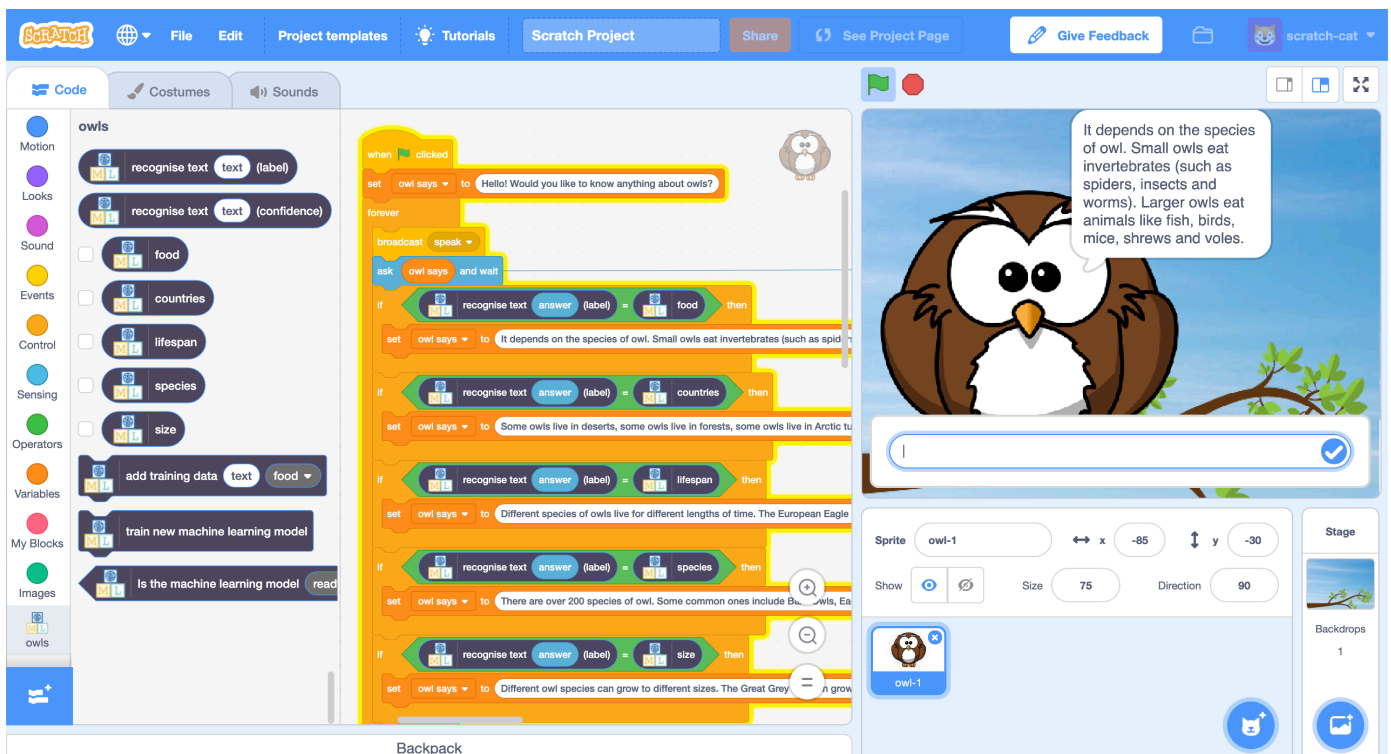


Chatbots

In this project you will make a chatbot that can answer questions about a topic of your choice.



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- 1.** Decide on a **topic** for your chatbot
Choose something that you know well enough to be able to answer questions about.
It could be a place (e.g. The town where you live?)
It could be an animal (e.g. Tigers? Dinosaurs?)
It could be an organisation (e.g. Your school)
It could be something from history (e.g. Vikings? Romans?)
*For the rest of this worksheet, I'll be using **owls***

- 2.** Think of **five things** someone might ask about your topic
*e.g. for **owls**, this could be:*
 - * 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?*

- 3.** Go to <https://machinelearningforkids.co.uk/> in a web browser

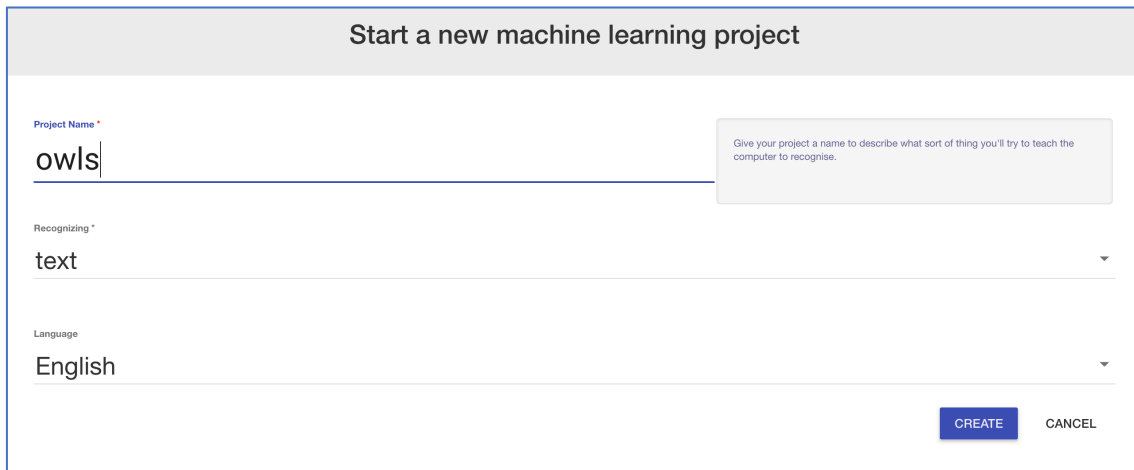
- 4.** Click on “**Get started**”

- 5.** Click on “**Try it now**”

- 6.** Click on “**Projects**” on the top menu bar

- 7.** Click the “**+ Add a new project**” button.

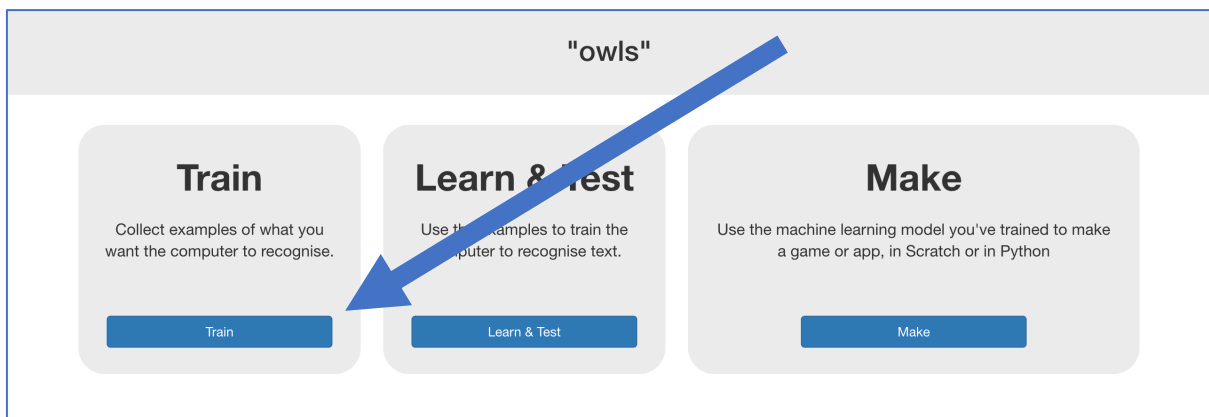
8. Name your project and set it to learn how to recognise “text”.
Click the “Create” button



The screenshot shows a form titled "Start a new machine learning project". It has three main input fields: "Project Name" with the text "owls" entered, "Recognizing" with "text" selected from a dropdown menu, and "Language" with "English" selected from a dropdown menu. To the right of the "Project Name" field is a grey box with the text: "Give your project a name to describe what sort of thing you'll try to teach the computer to recognise." At the bottom right of the form are two buttons: "CREATE" and "CANCEL".

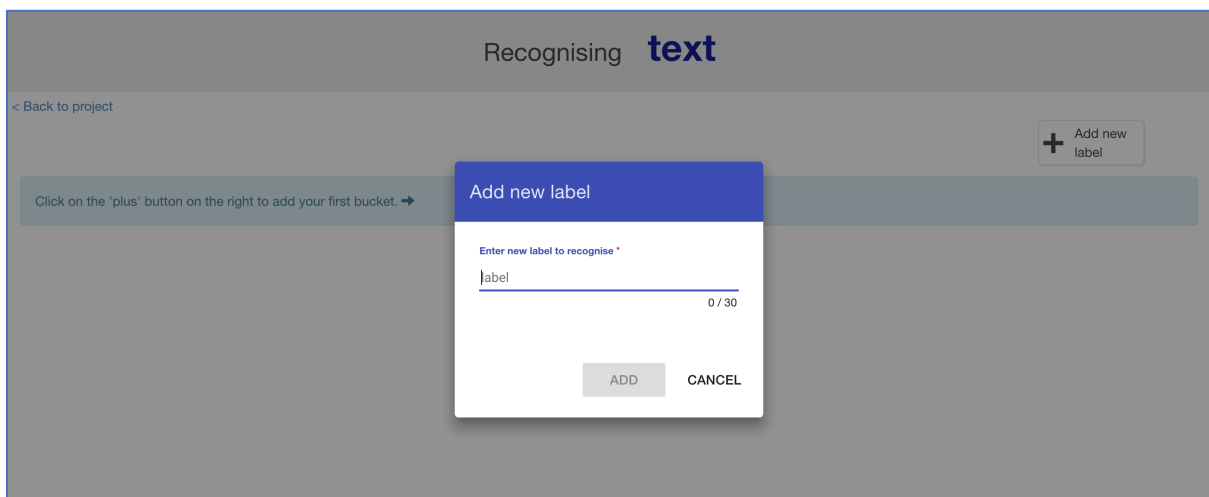
9. Click on your new project in the projects list

10. Click the **Train** button.



The screenshot shows a page titled "owls" with three main sections: "Train", "Learn & Test", and "Make". Each section has a description and a blue button. The "Train" section says "Collect examples of what you want the computer to recognise." and has a "Train" button. The "Learn & Test" section says "Use the examples to train the computer to recognise text." and has a "Learn & Test" button. The "Make" section says "Use the machine learning model you've trained to make a game or app, in Scratch or in Python" and has a "Make" button. A large blue arrow points from the top right towards the "Train" button.

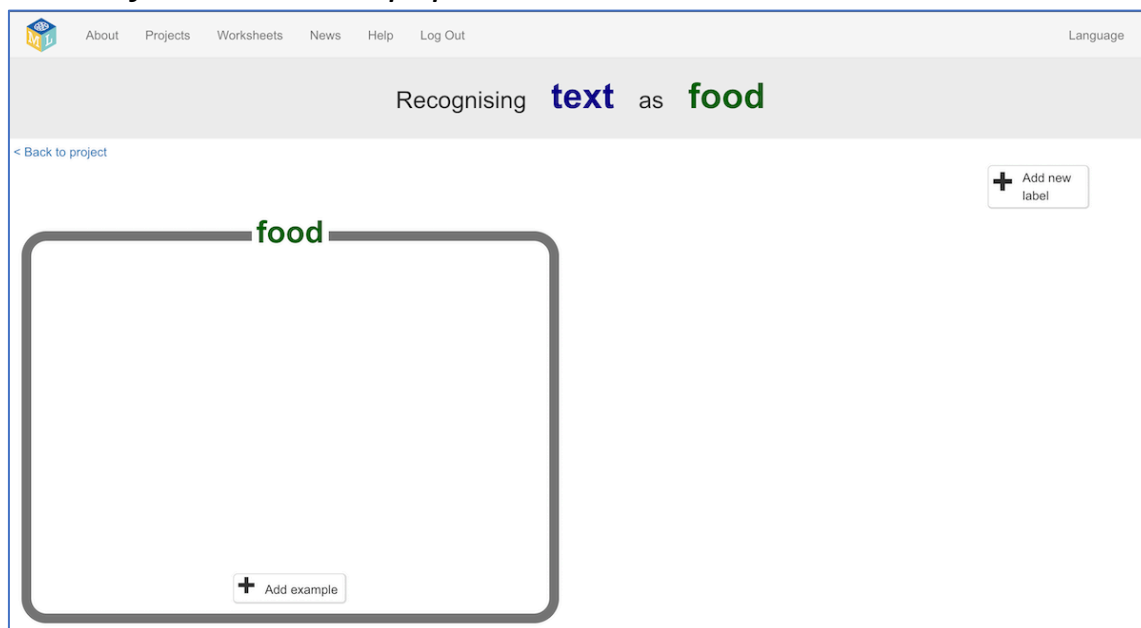
11. Click the “+ Add new label” button



The screenshot shows a page titled "Recognising text" with a "< Back to project" link and an "+ Add new label" button. A dialog box titled "Add new label" is open, showing a text input field with "label" entered and a character count of "0 / 30". At the bottom of the dialog are "ADD" and "CANCEL" buttons.

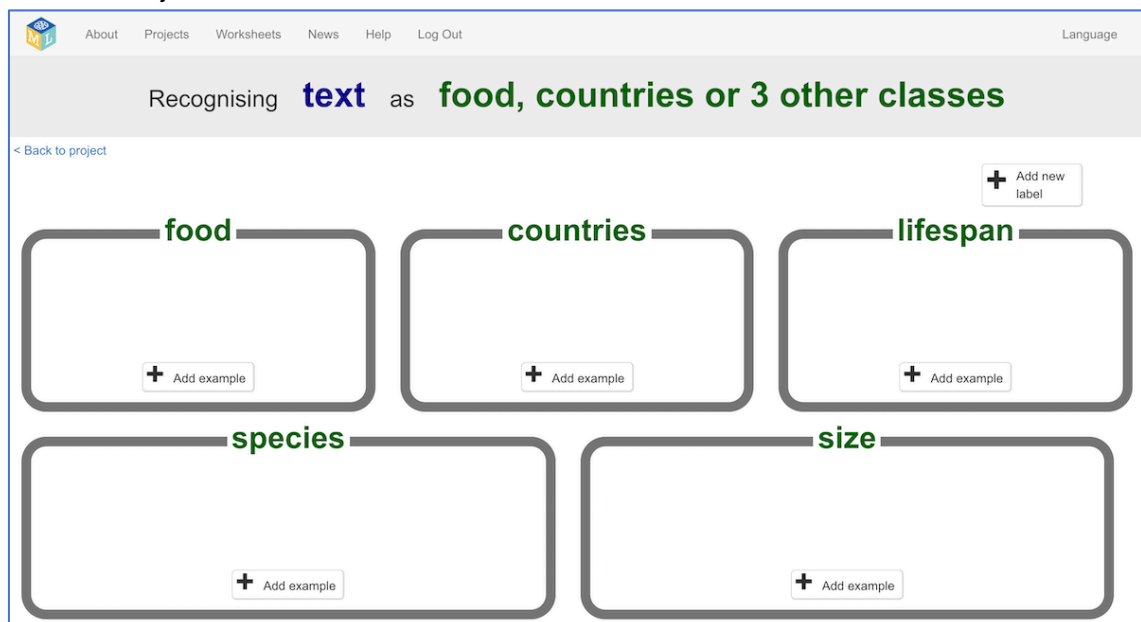
12. Type in **one word** that sums up the first of your things from Step 2, then click **Add**.

I used “food” to sum up questions like “What do owls eat?”



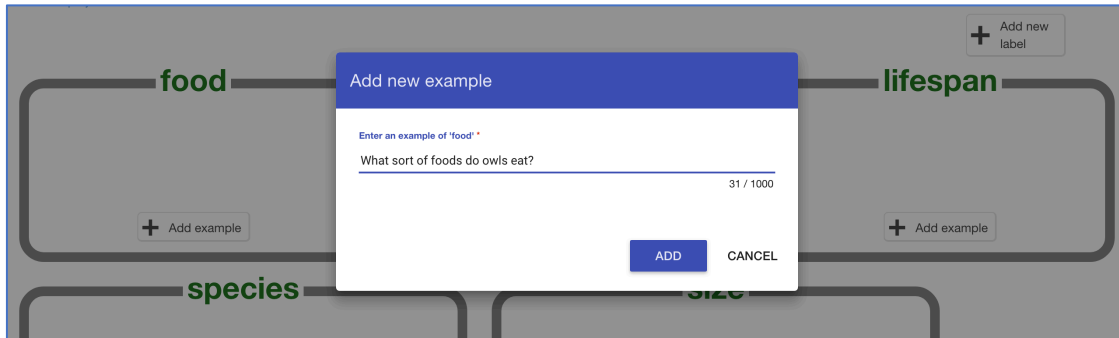
13. Do that again for all of the things in your list from Step 2

*The words you choose don't really matter, as long as **you** understand what they mean.*



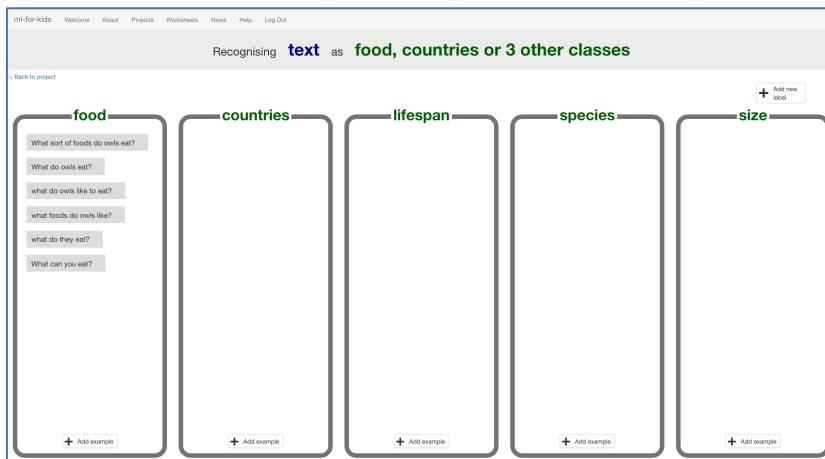
14. Click the “+ Add example” button in one of the buckets

15. Type in an example of how someone might ask that question

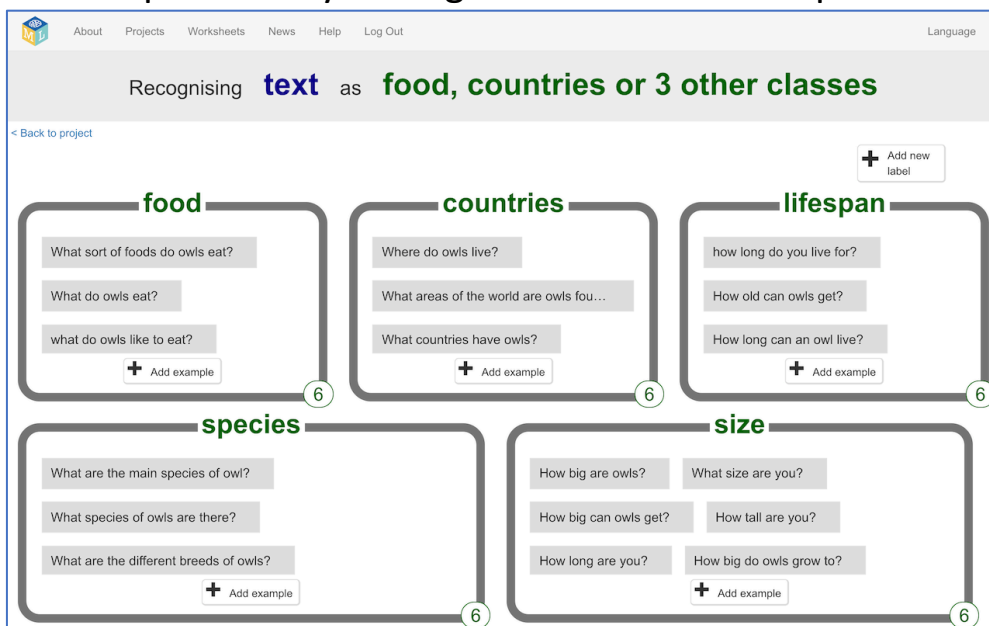


16. Click "Add"

17. Repeat until you've got five examples of how to ask that question.



18. Repeat until you've got at least five examples in every bucket

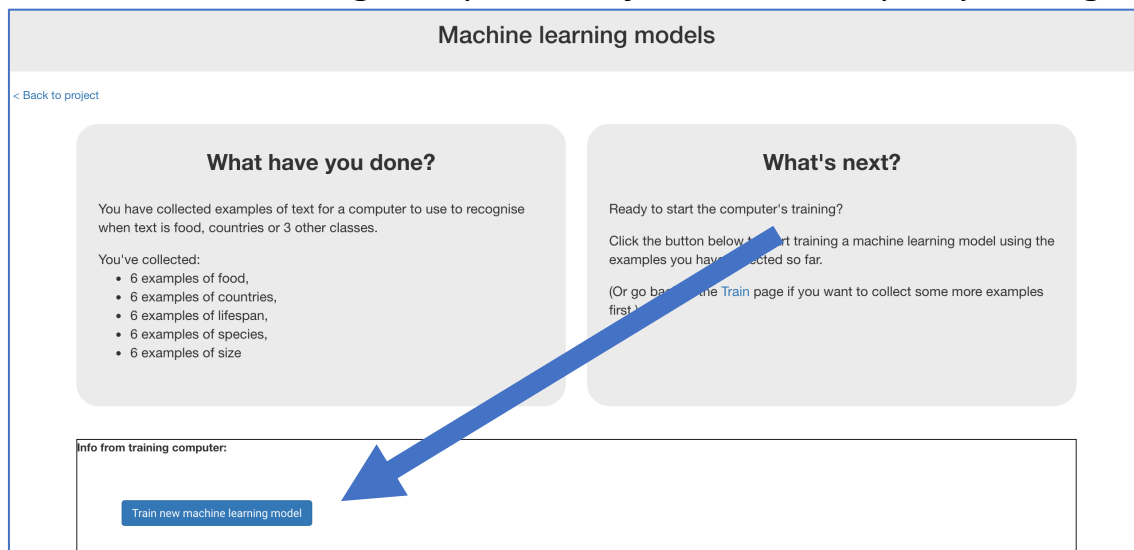


19. Click on the “< Back to project” link

20. Click the “Learn & Test” button

21. Click the “Train new machine learning model” button

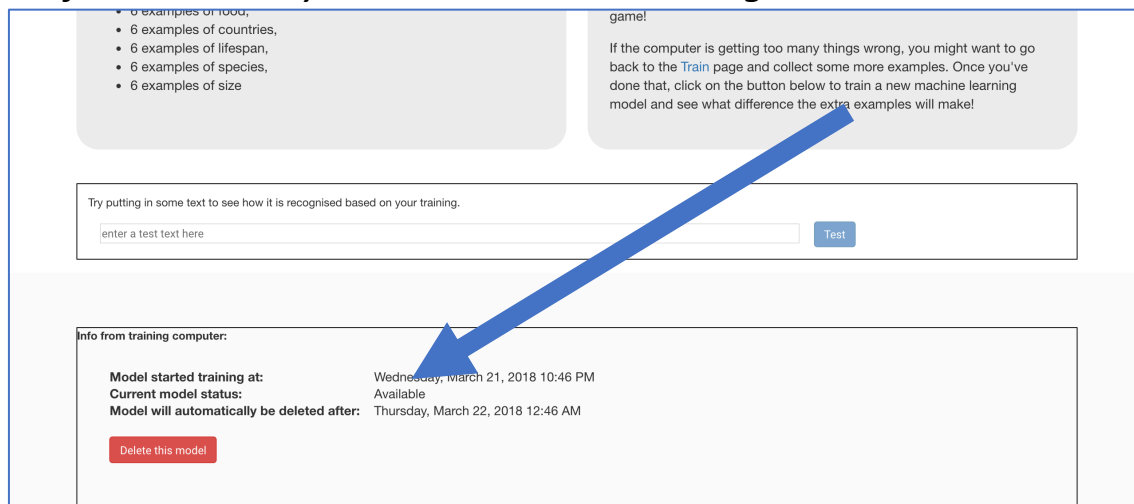
As long as you’ve collected enough examples, the computer should start to learn how to recognise questions from the examples you’ve given to it.



22. Wait for the training to complete.

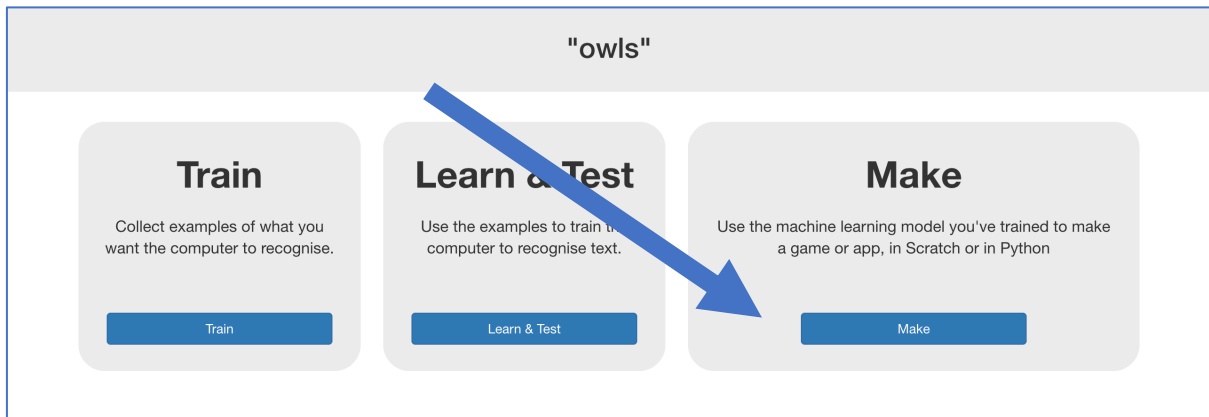
This might take a couple of minutes.

It's finished once you see the “status” change to “Available”



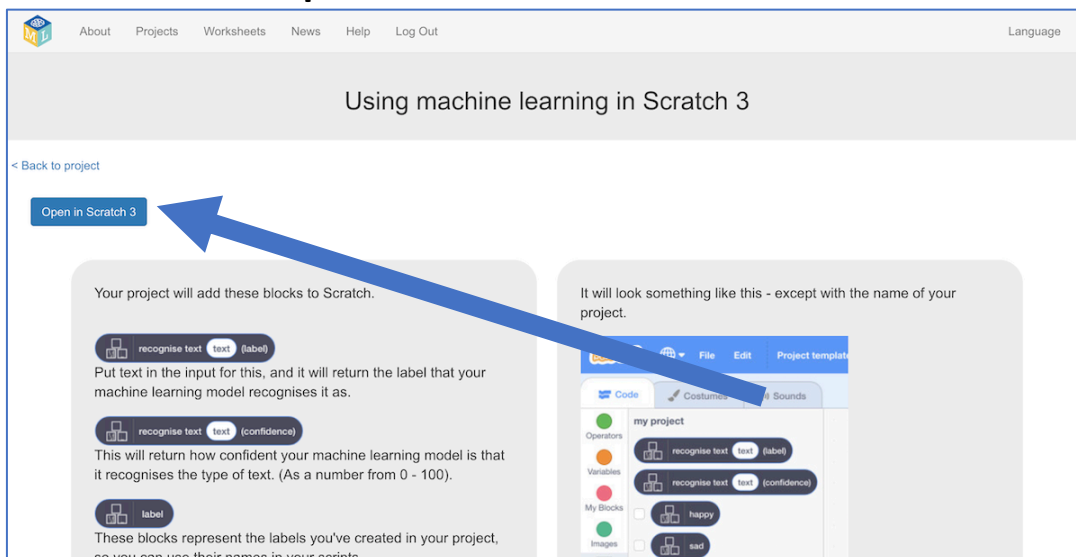
23. Click the “< Back to project” link

24. Click the “Make” button



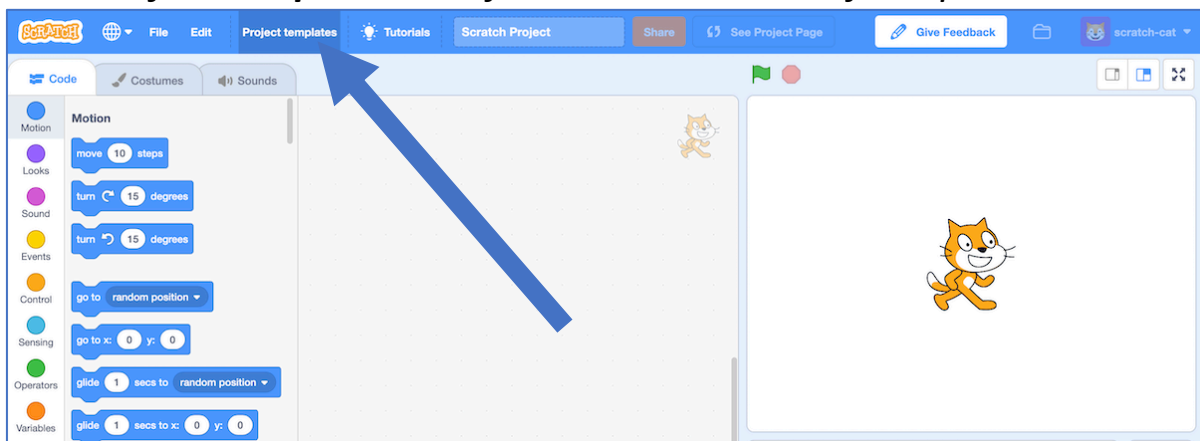
25. Click “Scratch 3”

26. Click the “Open in Scratch” button

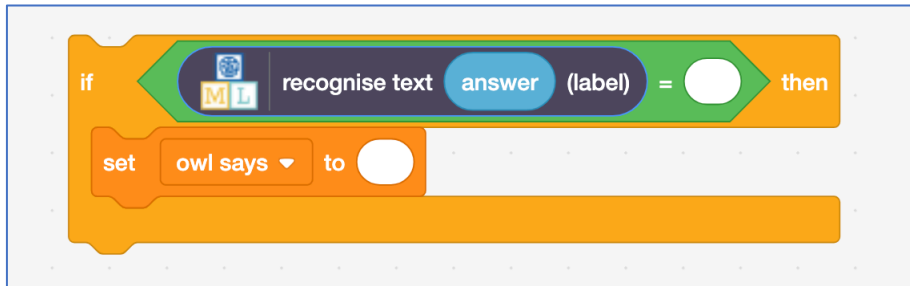


27. Open the Owls project template

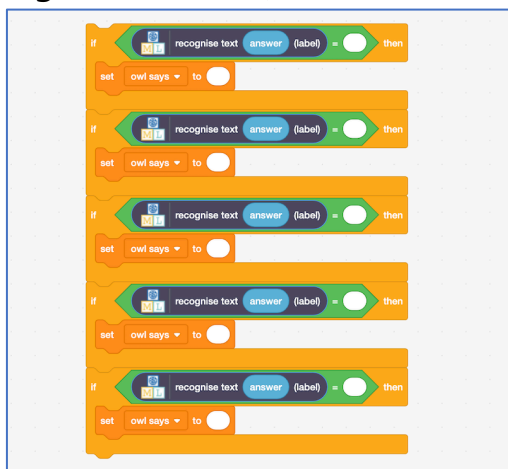
Click **Project templates** and find **Owls** in the list of templates



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



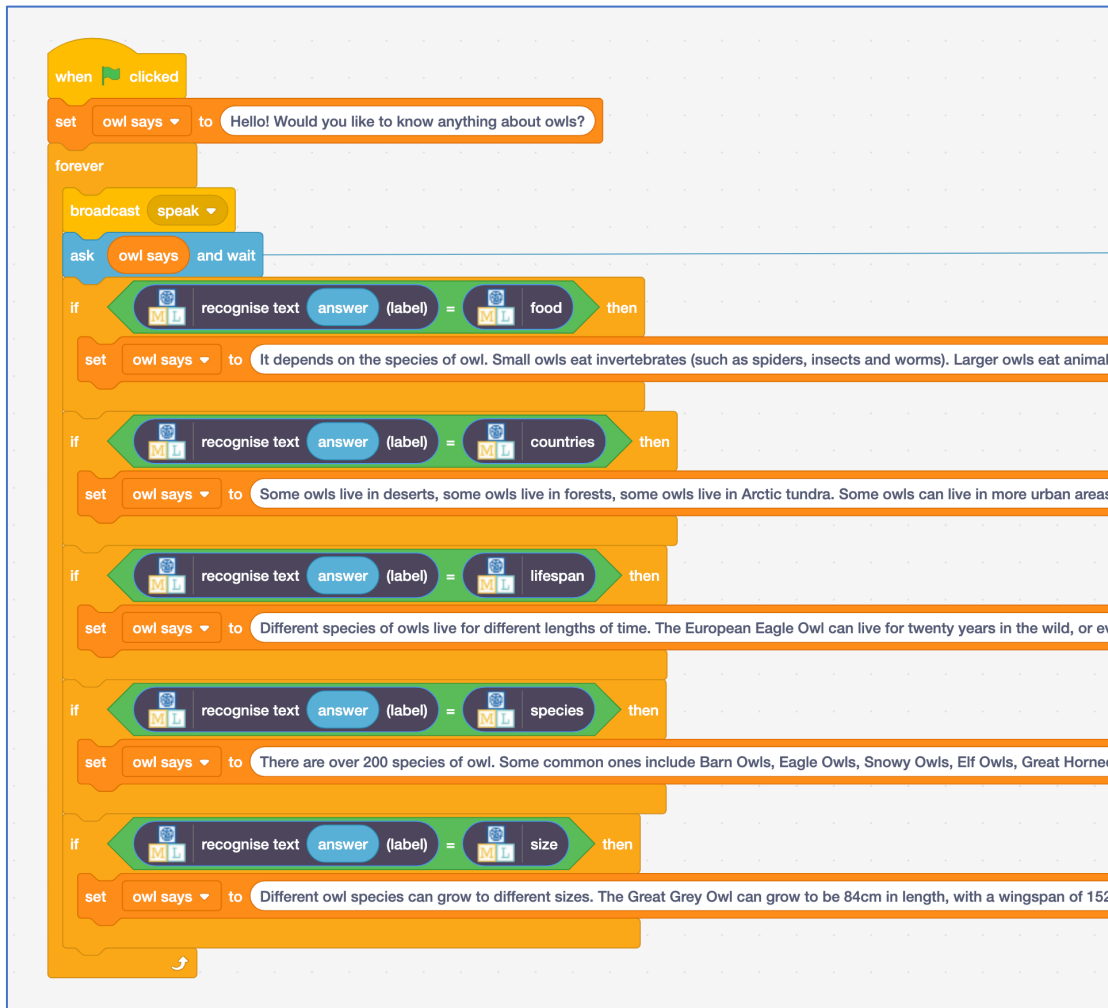
29. Duplicate it four times and join them all together
Right-click on it, and click "Duplicate"



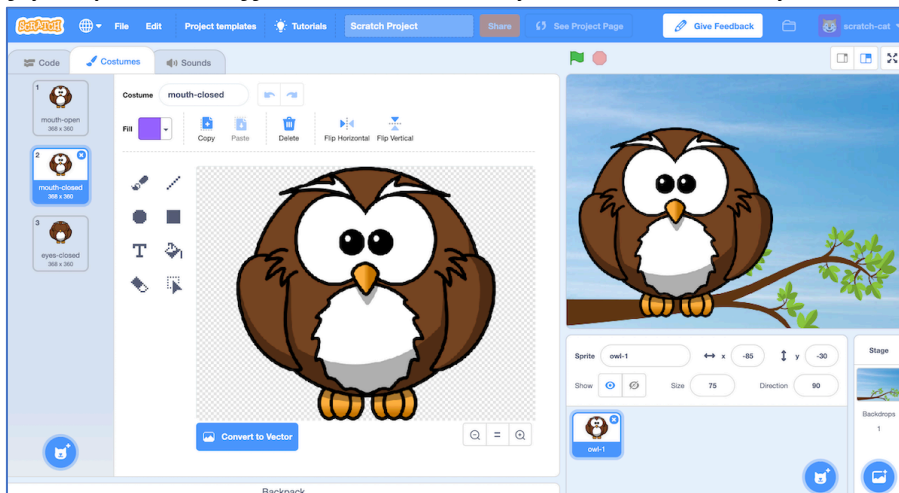
30. Fill in each copy of the block
Drag the label for one of your questions into the top space, and Type the answer to the question into the bottom space



- 31.** 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.

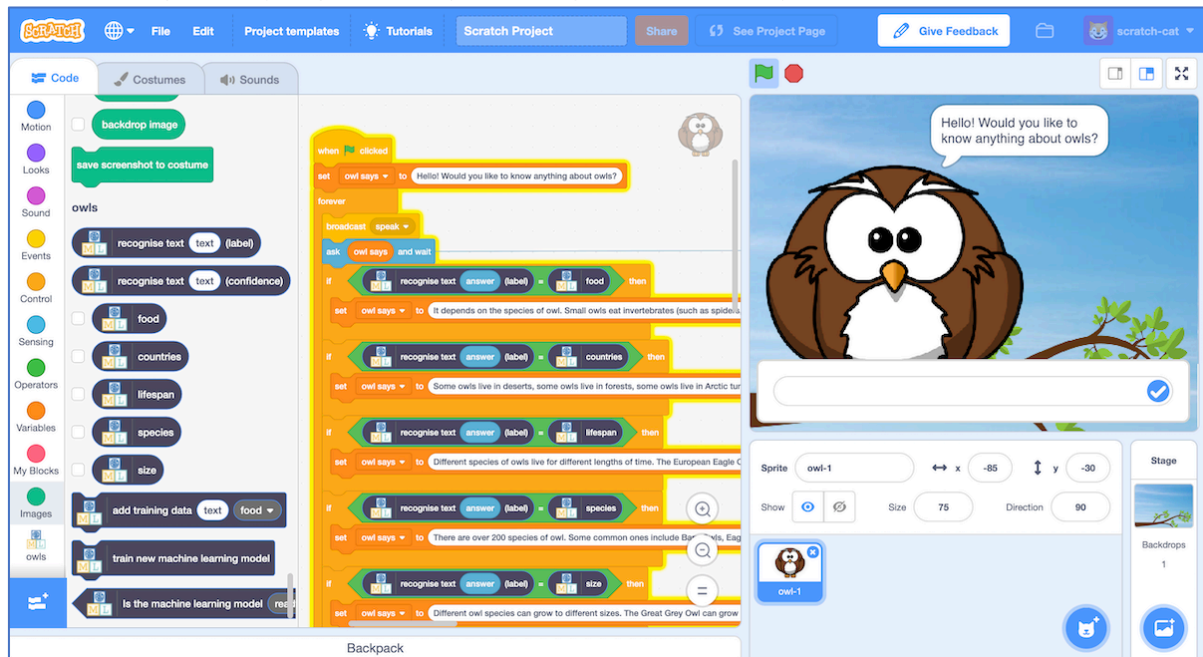


- 32.** Draw your chatbot
*Unless you've chosen **owls** as a topic, you'll need to draw your own character*
If you provide different costumes, you can animate your character while it talks.



33. Test your chatbot!

Click the green flag and try asking the owl a question



What have you done so far?

You've started to train a computer to recognise questions on a topic. Instead of trying to write rules to be able to do this, you did this by collecting examples. These examples were used to train a machine learning "model".

This is called "supervised learning" because of the way you are supervising the computer's training.

The computer will learn from patterns in the examples you've given it, such as the choice of words, and the way questions are structured. These will be used to be able to recognise new questions.

The biggest problem with this is that if you ask it something unexpected, it will still give you one of the answers you've written

- 34.** Create this little chunk of script, that you can use when someone asks a question that wasn't on your list from step 2.
*The confidence score is a percentage (from 0 to 100).
 It will be lower if someone asks a question that isn't similar to any of the examples you used to train the machine learning model.
 Use this to return a "I don't understand" message if the score is too low.*

```

if (recognise text answer (confidence) < 70) then
  set owl says to "Sorry, I don't understand. Ask me something else!"
else
  
```

- 35.** Add this into your script from before.

```

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 (confidence) < 70) then
      set owl says to "Sorry, I don't understand. Ask me something else!"
    else
      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..."
      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 u..."
      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..."
      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, Gr..."
      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 wings..."
  
```

Ideas and Extensions

Now that you've finished, why not give one of these ideas a try?

Or come up with one of your own?

Try other chatbots

<http://talktothetrex.com> is a good example of the sort of thing you've made. Give it a try to get ideas of how to improve your bot.

Add more topics

Can you add more topics to your chatbot, so that there are more types of question that it can answer?

Provide alternate answers

If someone asks the same question more than once, they'll get the exact same answer every time. Can you update your Scratch code so that it varies the answers each time a little? Or starts the answer with "You've asked me this before, but"

Ask follow-up questions

Can you update your Scratch script so that it replies with a question? It can then recognise the answer to that question, in a similar way to how you made it recognise questions.

Learn about how it works

Click on the "Describe your model" button on the "Learn & Test" page to learn more about how the model you've trained was created.