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. The Scratch scripts are slightly complex.
Time estimate	1 hour
Summary	Students will train Pac-Man by playing the game in Scratch. The machine learning model will be trained based on the moves that they make while playing. They will use this model 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

Help

Potential issues	• Time management is important for this project. Students often lose track of time while playing Pac-Man and don't leave enough time for training or coding. It may be helpful to time-box the sections (initial 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. For example, doing laps of the map. Or flipping back and forth swapping places with 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. General troubleshooting and help at https://machinelearningforkids.co.uk/help