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AI Coding  
Day 5

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# Intelligent Mini Application Design

CodeKids Canterbury

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# Today's Plan

1. **Finish our voice transcriber (10-10:45am)**
2. **Pokemon Type Guesser (10:45-11:10am)**
3. **The Wise Owl (11:10-12pm)**
4. **Choose your own mini application (Worksheets provided) (1pm-3pm)**

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# Project 1: Pokemon Images

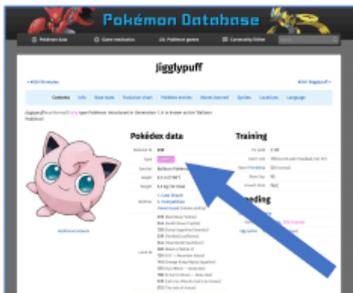
# Pokemon Basics



This is Pikachu.

Pikachu is an **electric** Pokémon.

There are lots of different types of Pokémon.



Jigglypuff is a **fairy** Pokémon.

Check the types of other Pokémon in the Pokémon database at <https://pokemondb.net>

The types of Pokémon are:

- Normal
- Grass
- Ground
- Rock
- Fire
- Ice
- Flying
- Ghost
- Steel
- Water
- Fighting
- Psychic
- Dragon
- Fairy
- Electric
- Poison
- Bug
- Dark

# Squirtle

What type of Pokémon is Squirtle?

What information do you think you could use to guess the type?

Would you use the way that it looks?  
Do you think the colours and the shapes would give you a good clue for what the type is?

Would you use the statistics that describe the Pokémon's size, abilities, and fighting style?

Do you think those numbers would give you a good clue for what the type is?



# No one way is perfect

There aren't rules. But we can learn what they have in common and use this to make a guess.

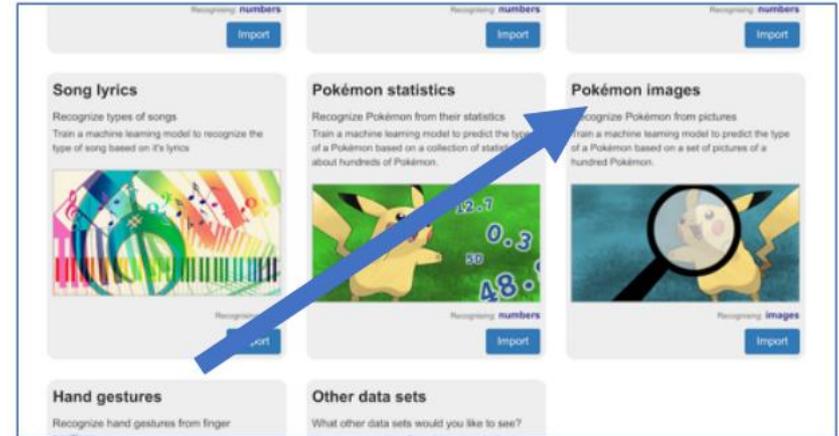
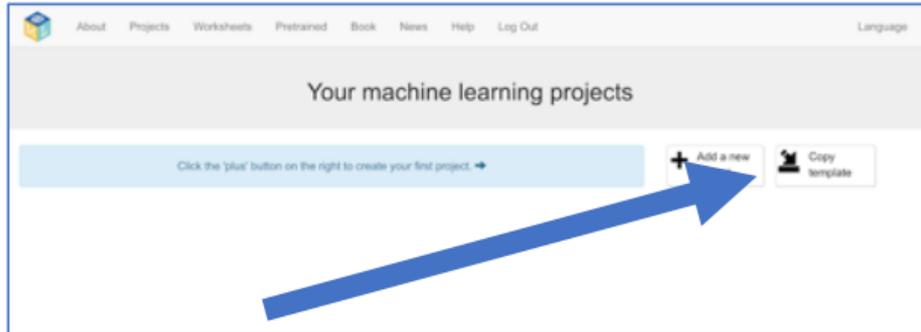
Computers can do this. Computers can work without relying on rules, by learning what things have in common and using this to make predictions. We call this type of computing **Machine Learning**.

In this project, you will train a computer to be able to predict the type of a Pokémon based on how it looks, by training it with pictures of a hundred example Pokémon.

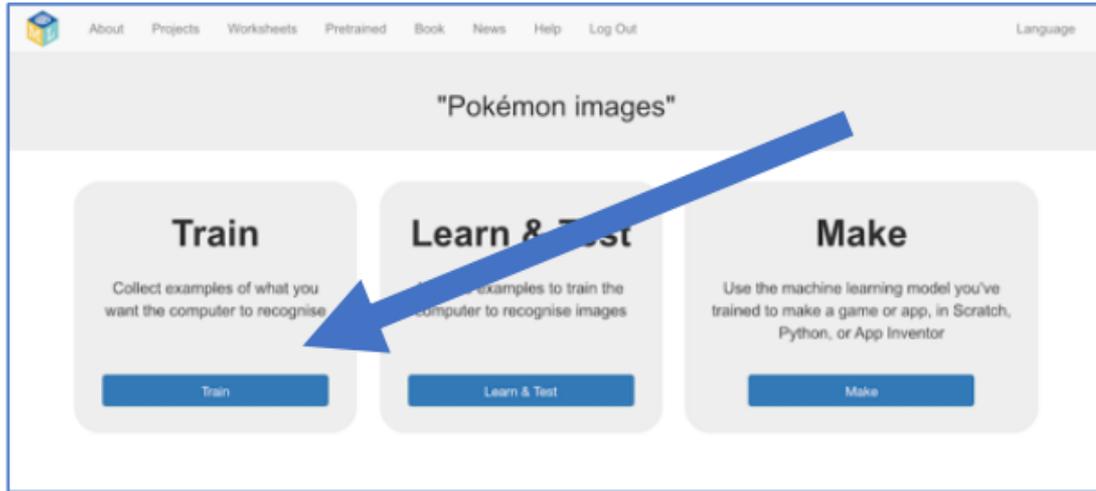
To make things a little quicker, we won't train the computer to recognise every type of Pokémon, we'll just focus on six of the types as an example.

# Get Started

1. Go to <https://machinelearningforkids.co.uk/> in a web browser
2. Click on “Get started”
3. Click on “Try it now”
4. Click on “Copy template”
5. Click on **“STORE ON YOUR COMPUTER”**



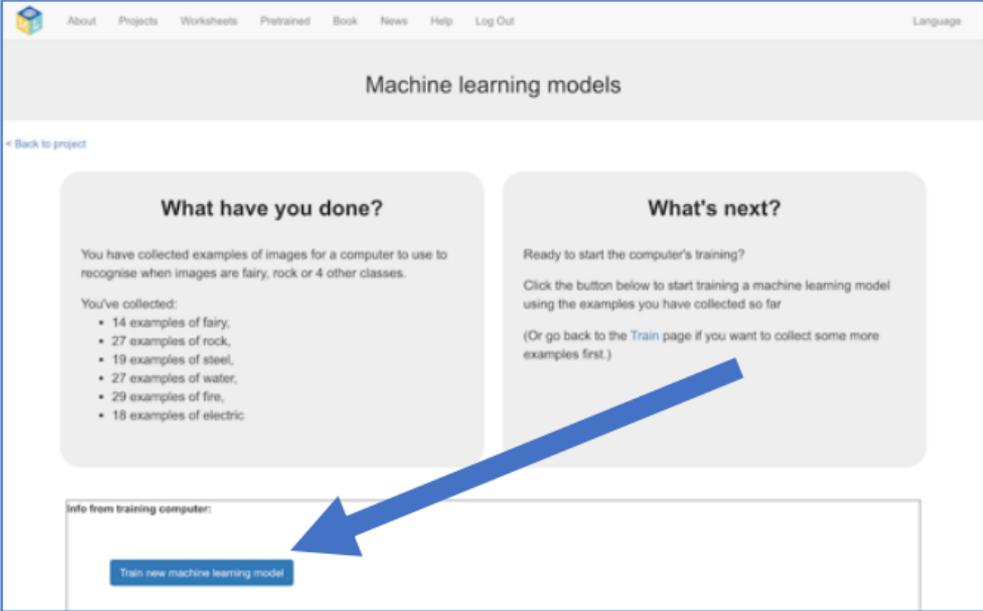
# Training Template



Look through the training images These are the images of over a hundred Pokémon that you will use to train the computer with

# Training The Model

1. Click on “Back to project”
2. Click on “Learn & Test”
3. Click on “Train new machine learning model”



The screenshot shows a web interface titled "Machine learning models". At the top, there is a navigation bar with links: About, Projects, Worksheets, Pretrained, Book, News, Help, Log Out, and Language. Below the navigation bar, there is a header section with the title "Machine learning models".

Below the header, there are two main sections:

- What have you done?**

You have collected examples of images for a computer to use to recognise when images are fairy, rock or 4 other classes.

You've collected:

  - 14 examples of fairy,
  - 27 examples of rock,
  - 19 examples of steel,
  - 27 examples of water,
  - 29 examples of fire,
  - 18 examples of electric
- What's next?**

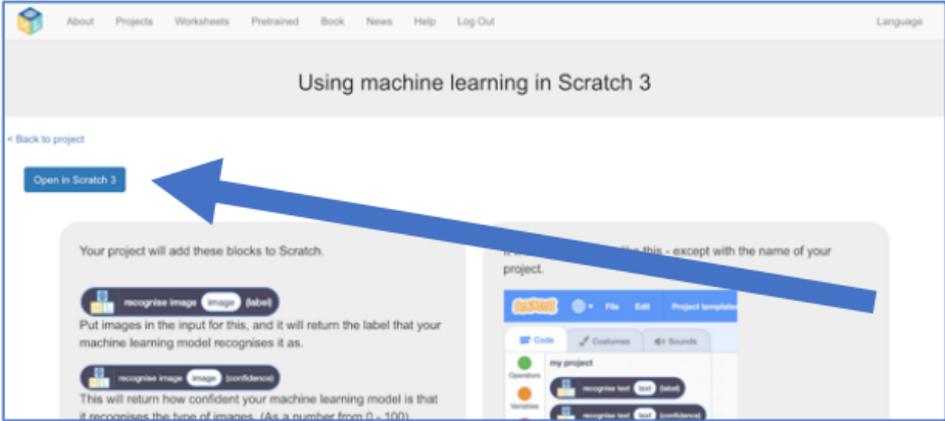
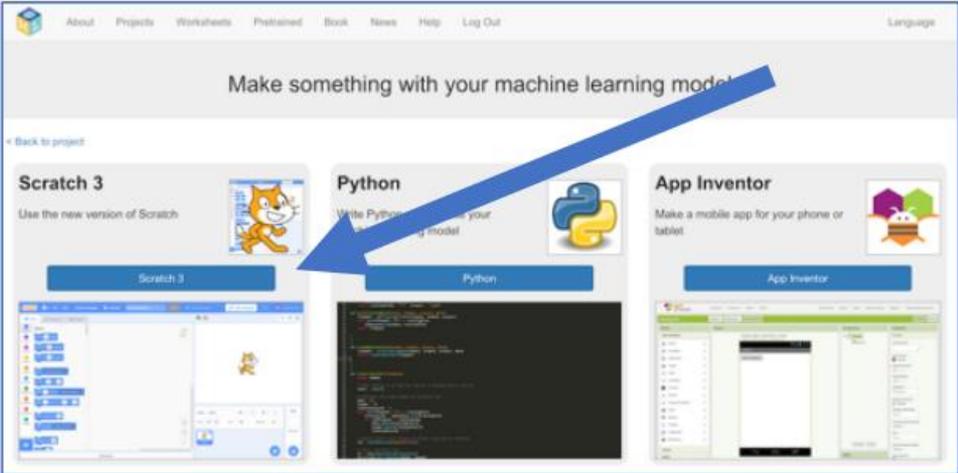
Ready to start the computer's training?

Click the button below to start training a machine learning model using the examples you have collected so far

(Or go back to the [Train](#) page if you want to collect some more examples first.)

At the bottom of the page, there is a section titled "Info from training computer:" which contains a button labeled "Train new machine learning model". A large blue arrow points from the "What's next?" section towards this button.

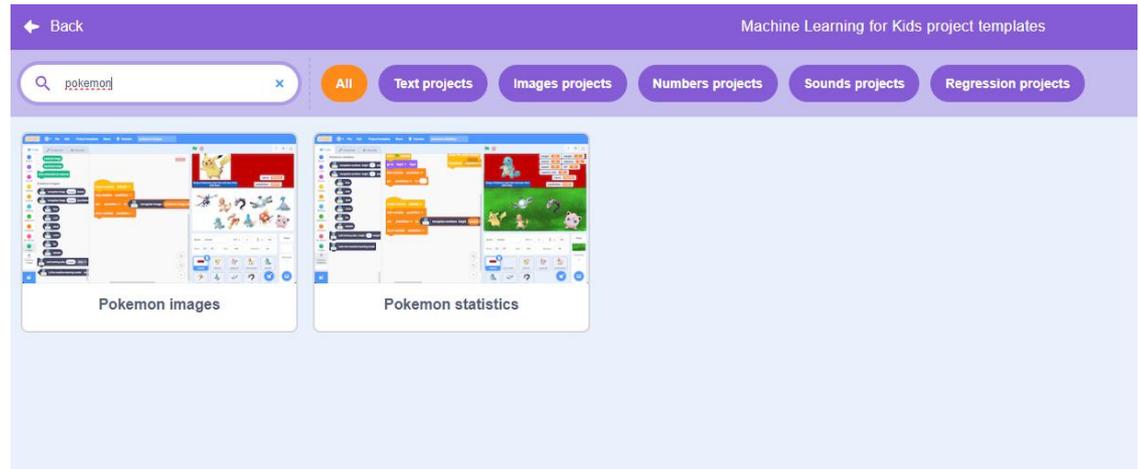
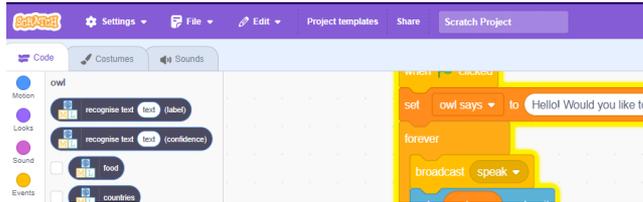
# Open in Scratch



# Find Pokemon Images in Templates

Click on “Project templates”

Click on “Pokemon images”

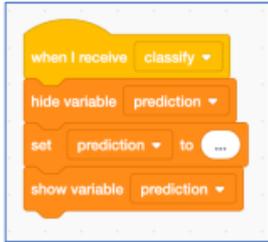


# Add Code

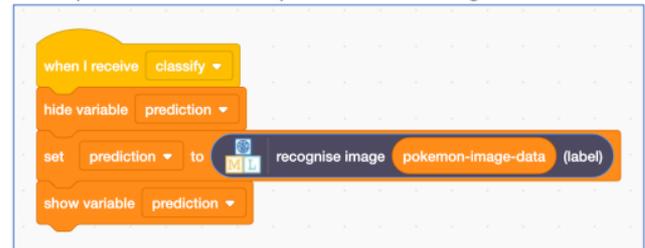
Select classify sprite



Find the “when I receive classify” code



Update the code to use your machine learning model



# Test Using <https://pokemondb.net/> Images

Images of six Pokémon have been prepared for you in the Scratch project. All six of these are Pokémon that were not included in the training data you used to train your machine learning model.

If you want to test with more Pokémon, you can find more images at <https://pokemondb.net>

Try testing your model to see what mistakes it makes.

If you find a mistake, look at your training examples again to try and think of a reason for the mistake. Different models will behave differently, so your results may not be the same as mine. But here are mistakes I noticed in my testing.

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# **Project 2: Wise Owl: Game Support Chat Bot**

# Decide on a game for your chat bot

It must be a **niche** within the game, as we can't teach it everything due to time constraints

- For example:
  - **Minecraft Creeper FAQ** (e.g what are they scared of? When do they spawn)
  - **Roblox specific game e.g 'steal a brain rot' or 'house td'** (What happens when you steal someone's brain rot but get killed?)
  - **Finnleys Ant Game** (I don't know any examples for this, but Finnley plays it all day)
  - **Clash of Clans Town Hall FAQ** (What does a level 5 town hall get me?)
  - Etc etc

For my example, I am going to **not pick** a game as I don't want you to copy me! I'll do a quiz on owls.



# Decide on 5 questions somebody may ask about your game

- What do owls eat?
- Where in the world do owls live?
- How long do owls live?
- What types of owls are there?
- How big do owls grow?

# Give your questions labels

- What do owls eat? -> **food**
- Where in the world do owls live? -> **countries**
- How long do owls live? -> **lifespan**
- What types of owls are there? -> **species**
- How big do owls grow? -> **size**

# Getting setup

- Go to <https://machinelearningforkids.co.uk/> in a web browser
- Click on “Get started”
- Click on “Try it now” 6.
- Click on “Projects” on the top menu bar
- Click the “+ Add a new project” button.

# Create a text based project

Create a project and set it to learn how to recognise 'text' and click the 'create' button

### Start a new machine learning project

Project Name \*

owls

Recognizing \*

text

Language

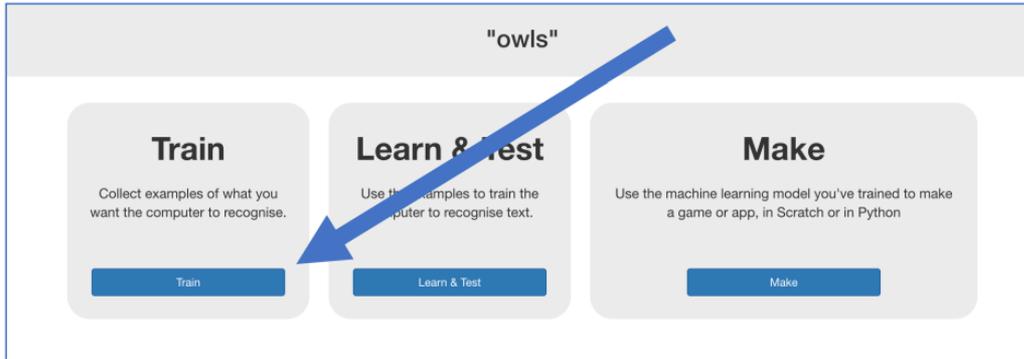
English

CREATE CANCEL

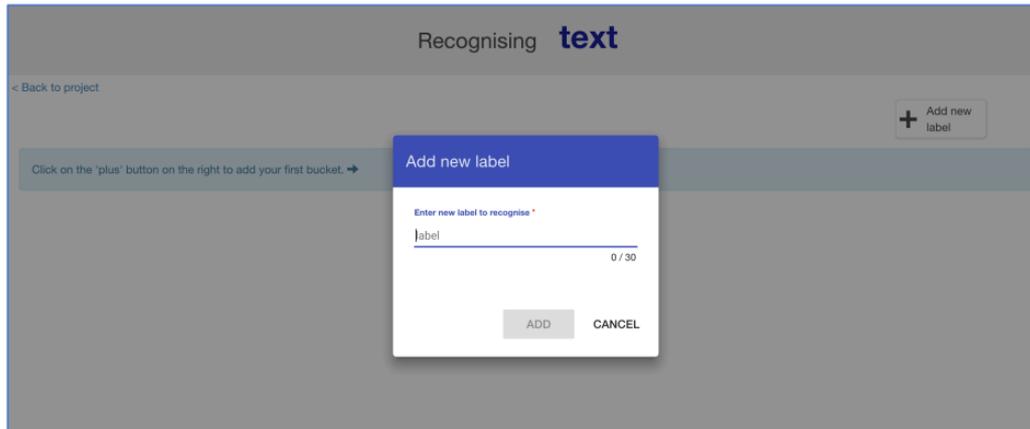
Give your project a name to describe what sort of thing you'll try to teach the computer to recognise.

# Open Training Screen, Add new label

1)



2)



# Add Labels For Your Categories

The screenshot shows a web application interface for managing categories. At the top, there is a navigation bar with links for 'About', 'Projects', 'Worksheets', 'News', 'Help', and 'Log Out', along with a 'Language' dropdown. The main heading reads 'Recognising **text** as **food, countries or 3 other classes**'. Below this, a '< Back to project' link is visible. A '+ Add new label' button is located in the top right corner. The interface features five category boxes, each with a title and an 'Add example' button: 'food', 'countries', 'lifespan', 'species', and 'size'. Each box is currently empty, indicating that no examples have been added yet.

Navigation: About Projects Worksheets News Help Log Out Language

Recognising **text** as **food, countries or 3 other classes**

< Back to project

+ Add new label

**food** + Add example

**countries** + Add example

**lifespan** + Add example

**species** + Add example

**size** + Add example

# Add Lots of Example Questions

The screenshot shows a web interface for a project titled "Recognising text as food, countries or 3 other classes". The interface is organized into five rounded rectangular boxes, each representing a different category: "food", "countries", "lifespan", "species", and "size". Each box contains several example questions in grey text boxes and a "+ Add example" button at the bottom. A callout box with the text "Add Lots of Example Questions" is positioned over the "lifespan" category. In the top right corner, there is a "+ Add new label" button. The top navigation bar includes links for "About", "Projects", "Worksheets", "News", "Help", and "Log Out", along with a "Language" dropdown menu. A "< Back to project" link is located in the top left corner. Each of the five category boxes has a small circle with the number "6" in the bottom right corner.

Recognising **text** as **food, countries or 3 other classes**

< Back to project

+ Add new label

**food**

What sort of foods do owls eat?

What do owls eat?

what do owls like to eat?

+ Add example

6

**countries**

Where do owls live?

What areas of the world are owls fou...

What countries have owls?

+ Add example

6

**lifespan**

how long do you live for?

How old can owls get?

How long can an owl live?

+ Add example

6

**species**

What are the main species of owl?

What species of owls are there?

What are the different breeds of owls?

+ Add example

6

**size**

How big are owls? What size are you?

How big can owls get? How tall are you?

How long are you? How big do owls grow to?

+ Add example

6

Add Lots of Example Questions

Each label only has **one answer.**

# Training The Model

Click on the “< Back to project” link

Click the “Learn & Test” button

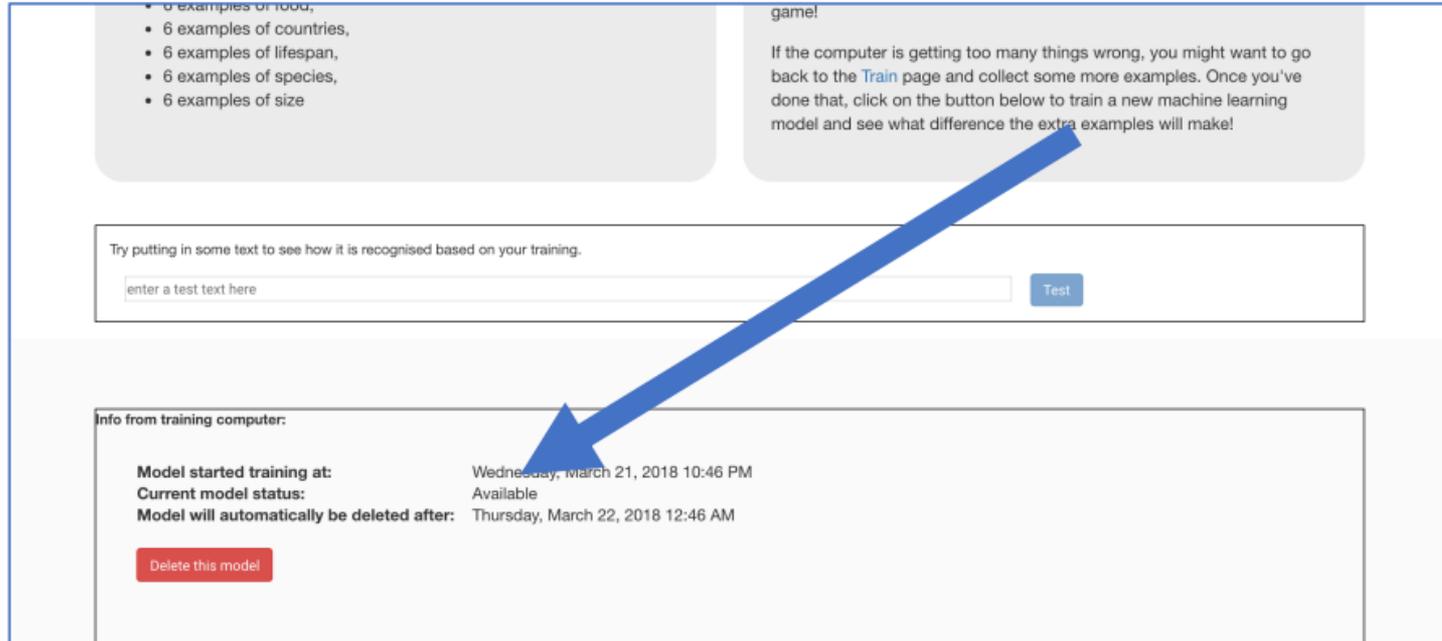
Click the “Train new machine learning model” button

As long as you’ve collected enough examples, the computer should start to learn how to recognise questions from the examples you’ve given to it.

The screenshot shows a web interface titled "Machine learning models". At the top left, there is a link "< Back to project". The main content is divided into two columns. The left column, titled "What have you done?", contains text stating that examples of text for a computer to use to recognise when text is food, countries or 3 other classes have been collected. Below this, it lists "You've collected:" followed by a bulleted list: 6 examples of food, 6 examples of countries, 6 examples of lifespan, 6 examples of species, and 6 examples of size. The right column, titled "What's next?", contains text asking "Ready to start the computer's training?" and instructs the user to "Click the button below to start training a machine learning model using the examples you have collected so far." It also includes a note: "(Or go back to the Train page if you want to collect some more examples first)". At the bottom of the interface, there is a section titled "Info from training computer:" which contains a blue button labeled "Train new machine learning model". A large blue arrow points from the text in the "What's next?" section down to this button.

# Wait For Training to Complete 🤔

This might take a couple of minutes. It's finished once you see the “status” change to “Available”



6 examples of food,  
• 6 examples of countries,  
• 6 examples of lifespan,  
• 6 examples of species,  
• 6 examples of size

game!

If the computer is getting too many things wrong, you might want to go back to the [Train](#) page and collect some more examples. Once you've done that, click on the button below to train a new machine learning model and see what difference the extra examples will make!

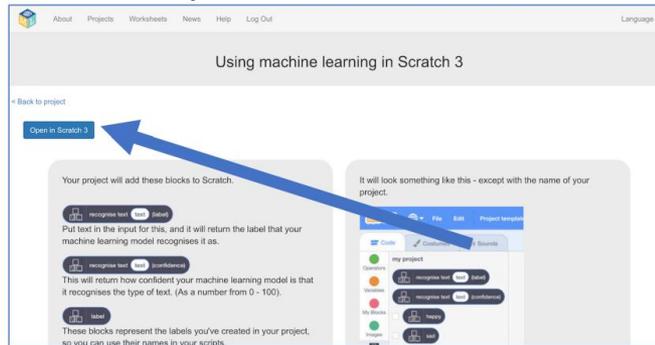
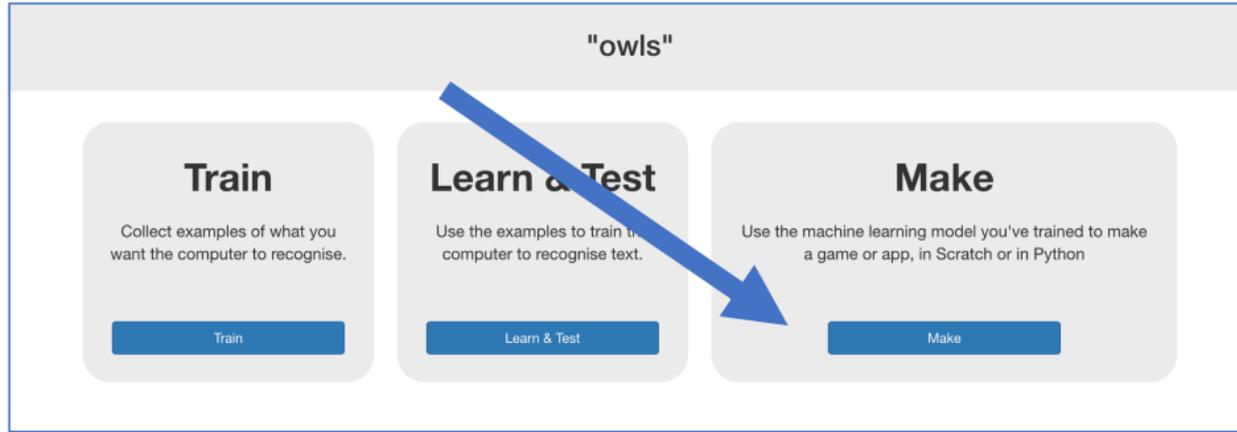
Try putting in some text to see how it is recognised based on your training.

Info from training computer:

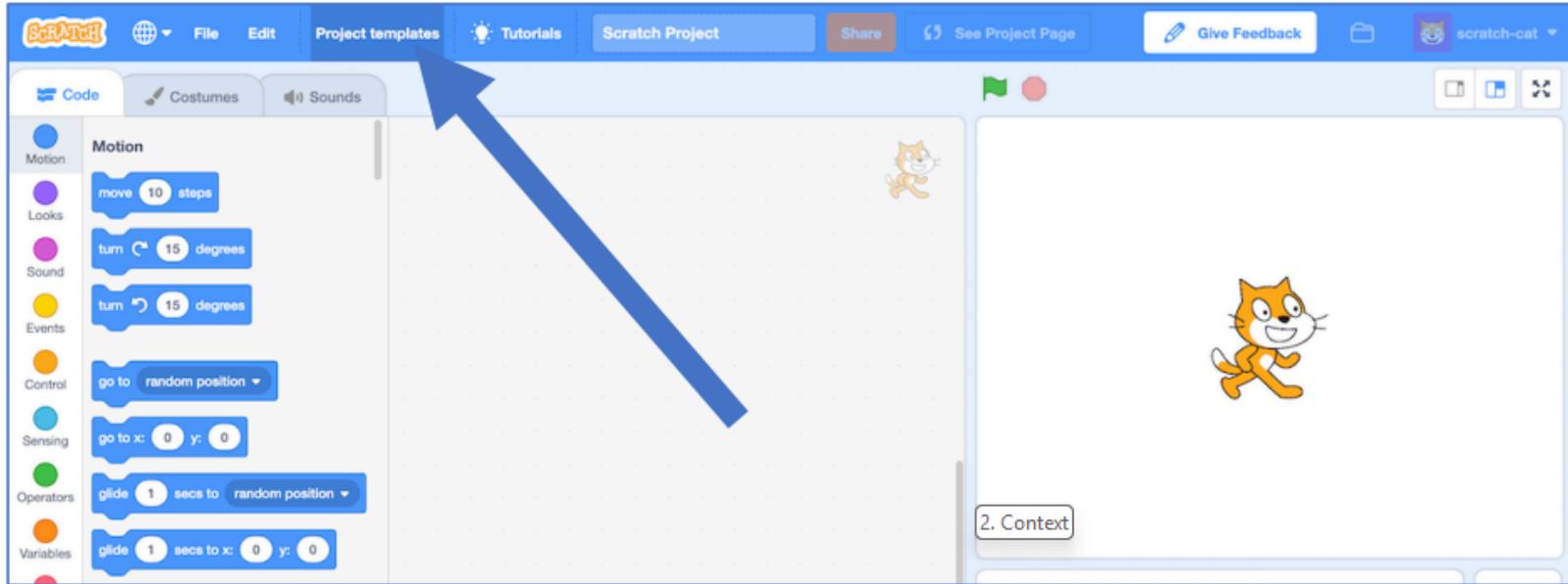
<b>Model started training at:</b>	Wednesday, March 21, 2018 10:46 PM
<b>Current model status:</b>	Available
<b>Model will automatically be deleted after:</b>	Thursday, March 22, 2018 12:46 AM

# Import to Scratch



# Open 'Owls' Template

Open Owls Templates from this tab



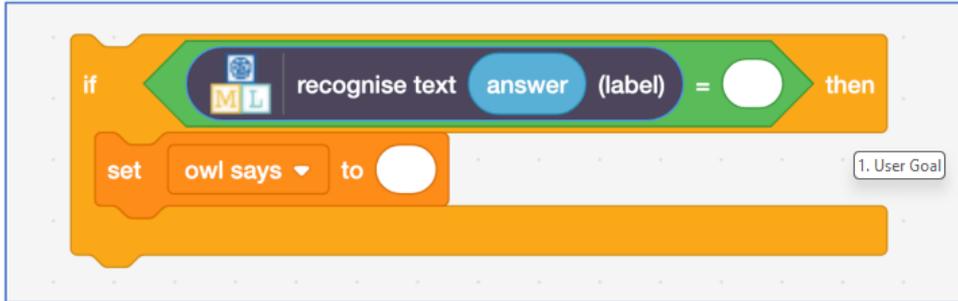
# What you should see:

The image shows a Scratch code editor window with the following components:

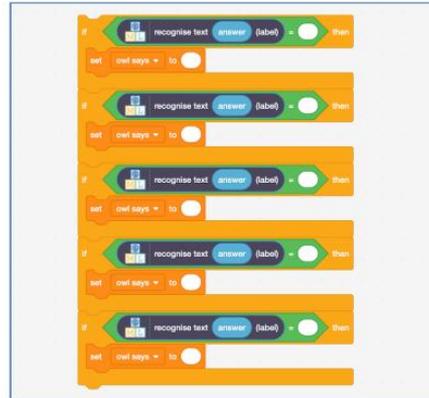
- Code Area:** A script starting with a "when clicked" event block, followed by a "set owl says to Hello! Would you like to know anything about owls?" block. A "forever" loop contains a "broadcast speak" block, an "ask owl says and wait" block, and a "set owl says to Sorry. I haven't been taught anything yet." block.
- Left Panel:** The "Motion" category is selected, showing various movement blocks like "move 10 steps", "turn 15 degrees", "go to random position", "go to x: -85 y: -30", "glide 1 secs to random position", "glide 1 secs to x: -85 y: -30", "point in direction 90", "point towards mouse-pointer", "change x by 10", "set x to -85", "change y by 10", and "set y to -30".
- Right Panel:** The "Stage" area displays an owl character on a branch. The "Sprite" panel shows the owl's position (x: -85, y: -30), size (75), and direction (90). A yellow tooltip box is overlaid on the "broadcast speak" block, containing the text: "This 'broadcast speak' block makes the owl move its beak while it's talking. It's fun, but you don't really need to include this."

# New Code

Create this little snippet of script but don't attach it to anything yet Make sure you choose "owl says" for the orange block.



Duplicate it four times and  
join them all together  
Right-click on it, and click  
"Duplicate"



# Answers

Fill in each copy of the block Drag the label for one of your questions into the top space, and Type the answer to the question into the bottom space

The image shows a Scratch script editor with five 'if-then' blocks. Each block has an 'if' block with a 'recognise text' block and an 'answer' block, followed by a 'then' block with a 'set owl says' block. The 'answer' blocks contain labels: 'food', 'countries', 'lifespan', 'species', and 'size'. The 'set owl says' blocks contain text answers.

```
if (recognise text) {
  answer (label) = food
  then
  set owl says to "It depends on the species of owl. Small owls eat invertebrates (such as spiders, insects and worms). Larger owls eat animals."
}

if (recognise text) {
  answer (label) = countries
  then
  set owl says to "Some owls live in deserts, some owls live in forests, some owls live in Arctic tundra. Some owls can live in more urban areas."
}

if (recognise text) {
  answer (label) = lifespan
  then
  set owl says to "Different species of owls live for different lengths of time. The European Eagle Owl can live for twenty years in the wild, or more in captivity."
}

if (recognise text) {
  answer (label) = species
  then
  set owl says to "There are over 200 species of owl. Some common ones include Barn Owls, Eagle Owls, Snowy Owls, Elf Owls, Great Horned Owls, and Screech Owls."
}

if (recognise text) {
  answer (label) = size
  then
  set owl says to "Different owl species can grow to different sizes. The Great Grey Owl can grow to be 84cm in length, with a wingspan of 150cm."
}
```

# Combining

Drag this new block into the Green Flag block prepared for you. Remove the “Sorry. I haven't been taught anything yet.” block and replace it with your new chunk of script

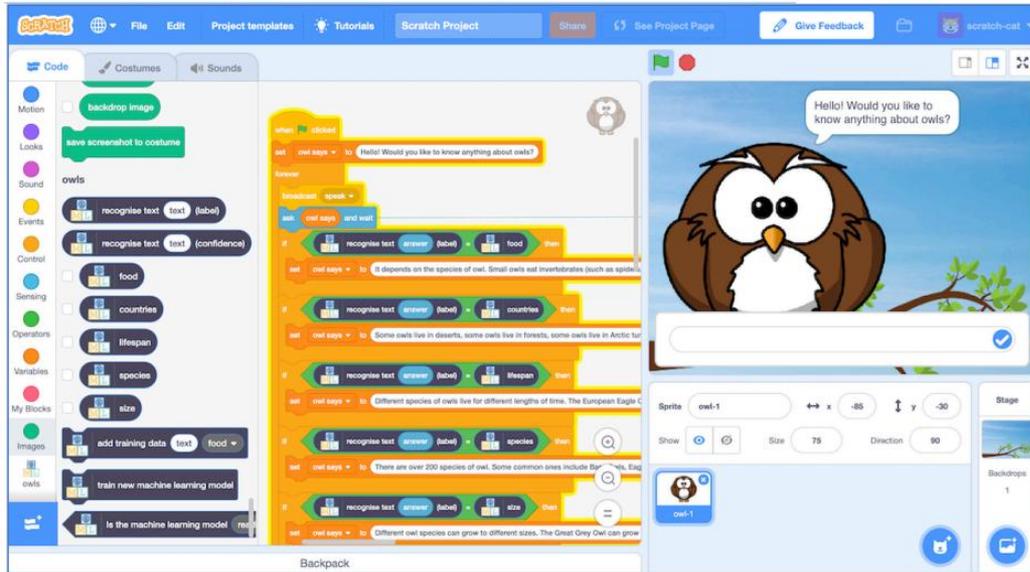


The image shows a Scratch script for an owl quiz. The script starts with a 'when clicked' event block. It then sets a variable 'owl says' to the text 'Hello! Would you like to know anything about owls?'. A 'forever' loop follows, containing several blocks: a 'broadcast speak' block, an 'ask owl says and wait' block, and a series of 'if' blocks that check for specific keywords in the user's answer. Each 'if' block has a corresponding 'set owl says' block that provides information related to that keyword. The keywords and their corresponding information are: 'food' (owls eat invertebrates or animals), 'countries' (owls live in deserts, forests, Arctic tundras, or urban areas), 'lifespan' (owls live for different lengths of time, up to 20 years), 'species' (there are over 200 species, including Barn Owls, Eagle Owls, Snowy Owls, Elf Owls, and Great Horned Owls), and 'size' (owls grow to different sizes, with the Great Grey Owl growing to 84cm in length and a wingspan of 152cm).

```
when clicked
set owl says to Hello! Would you like to know anything about owls?
forever
broadcast speak
ask owl says and wait
if recognise text answer label = food then
set owl says to It depends on the species of owl. Small owls eat invertebrates (such as spiders, insects and worms). Larger owls eat animals
if recognise text answer label = countries then
set owl says to Some owls live in deserts, some owls live in forests, some owls live in Arctic tundras. Some owls can live in more urban areas.
if recognise text answer label = lifespan then
set owl says to Different species of owls live for different lengths of time. The European Eagle Owl can live for twenty years in the wild, or even longer.
if recognise text answer label = species then
set owl says to There are over 200 species of owl. Some common ones include Barn Owls, Eagle Owls, Snowy Owls, Elf Owls, Great Horned Owls, and Screech Owls.
if recognise text answer label = size then
set owl says to Different owl species can grow to different sizes. The Great Grey Owl can grow to be 84cm in length, with a wingspan of 152cm.
```

# Test

Click the green flag and try asking the owl a question



# Extension Tasks

1) If the owl is not confident in its answer, then add a redundancy.



2) Change the owl to a character from your video game