

Coding & STEM 4 Schools

2019 AI Workshop

Training a Smart Assistant

Presented by Mr Daniel Hickmott on 12th November 2019

Machine Learning for Kids

- Free to use, although there can be some cost involved
- Non-commercial and all web-based
- Created and maintained by Dale Lane (Developer at IBM)
- Can use with Scratch, Python and AppInventor
- Important: the Scratch used within ML for Kids is not the 'real' Scratch



Teach a computer to play a game

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- 1 Collect examples of things you want to be able to recognise
- 2 Use the examples to train a computer to be able to recognise them
- 3 Make a game in Scratch that uses the computer's ability to recognise them

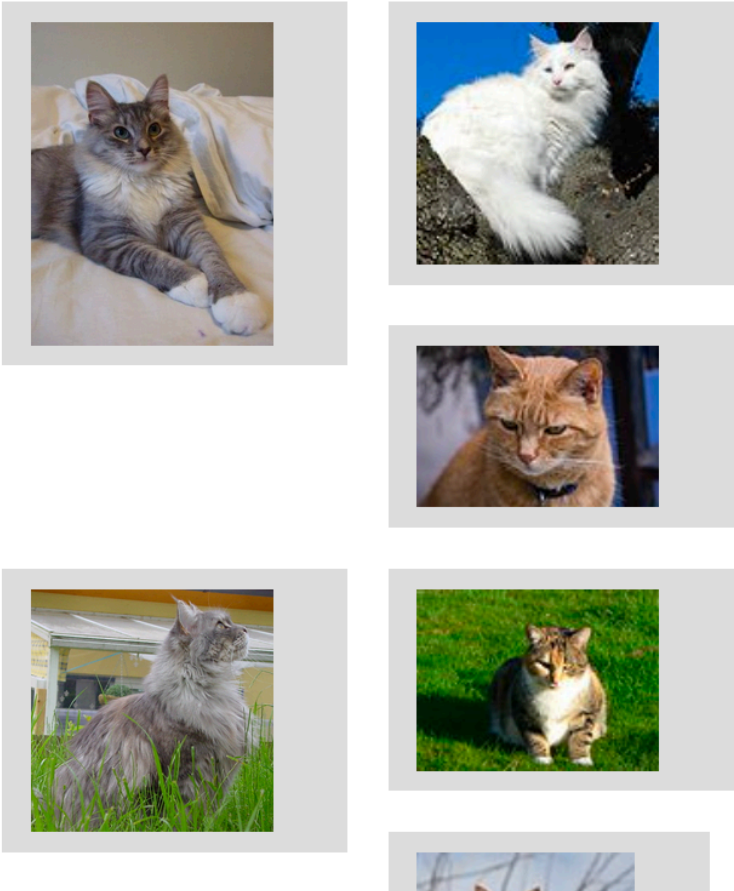
<https://machinelearningforkids.co.uk>

Using Machine Learning for Kids

- Usually involves two main steps:
 - We train a model by giving the computer examples split into different 'buckets', e.g. spam or not spam (**supervised learning**)
 - Code (e.g. Scratch blocks) are created that use the model to classify new data into these buckets

Training with Examples


cat



www webcam draw

20

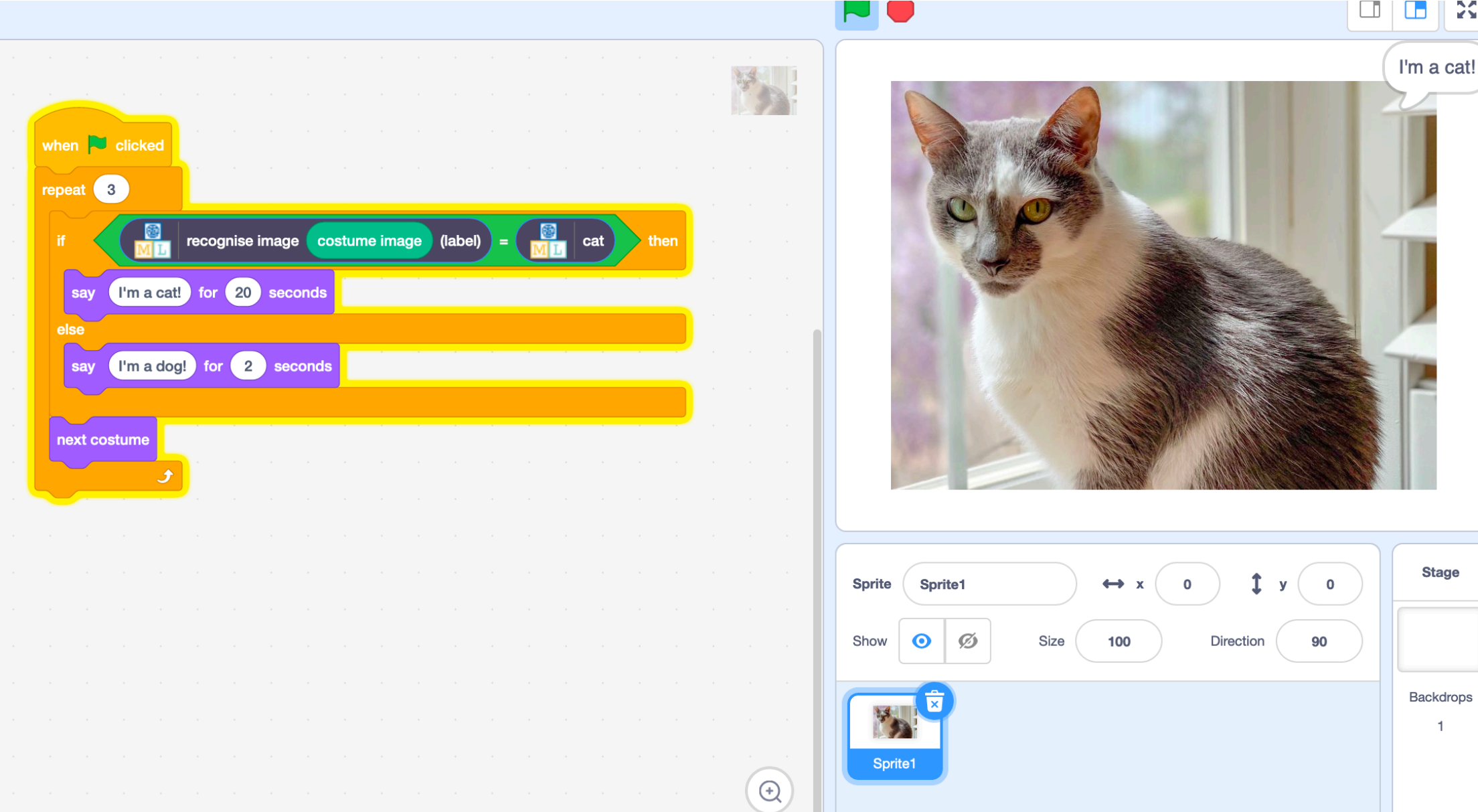
dog



www webcam draw

20

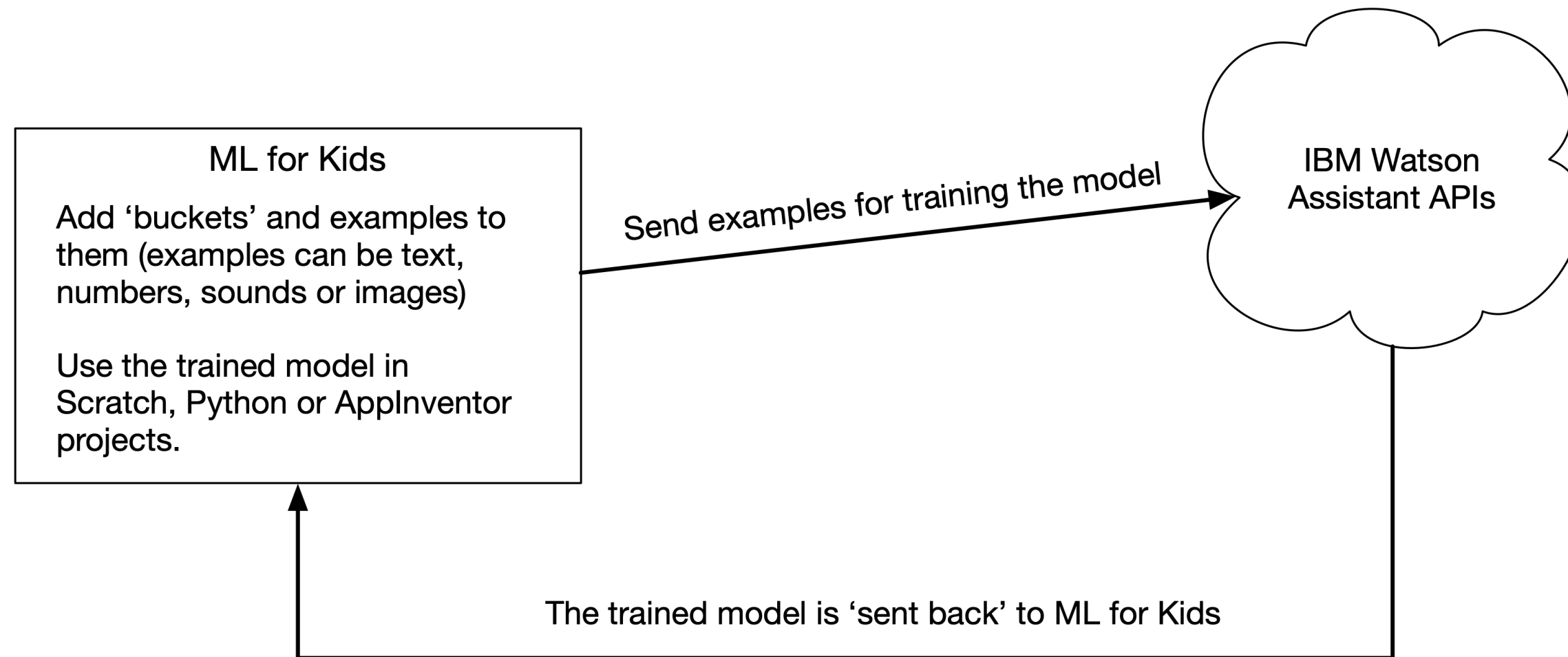
Coding with the Model



The image displays the Scratch code editor interface. On the left, a script is written on a grid background. The script starts with a 'when clicked' event block, followed by a 'repeat 3' loop. Inside the loop is an 'if' block that uses the 'recognise image' block to check if the 'costume image' label is equal to 'cat'. If true, it says 'I'm a cat!' for 20 seconds; otherwise, it says 'I'm a dog!' for 2 seconds. The loop ends with a 'next costume' block. On the right, the stage area shows a cat sprite with a speech bubble saying 'I'm a cat!'. Below the stage, the 'Sprite' panel shows 'Sprite1' with coordinates (0, 0), size 100, and direction 90. The 'Backdrops' panel shows backdrop 1.

```
when clicked
repeat (3)
  if (recognise image costume image (label) = cat) then
    say I'm a cat! for (20) seconds
  else
    say I'm a dog! for (2) seconds
  next costume
```

How it Works



— Usage of IBM Watson Assistant can cost \$

Resources

- Worksheets
- Project templates (e.g, pictures of cats and dogs, passengers on the titanic)
- Sample projects within Scratch and Code editors
- Raspberry Pi Foundation: Scratch Machine Learning projects

Training a Smart Assistant

- We will use the Raspberry Pi Foundation's version of the Smart Classroom Assistant activity
- We will compare coding with rules and machine learning first
- You will create a Scratch project that 'understands' different instructions for turning a fan and light on and off

Application of these Models

- Amazon Alexa Skills
- As described in Smart Classroom activity:
 - Buckets are created for different commands
 - Examples of appropriate phrases are added to each of the buckets
 - Model is trained with these examples