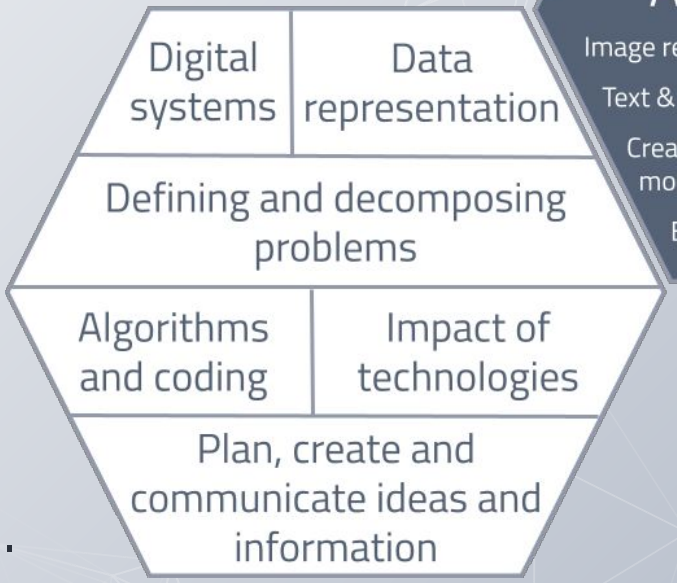
Next steps

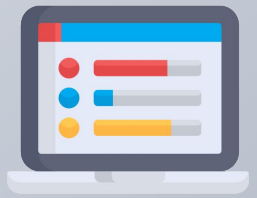
Making a commitment to implementing AI in your classroom

Use the chat to **write your idea** of where you will include AI as part of your teaching and learning program.

Connecting and sharing with the group.

email:
digitaltechnologieshub@esa.edu.au





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