Machine Learning For Kids :: Teachers' notes

Worksheet	Rock, Paper, Scissors
Activity	Make a Rock, Paper, Scissors game in Scratch that learns to recognise hand shapes.
Objective	**Teach a computer to recognise shapes** • How computers can be trained to recognise pictures. • The important of variety in training machine learning systems.
Difficulty level	Intermediate Taking the training photos of your own hand needs coordination.
Time estimate	45 minutes
Summary	Students will train a machine learning model to recognise pictures of hand shapes. They will use this to make a project in Scratch that plays rock, paper, scissors.
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.
Technology	Web-cam
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**.

Template	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	• Students take photos of their hands and upload them to a secure site. As long as only hands are visible, students are unlikely to be identifiable. If using laptops, angling the screen towards the ceiling helps. However, if photos accidentally including students is a concern it may be useful to obtain parental permission. • Students often take very similar training photos. This is less likely to be effective than photos of a variety of positions and angles. It's helpful to highlight this and encourage students to think about why. • ML models for image projects sometimes take a few minutes to train. Students can continue to work on their Scratch project scripts while they wait. Warn them that their Scratch script won't work until the model has finished training, though. General troubleshooting and help at https://machinelearningforkids.co.uk/help