Machine Learning For Kids :: Teachers' notes

Worksheet	Pac-Man
Activity	Create a Pac-Man game in Scratch that learns how to avoid the ghost.
Objective	**Teach a computer to play a game** • How machines are taught to play games • Decision tree learning as a way for computers to learn how to play games.
Difficulty level	Intermediate It needs an understanding of 2D coordinates.
Time estimate	1 hour
Summary	Students train Pac-Man by playing in Scratch. The machine learning model will be trained based on how they play. They will use this to get Pac-Man to play by itself.
Topics	AI in games, decision tree 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	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	• Time management is important. Students lose track of time while playing Pac-Man and don't leave time for coding. It may be helpful to time-box trying out of the game, training the model, testing the model, to keep the class on track. • There is more than one way to avoid the ghost. Let students find their own preferred strategy (there is no "right" way) and see if the Pac-Man they train learns to adopt their strategy. • Encourage students to keep their two Scratch projects separate – one for training Pac-Man, the other to use that training to let the computer play. That means if Pac-Man isn't very good, they can easily go back and add more training. • The worksheet screenshots are based on Scratch 2. You may prefer to use Scratch 3 instead, however students may find it harder to find some blocks. General troubleshooting and help at https://machinelearningforkids.co.uk/help