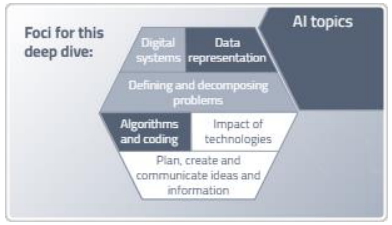
AI Professional Learning: Investigating training a machine learning model (Yrs 7-10)

Session overview

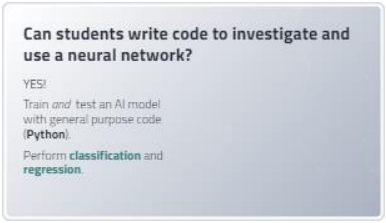
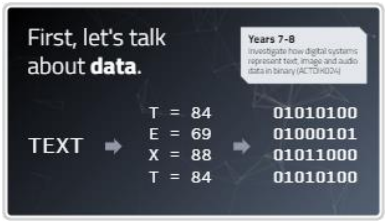
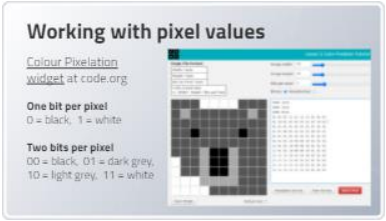
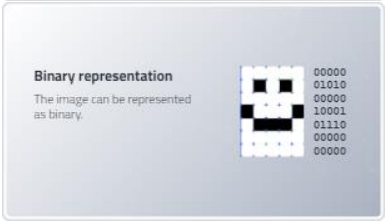
DT Curriculum focus	Relevant slides	Covered in the session	Resources
		During this session you will: • Explore guiding students in how machine learning differs from traditional code, especially in terms of **input data**. • Try / observe a hands-on example of writing a conventional program and adding **AI decisions** to it. • Consider **assessment** and **coding pedagogies**, as well as concerns around **IP** and **privacy**.	
Defining and decomposing problems / Algorithms / Implementation		Curriculum connections • Digital Technologies: Focus on defining and decomposing problems creating a digital solution that incorporates algorithms and implementation the related key concepts include:	

		**Defining and decomposing problems:** the focus on the precise definition and communication of problems and their solutions. **Implementation**: the automation of an algorithm, typically by using appropriate software or writing a computer program. **Algorithms:** precise description of the steps and decisions needed to solve a problem. While focussing on implementation we can incorporate relevant general capabilities. • General capability: ICT capability	

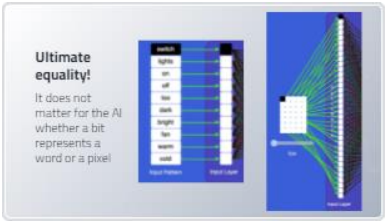
AI Professional Learning: Investigating training a machine learning model (Yrs 7-10)

		• General capability: Critical and creative thinking We also include ways of thinking, particularly: • Design Thinking • Computational Thinking	
Implementation		What's so special about AI? We use simulations to show how the same type of artificial neural network solves different problems.	Downloadable resources/links • Simulations at My Computer Brain
Data representation		We discuss why coding a neural network from scratch may be unsuitable as a classroom activity. Screenshot references this tutorial. However, students can write code to investigate and use a neural network: • Utilise an existing speech recognition system in a general purpose program (JavaScript) • Utilise an existing sentiment analysis system in a general purpose program (Python) • Train their own AI model with an online tool. Then, bring the model	Downloadable resources/links • Lesson idea: Home automation: General Purpose Programming (Years 7-8) • Lesson idea: Coding a sentimental chatbot (Years 7-10) • Lesson idea: Book analysis with AI techniques (Years 7-10) • Lesson idea: Rock,

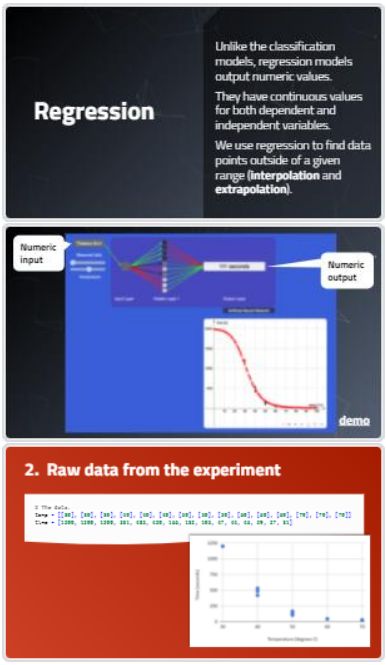
AI Professional Learning: Investigating training a machine learning model (Yrs 7-10)

		into a general purpose program (JavaScript) to make a decision.	Paper, Scissors, AI! (Years 7-8)
		We introduce the main activity we'll be doing in this session, using Python to work with an AI model in order to perform • a classification (identify which class/bucket data fits into) • a regression (line of best fit from numerical data)	
Data representation	  	We explore how text, sounds and images are represented in binary. We break down simple black and white images into binary. These will be used in our coding examples later in the session.	Downloadable resources/links • Colour pixelation widget at code.org

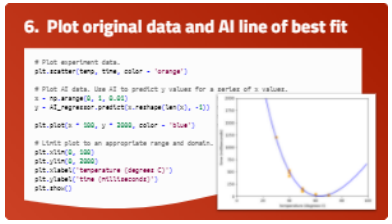
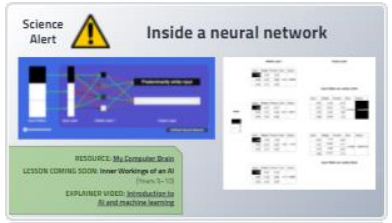
AI Professional Learning: Investigating training a machine learning model (Yrs 7-10)

			
Data representation / Algorithms / Implementation/ Computational Thinking		We begin our first coding example: a classifier for 10 letter images. The example is first illustrated with a visualisation. Then, the code is done in Python, using the replit.com online environment. The functions and objects for the AI neural network and modelling is provided by the sci-kit library.	Downloadable resources/links • The replit.com online environment • The sci-kit library • Starting point for our program • The finished program

AI Professional Learning: Investigating training a machine learning model (Yrs 7-10)

			
Data representation / Algorithms / Implementation/ Computational Thinking		We begin our second coding example: a regression (line of best fit) for a small set of experimental data. The example is first illustrated with a visualisation. Then, the code is done in Python, using the replit.com online environment. This is a more complex program than the classifier, due to the need to normalise the data. Again, the functions and objects for the AI neural network and modelling is provided by the sci-kit library.	Downloadable resources/links • The replit.com online environment • The sci-kit library • Starting point for our program • The finished program

AI Professional Learning: Investigating training a machine learning model (Yrs 7-10)

			
Data representation / Algorithms / Computational Thinking		In the time remaining, we dive a little more into the internal workings of a neural net, exploring how the Perceptron (the equivalent of a biological neuron) works.	Downloadable resources/links • Simulations at My Computer Brain • Artificial Intelligence Explainers: Video 1: Introduction to AI & machine learning