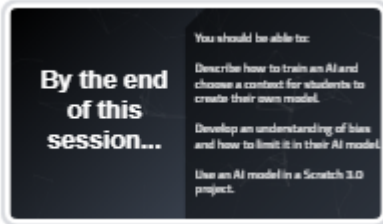





AI Professional Learning: Creating an AI model




PRIMARY DD3: Session overview

DT Curriculum focus	Relevant slides	Covered in the session	Resources
Impact and interactions		<p>You should be able to:</p> <ul style="list-style-type: none"> • Describe how to train an AI and choose a context for students to create their own model. • Develop an understanding of bias and how to limit it in their AI model. • Use an AI model in a Scratch 3.0 project. 	
Digital systems/Data representation		<p>Curriculum connections</p> <ul style="list-style-type: none"> • Digital Technologies: Focus on information systems the related key concepts include impacts, interactions and digital systems: <p>Data representation: Deals with the way different types of data is represented (text, images, sound), stored and used in digital systems.</p>	



AI Professional Learning: Creating an AI model

	 	<p>Defining and decomposing problems: the focus on the precise definition and communication of problems and their solutions.</p> <p>Implementation: the automation of an algorithm, typically by using appropriate software or writing a computer program.</p> <p>Algorithms: precise description of the steps and decisions needed to solve a problem.</p> <p>While focussing on implementation we can incorporate relevant general capabilities.</p> <ul style="list-style-type: none">• General capability: ICT capability• General capability: Critical and creative thinking <p>We also include ways of thinking, particularly:</p> <ul style="list-style-type: none">• computational thinking and design thinking	
--	---	---	--


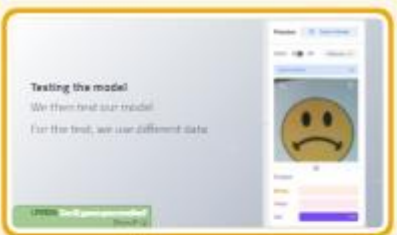


AI Professional Learning: Creating an AI model

<p>Data representation</p>	 <p>The top slide defines an AI model as a program trained on data to recognize patterns. The bottom slide, titled 'Learning', explains that AI programs need learning data to test the process, receive feedback to get it right, and use test data to check if learning was successful.</p>	<p>An AI (artificial intelligence) model is a program that has been trained on a set of data (called the training set) to recognize certain types of patterns.</p> <p>So the AI is a program that can learn.</p> <p>It needs learning data to carry out the learning process.</p> <p>And (usually) our feedback to get it right</p> <p>We use test data to check if the learning was successful</p>	
<p>Data representation</p>	 <p>The slide states the objective: 'Build an AI model that can distinguish happy and sad emojis.' It features a yellow smiley face and a yellow frowny face.</p>	<p>Objective: Build an AI model that can distinguish happy and sad emojis.</p> <p>Teaching tips</p> <ul style="list-style-type: none"> • Discuss Abstraction: What information do we need to include? What is not needed? • We end up extracting the important features that make it recognisable. 	<p>Lesson ideas</p> <ul style="list-style-type: none"> • Can AI recognise what you are drawing? (Years F-4)
<p>Data representation/ Digital systems/ ICT Capabilities</p>	 <p>The screenshot shows the 'Teachable Machine' interface with the text: 'Train a computer to recognize your own images, sounds, & poses. A fast, easy way to create machine learning models for your sites, apps, and more - no expertise or coding required.' It includes a 'Get Trained' button and a 'SORTER' window.</p>	<p>We use Teachable machine to create, test and use an AI model</p>	<p>Downloadable resources/links</p> <p>Teachable machine</p>


AI Professional Learning: Creating an AI model

		<p>1) Collect Learning Data</p> <p>We collect images of happy and sad emojis</p> <p>2) Group the learning Data</p> <p>We then group and label the learning data, for example by placing the images in labelled buckets</p> <p>3. Configuring the AI</p> <p>Set up the groups in the AI.</p> <p>Happy and Sad. Also, add a Background Group</p>	
<p>Data representation/ Digital systems/ ICT Capabilities</p>		<p>5. Start the learning process</p> <p>Tell the AI to begin learning.</p> <p>Internally, the AI will begin a process of adjusting its internal values.</p> <p>6) Learning process complete</p>	<p>Downloadable resources/links</p> <p>LESSON: HOW CAN AN AI RECOGNISE WHAT IT SEES?</p>

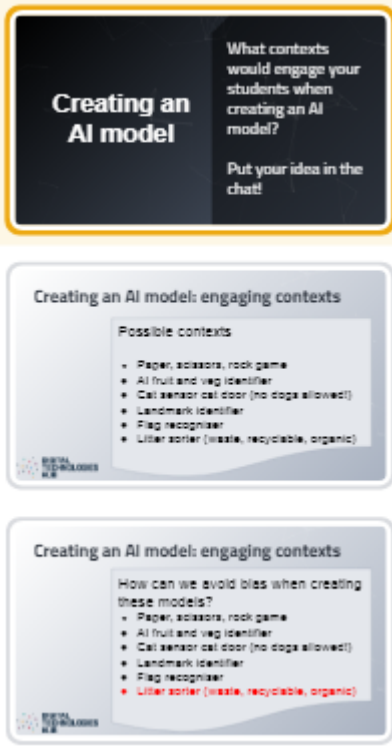

AI Professional Learning: Creating an AI model

	 <p>Learning process complete We have given all these different images to the AI and told it to learn. Because we have labeled the images, the AI knows what they mean. (supervised learning)</p>	<ul style="list-style-type: none"> We have given all these different images to the AI and told it to learn. Because we have labeled the images, the AI knows what they mean. (supervised learning) 	
<p>Data representation/ Digital systems/ ICT Capabilities</p>	 <p>Testing the model We then test our model For the test, we use different data</p>  <p>Confidence The AI tells us how likely it is that the input belongs to a certain class. Here, the AI is 17% certain that this is a happy face, but 78% that it is a sad face.</p>  <p>Confidence issues The AI can be confident, but still be wrong. Here, the AI is 82% confident that it sees a happy face, yet it is wrong. Our AI model has a problem.</p>	<p>Testing the model</p> <p>We then test our model</p> <p>For the test, we use different data</p> <p>Confidence</p> <p>The AI tells us how likely it is that the input belongs to a certain class.</p> <p>Here, the AI is 17% certain that this is a happy face, but 78% that it is a sad face.</p> <p>Confidence issues</p> <p>The AI can be confident, but still be wrong.</p>	<p>Downloadable resources/links</p>

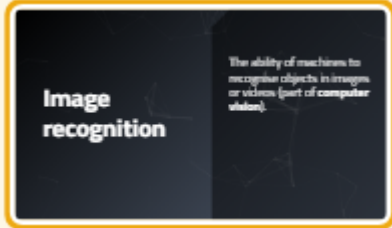


AI Professional Learning: Creating an AI model

<p>Data representation/ Digital systems/ ICT Capabilities</p>		<p>For an AI system to be unbiased requires the training data to be balanced.</p> <p>Bias can be intentional, but often creeps in unintended.</p> <p>Our model has a number of biases:</p> <ul style="list-style-type: none">• Shape• Colour• Size• Backgrounds• Rotation • Eye, mouth shape ... <p>We introduce a data chart to record data to be used in training the AI.</p>	<p>Data chart</p>
---	---	--	-------------------



AI Professional Learning: Creating an AI model

<p>Data representation/ Digital systems/ ICT Capabilities</p>		<p>What contexts would engage your students when creating an AI model?</p> <p>We discuss possible contexts including:</p> <ul style="list-style-type: none"> • Paper, scissors, rock game • AI fruit and veg identifier • Cat sensor cat door (no dogs allowed!) • Landmark identifier • Flag recogniser • Litter sorter (waste, recyclable, organic) <p>We discuss ways to avoid bias in these contexts.</p>	<p>Downloadable resources/links</p>
<p>ICT Capabilities</p>		<p>Data: sourcing images</p> <p>Recognise intellectual property</p> <p>Part of Applying social and ethical protocols and practices when using ICT</p> <p>Provide links to image free library or provide a folder of images (teacher curated)</p>	


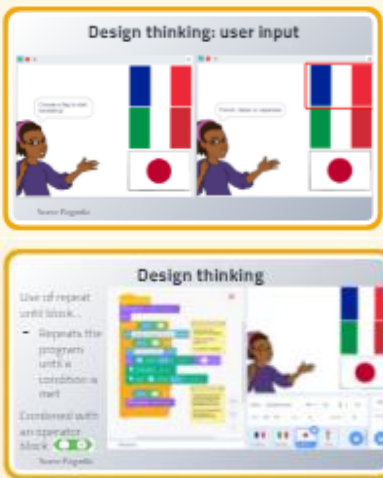
AI Professional Learning: Creating an AI model

<p>Data representation/ Digital systems</p>	 <p>The ability of machines to recognise objects in images or videos (part of computer vision).</p>	<p>Use image recognition to introduce student AI projects</p> <p>The ability of machines to recognise objects in images or videos (part of computer vision).</p>	
<p>Data representation/ Digital systems</p>	 	<p>AI Scratch blocks</p> <p>A new version of Scratch that is AI compatible!</p> <p>We demonstrate how to do a simple coding project to recognise litter.</p> <p>The AI model has been trained to recognise:</p> <ul style="list-style-type: none"> • Soft drink bottles • Chip /lollies packets • Banana skin. 	<p>AI Scratch blocks https://www.media.mit.edu/posts/ai-blocks/</p> <p>Scratch blocks editor: https://mitmedialab.github.io/prg-extension-boilerplate/create/</p> <p>Trained AI model to include in the AI scratch version to test https://teachablemachine.withgoogle.com/models/uWryl1Rue/</p>


AI Professional Learning: Creating an AI model

<p>Data representation/ Digital systems</p>		<p>We discuss training the model</p> <p>TIPS...</p> <ul style="list-style-type: none"> Have all your data samples ready Have your classes (buckets) worked out Have something in place for the time taken to train the model. <p>... wait</p> <p>When training is finished</p> <p>Copy and save the URL. Test in new browser</p>	<p>Downloadable resources/links</p> <p>Trained AI model to include in the AI scratch version to test</p> <p>https://teachablemachine.withgoogle.com/models/uWryl1Rue/</p>
<p>Defining and decomposing problems/ Implementation/ Algorithms</p>		<p>5 step process: Using an AI model in Scratch</p> <ol style="list-style-type: none"> 1. Define the problem and data requirements 2. Collect the data (folder) 3. Train and test the model (copy URL of model) 4. Design and represent the algorithm 5. Build the program (user input) then modify to include AI model (URL) 	<p>Downloadable resources/links</p>

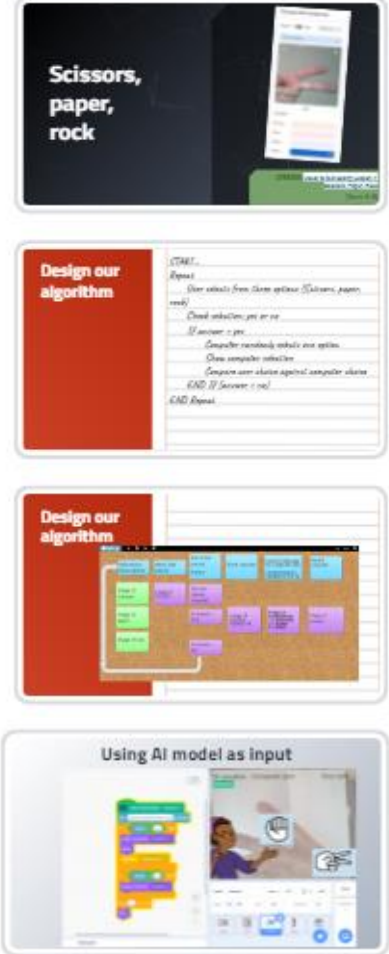
AI Professional Learning: Creating an AI model

<p>Defining and decomposing problems/ Implementation/ Algorithms</p>		<p>Build on this basic translating app to include other languages.</p> <p>We draw on:</p> <ul style="list-style-type: none"> • design thinking skills for layout (how it will look) • computational thinking to program the solution (how it will work). <p>We demonstrate an algorithm to help map out how the app could be programmed.</p>	<p>Lesson plan:</p> <p>Fun projects with language translation</p> <p>A basic translator app program in Scratch</p>
<p>Defining and decomposing problems/ Implementation/ Algorithms</p>		<p>We discuss how to set up a Scratch program using images as the input where the user clicks on the image of a flag. (We will later replace that input with the AI input.)</p> <ul style="list-style-type: none"> • One way is for the user to select the language by clicking on a flag (sprite) • A neat feature in scratch is When this sprite is clicked (we code that sprite to run the translate program for that language) • We could have also chosen buttons FRENCH, ITALIAN, JAPANESE • We have a character to tell the user what to do.(use say blocks) • 	<p>Lesson plan:</p> <p>Fun projects with language translation</p>


AI Professional Learning: Creating an AI model

<p>Defining and decomposing problems/ Implementation/ Algorithms</p>		<p>We show how to modify the program to accept the AI model of recognising a flag to select the language to translate in.</p>	<p>Lesson plan:</p> <p>Fun projects with language translation</p> <p>AI flag model (pre-made) recognises French, Italian and Japanese flags</p>
--	---	---	---

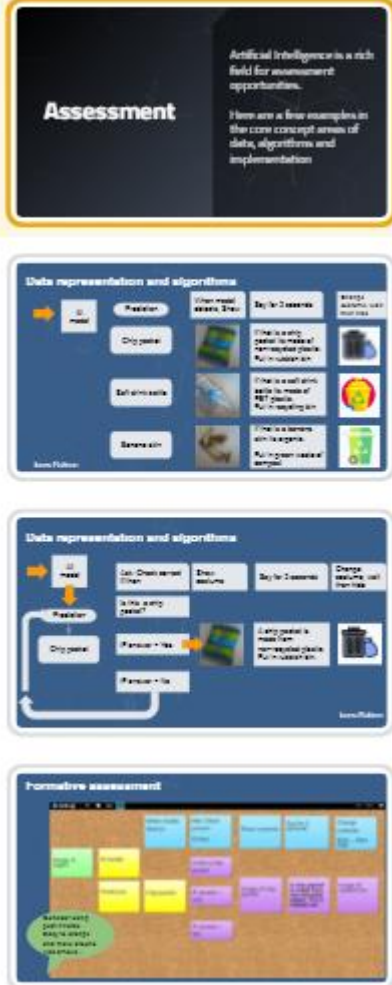
AI Professional Learning: Creating an AI model

<p>Defining and decomposing problems/ Implementation/ Algorithms</p>	 <p>Scissors, paper, rock</p> <p>Design our algorithm</p> <pre>START: Repeat Get inputs from Game options (Scissors, paper, rock) Check selection: get an int If answer = 0: Computer randomly selects one option Else computer selection Computer user choice against computer selection END If answer = 0 END Repeat</pre> <p>Design our algorithm</p> <p>Using AI model as input</p>	<p>We use the game Paper scissors rock as another way to change a conventional program to one that includes an AI input.</p>	<p>For a lesson on how to program paper scissors rock game</p> <p>Visual to text coding Lesson 4: Scissors, Paper, Rock</p> <p>Data chart: paper scissors rock</p> <p>A completed rock, paper, scissors classifier AI model: Rock, paper, scissors. [Requires device with camera enabled].</p>
--	---	--	--

AI Professional Learning: Creating an AI model

		<p>We discuss conducting a risk assessment</p> <p>We discuss how to go through a risk assessment for teachable machine</p> <p>Check FAQ, for privacy issues:</p>	<p>New technologies risk-assessment tool</p>
--	---	--	--

AI Professional Learning: Creating an AI model

	 <p>The first screenshot, titled "Assessment", states: "Artificial Intelligence is a rich field for assessment opportunities. Here are a few examples in the core concept areas of data, algorithms and implementation." The second screenshot, titled "Data representation and algorithms", shows a flowchart: "Data" leads to "Preparation" (with sub-steps: "Clean, Organize, Store", "Apply to datasets", "Apply models, test results"), "Preparation" leads to "Disposal" (with sub-steps: "Use a web portal to make a personalized class", "Full inclusion in..."), "Disposal" leads to "Evaluation" (with sub-steps: "Use a web portal to make a personalized class", "Full inclusion in..."), and "Evaluation" leads to "Review" (with sub-steps: "Use a web portal to make a personalized class", "Full inclusion in..."). The third screenshot, titled "Formative assessment", shows a corkboard with several sticky notes in various colors (green, yellow, purple) and a small text box that says "Personalized digital content, data, and algorithms".</p>	<p>We discuss the opportunities for assessment</p> <p>Evidence of learning:</p> <p>Trained and tested AI model</p> <p>Plan of the training data (data chart)</p> <p>How well did they avoid bias?</p> <p>How well did their model work? (Star rating)</p> <p>Think aloud (student records a video of the AI model in action with commentary or as an interview with the teacher.</p> <p>Use post it notes for algorithms and use in formative assessment</p>	
--	---	--	--