

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 <ul style="list-style-type: none"> 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
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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	<ul style="list-style-type: none"> 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 3. You may prefer to use Scratch 2 instead, however students may find it harder to find some blocks. <p>General troubleshooting and help at https://machinelearningforkids.co.uk/help</p>
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