Machine Learning For Kids :: Teachers' notes

Worksheet	Car or Cup
Activity	Train the computer to be able to sort photos into groups.
Objective	**Teach a computer to recognise pictures of objects** • How computers can be trained to recognise pictures. • The important of variety in training machine learning systems.
Difficulty level	Beginner
Time estimate	45 minutes
Summary	Students will train a machine learning model to recognise pictures of cars or cups. They will use this to make a project in Scratch that sorts a pile of photos into groups.
Topics	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.
	Access	Access to an image search site (e.g. Google Images, Bing Images, etc.)
	Access	Username and password for machinelearningforkids.co.uk

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 Scratch 3 templates end .sb3 Scratch 2 templates end .sb2
Worksheets	https://github.com/IBM/taxinomitis-docs/tree/master/project-worksheets/msword

Help

Potential issues	• Students need Internet access to search for pictures of cars and cups to train the computer with. Close supervision may be appropriate to ensure safe searching. • The starter Scratch project includes a test set of images. Accuracy will be affected by how similar these are to the students' training images. For example, if students collect examples of sports cars to train the computer to recognise cars, this may struggle to recognise non-sports cars. If this happens, encourage them to think about why it's getting things wrong, and how they could improve this by collecting a more varied set of photos to train the computer with. • Dragging and dropping doesn't work in Internet Explorer. You can provide your students with a different web browser (Firefox or Chrome work well) or explain to them how to copy/paste image URLs from a page. • You cannot drag and drop pictures between different types of browser. In other words, you can't drag a picture from a Firefox window to Machine Learning for Kids running in Chrome. Or from a Chrome window to Machine Learning for Kids running in Firefox. You need to use the same type of web browser for both.

	• Only jpg and png images can be used. If students find other image types (e.g. gif files) and try to drag them into their training buckets, they'll get an error. Explain to them that this is okay, and they should just choose a different picture. • If there is a problem with any of the pictures they find, they'll be shown as a red box. They can click on the cross for these broken images to remove them. General troubleshooting and help at https://machinelearningforkids.co.uk/help