Machine Learning For Kids :: Teachers' notes

Worksheet	Explainable AI
Activity	Create a machine learning model tester in Scratch that explains what parts of an image are most significant for the predictions that it makes.
Objective	**Make a simple Explainable AI project that helps give insight into an ML model** • Learn how computers can be trained to recognise objects • Learn a simple technique for understanding what a model finds most significant • Learn about the importance of Explainable AI (XAI)
Difficulty level	Intermediate
Time estimate	1.5 hours
Summary	Students train a simple image classifier using Teachable Machine and test it in Scratch. They use a simple manual technique in Scratch to check their intuitions for what parts of the test image are most significant, and then make a testing project that visualises the relevance of different parts of an image.
Topics	explainable AI, XAI, explainability, image classification, supervised learning

Setup

Each student will need:

Print-outs	Project worksheet (download from https://machinelearningforkids.co.uk/worksheets) Blocks in Scratch scripts are colour-coded, so printing in colour will make it easier for students.
Technology	Web-cam

Class account will need:

API keys	None

Customizing

If you use **PRIMM** approaches with your class, add a step where students predict how the project template works.
If you want to **increase the amount of coding** involved, delete some of the code from the project template and add steps to the worksheet so students code it themselves.
If you want to **encourage problem solving**, delete some of the detail in the worksheets and provide more general instructions instead.
Project template files & worksheets in MS Word format are available so you can **modify them to suit your class**.

Project templates	https://github.com/IBM/taxinomitis-docs/tree/master/scratch-templates
Worksheets	https://github.com/IBM/taxinomitis-docs/tree/master/project-worksheets/msword

Help

Potential issues	• There is no need for students to create an account or log on to do this project. • Photos taken by the webcam for this project are not uploaded to anywhere and will not leave their computer. All of the analysis is performed in the web browser. • "https://machinelearningforkids.co.uk" is a long URL to type for some children. You may find it easier to set up a bookmark that they can click on instead. • It is not uncommon for students to find that their machine learning model remains confident, whichever part of the test image they cover. An explanation is included in Step 33 of the worksheet, but be prepared to reassure students that it is not their fault. Taking a new test image of a different object is often the quickest way to allow them to continue. General troubleshooting and help at https://machinelearningforkids.co.uk/help